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1817

THE NEW INTERNATIONAL ENCYCLOPÆDIA

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VOLUME XIV

NEW YORK
DODD, MEAD AND COMPANY
1906

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V.14

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KEY TO PRONUNCIATION.

ā	**as in**	ale, fate. Also see *ĕ*, below.
ā̇	“ “	senate, chaotic. Also see *ĕ*, below.
â	“ “	glare, care.
ă	“ “	am, at.
ä	“ “	arm, father.
ȧ	“ “	ant, and final *a* in America, armada, etc. In rapid speech this vowel readily becomes more or less obscured and like the neutral vowel or a short u (ŭ).
a	“ “	final, regal, where it is of a neutral or obscure quality.
a̱	“ “	all, fall.
ē	“ “	eve.
ē̇	“ “	elate, evade.
ĕ	“ “	end, pet. The characters *ĕ*, *ā*, and *â* are used for *ä* in German, as in Gärtner, Gräfe, Hähnel, to the values of which they are the nearest English vowel sounds. The sound of Swedish *ä* is also indicated by *ĕ*.
ẽ	“ “	fern, her, and as *i* in sir. Also for *ö*, *oe*, in German, as in Göthe, Goethe, Ortel, Oertel, and for *eu* and *oeu* in French, as in Neufchâtel, Crèvecœur; to which it is the nearest English vowel sound.
e	“ “	agency, judgment, where it is of a neutral or obscure quality.
ī	“ “	ice, quiet.
ī̇	“ “	quiescent.
ĭ	“ “	ill, fit.
ō	“ “	old, sober.
ō̇	“ “	obey, sobriety.
ô	“ “	orb, nor.
ŏ	“ “	odd, forest, not.
o	“ “	atom, carol, where it has a neutral or obscure quality.
oi	“ “	oil, boil, and for *eu* in German, as in Feuerbach.
o͞o	“ “	food, fool, and as *u* in rude, rule.
ou	“ “	house, mouse.
ū	“ “	use, mule.
ū̇	“ “	unite.
ŭ	“ “	cut, but.
ụ	“ “	full, put, or as *oo* in foot, book. Also for *ü* in German, as in München, Müller, and *u* in French, as in Buchez, Budé; to which it is the nearest English vowel sound.
û	“ “	urn, burn.
y	“ “	yet, yield.
B	“ “	the Spanish Habana, Cordoba, where it is like a *v* made with the lips alone, instead of with the teeth and lips.
ch	“ “	chair, cheese.
D	as in	the Spanish Almodovar, pulgada, where it is nearly like *th* in English then, this.
g	“ “	go, get.
G	“ “	the German Landtag, and *ch* in Feuerbach, buch; where it is a guttural sound made with the back part of the tongue raised toward the soft palate, as in the sound made in clearing the throat.
H	as *j* in	the Spanish Jijona, *g* in the Spanish gila; where it is a fricative somewhat resembling the sound of *h* in English hue or *y* in yet, but stronger.
hw	“ *wh* in	which.
K	“ *ch* in	the German ich, Albrecht, and *g* in the German Arensberg, Mecklenburg; where it is a fricative sound made between the tongue and the hard palate toward which the tongue is raised. It resembles the sound of *h* in hue, or *y* in yet; or the sound made by beginning to pronounce a *k*, but not completing the stoppage of the breath. The character K is also used to indicate the rough aspirates or fricatives of some of the Oriental languages, as of kh in the word Khan.
n̲	as in	sinker, longer.
ng	“ “	sing, long.
N	“ “	the French bon, Bourbon, and *m* in the French Etampes; where it is equivalent to a nasalizing of the preceding vowel. This effect is approximately produced by attempting to pronounce ‘onion’ without touching the tip of the tongue to the roof of the mouth. The corresponding nasal of Portuguese is also indicated by N, as in the case of São Antão.
sh	“ “	shine, shut.
th	“ “	thrust, thin.
TH	“ “	then, this.
zh	as *z* in	azure, and *s* in pleasure.

An apostrophe ['] is sometimes used to denote a glide or neutral connecting vowel, as in tā'b'l (table), kăz''m (chasm).

Otherwise than as noted above, the letters used in the respellings for pronunciation are to receive their ordinary English sounds.

When the pronunciation is sufficiently shown by indicating the accented syllables, this is done without respelling; as in the case of very common English words, and words which are so spelled as to insure their correct pronunciation if they are correctly accented. See the article on PRONUNCIATION.

A PARTIAL LIST OF THE LEADING ARTICLES IN VOLUME XIV.

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THE NEW INTERNATIONAL ENCYCLOPÆDIA

MORGAN CITY. A city and port of entry in Saint Mary Parish, La., about 75 miles west by south of New Orleans, on the Southern Pacific Railroad. It is on the Atchafalaya Bayou, navigable for vessels of light draught, which extends from Grand Lake to the Gulf of Mexico, 20 miles distant; has regular steamship communication with important Gulf ports, and has extensive sugar, fish and oyster, and truck gardening interests. The city contains an interesting geological and botanical garden in Oneonta Park. Morgan City was formerly known as Brashear City. Here, on June 23, 1863, Richard Taylor, with about 3000 Confederates, captured the Federal garrison of about 1000, secured property worth about $2,000,000, and recaptured a large number of refugee blacks. Brashear was soon afterwards abandoned by the Confederates and reoccupied by the Federals. Population, in 1890, 2291; in 1900, 2332.

MOR'GANFIELD. A city and the county-seat of Union County, Ky., 25 miles southwest of Henderson, on the Illinois Central Railroad (Map: Kentucky, D 3). It has tobacco stemmeries, and manufactories of carriages and wagons, brick, flour, etc. Saint Vincent's Academy (Roman Catholic) is here. The waterworks are owned and operated by the city. Population, in 1890, 1094; in 1900, 2046.

MORGANTE MAGGIORE, môr-gän'tȧ mȧ-jō'rȧ, Il. A metrical romance by Luigi Pulci (q.v.).

MOR'GANTON. A town and the county-seat of Burke County, N. C., 79 miles west of Salisbury, on the Southern Railroad (Map: North Carolina, A 2). It is the seat of the State Hospital for the Insane and of the North Carolina School for the Deaf and Dumb, and has considerable reputation as a health resort. Among the principal manufactories are cotton mills, tanneries, lumber mills, and machine shops. There are gold deposits in the vicinity. Population, in 1890, 1557; in 1900, 1938.

MOR'GANTOWN. A city and the county-seat of Monongalia County, W. Va., 102 miles south of Pittsburg, Pa., on the Monongahela River, which is navigable to this point, and on the Baltimore and Ohio Railroad (Map: West Virginia, E 2). It has a fine court house, and is the seat of the West Virginia University (q.v.), established in 1868. There are glass works, furniture factories, woolen, planing, and flour mills, and brick and tile works. The city is in a rich agricultural, timber, natural gas, and mineral country—coal, iron, limestone, clay, and glass sand being found in paying quantities. Population, in 1890, 1011; in 1900, 1895.

MORGARTEN, môr'gär-ten. A mountain slope on the boundary of the cantons of Schwytz and Zug, Switzerland, celebrated as the scene of a great victory won by the Swiss forest cantons over a numerically superior force of Austrians, November 15, 1315. In January, 1314, the farmers of Schwytz had seized the Abbey of Einsiedeln, robbed it of its treasures, and driven out the monks. Frederick the Fair, head of the House of Hapsburg, who was the protector of Einsiedeln, ordered his brother, Duke Leopold, to punish the guilty ones. The battle was the result.

MORGEN, môr'gen, Kurt (1858—). A German soldier and explorer, born at Neisse (Silesia), Prussia. He was educated for the army at Wahlstatt and Berlin, and in 1889 took charge of an expedition for the exploration of Kamerun. On November 5 he left Kribi on the coast of Batanga. He discovered the Mbam River, the principal tributary of the Sanaga, and proceeded along the Sanaga as far as Malimba. On June 2, 1890, he again set out from Kribi. During this second expedition he penetrated to Tabati, and thence to Ibi on the Benue, from which point he descended the river to Akassa, on the coast. In 1896-97 he fought with the English army against the Mahdi, and in the latter year witnessed the Græco-Turkish War from the headquarters of the Ottoman army. He attained the rank of major in 1898.

MORGENSTERN, môr'gen-stĕrn, Christian (1805-67). A German landscape painter, born in Hamburg. He studied in his native city and at the Academy of Copenhagen, settled in 1830 at Munich, and acquired a reputation with his romantic views of the Bavarian and Austrian Alps. From a later period date the moonlight and storm scenes which constitute the most admired portion of his work, representative examples of which are a "Mill in Sainte Marie Valley, Alsace" (1836, Hamburg Gallery); "April Day on Lake Starnberg" (1853, Leipzig Museum); "Storm at Sea" (1839) and "Alsatian Landscape" (both in New Pinakothek, Munich).

MORGENSTERN, LINA (BAUER) (1830—). A German philanthropist and author, born in Breslau. In 1854 she removed to Berlin, where she became prominent as a reformer. She was interested in the formation of 'people's kitchens,' of technical and domestic schools for women, and of schools for the reform of wayward young girls. She edited *Deutsche Hausfrauenzeitung* (1874 sqq.) and *Für junge Mädchen* (1888-94), and wrote *Friedrich Fröbel* (1882), *Die Frauen des neunzehnten Jahrhunderts* (1888), and *Frauenarbeit in Deutschland* (1893).

MORGES, môrzh. A town in the Canton of Vaud, Switzerland, about six miles west of Lausanne, on Lake Geneva and on a branch of the Jura-Simplon railway (Map: Switzerland, A 2). There are Reformed and Catholic churches, a college with a Realschule, a casino with a library and a museum of natural history, and a high school for girls. The town contains an old château (twelfth century), once the seat of the Bernese governors and now used as an arsenal, and nearby is the château of Vufflens, said to have been erected by Queen Bertha of Swabia. Population, in 1900, 4438, of whom about 500 were Roman Catholics.

MORGHEN, môr'gĕn, RAFFAELLO (1758-1833). An Italian line engraver. He was born at Florence, June 19, 1758, the son and pupil of Filippo Morghen, and was also instructed by his uncle, Giovanni Elia Morghen. When twelve years old he engraved a good plate after the "Prophets" of Bandinelli, and at twenty he showed remarkable proficiency. He studied at Rome under Volpato, whose daughter he married in 1781. In the same year he engraved Raphael's "Poetry" and "Theology," then worked in conjunction with his father-in-law, assisting him in his "Parnassus," after Raphael. He was appointed professor at the Academy in Florence in 1793, became a member of the French Institute in 1803, and visited Paris in 1812, at the invitation of Napoleon, who conferred many honors upon him. His best known works include the "Aurora," after Guido Reni; the "Mass of Bolsena," "Madonna della Sedia," and "Transfiguration," after Raphael; "Diana Hunting," after Domenichino; the "Madonna del Sacco," after Andrea del Sarto; the "Dance of the Seasons," after Poussin; and the "Last Supper," after Leonardo, generally considered his masterpiece. Of high finish and special interest are also his portraits of Dante, Petrarch, Boccaccio, Ariosto, Tasso, Alfieri, Raphael, etc. He died in Florence, April 8, 1833. His life and all his works, comprising 252 plates, have been fully described by his pupil Palmerini, in *Catalogo delle opere d'intaglio di Raffaello Morghen* (Florence, 1824).

MOR'GIA'NA. A female slave, belonging to Cassius and then to his brother, in "Ali Baba and the Forty Thieves," a story in the *Arabian Nights Entertainments*. She outwitted the thieves in their attempts to find the discoverer of their cave first by duplicating their mark on Ali's house, then by scalding the Forty with hot oil in the jars in which they were smuggled into the house; and at last, when the captain, disguised as a merchant, dined with Ali, she first danced for him and then stabbed him with his own dagger. Ali freed her and married her to his son.

MORGUE (Fr., originally the inner wicket of a prison, where prisoners were kept for some time, that the jailers and turnkeys might view them at their leisure, so as to be able to recognize them when occasion required, from *morguer*, to look at solemnly or sourly, to defy). The name of a certain building in Paris, situated on the *Quai du Marché neuf*, where the dead bodies of persons unknown, found either in the river (Seine) or in the streets, are exposed to public view for three days. The corpses are put under a glass case, on a sloping slab of black marble. The clothes are hung on the wall above. When a corpse is recognized it is handed over to the relatives or friends of the deceased, on payment of costs and dues—otherwise it is interred at the expense of the city. The number of bodies yearly exposed in the *Morgue* is about 300, of which five-sixths are those of males. Morgues have been established in Berlin and in the principal American cities; in New York in 1866, in Boston in 1851, in Brooklyn in 1870, in Chicago in 1872, in Saint Louis in 1874.

MORHOF, mōr'hōf, DANIEL GEORG (1639-91). A German literary historian, born at Wismar. He studied law and the humanities at Rostock, where in 1660 he became professor of poetry. In 1665 he was called to the chair of oratory and poetry at Kiel and in 1673 became also professor of history and in 1680 librarian. His *Opera Poetica* (1677) and *Deutsche Gedichte* (1682) are valueless, but his two prose works, *Unterricht von der Deutschen Sprache und Poesie* (1682) and *Polyhistor* (1688) are of considerable interest in the history of literature. The former contains perhaps the first historical treatment of German grammar and a review of what was then modern European literature. The *Polyhistor*, which deals with general literature and is encyclopædic in scope, marks the first systematic study in Germany of the history of literature.

MORI, mō̆'rê. The name of the Lords of Choshu in Japan. The chief of the clan was foremost in the anti-foreign agitation which sought to close Japan again to the world (1858-67), after the demand for admission made by Commodore Perry, and in 1863 became known through his action in firing upon Dutch and American merchantmen passing through the Straits of Shimonoseki. In consequence, a squadron was formed and the town of Shimonoseki was bombarded. This helped to convince the Japanese that resistance was impossible and that the ancient policy of seclusion must be reversed. Mori continued the agitation, however, directing it against the Government of the *Shogun*, and was one of the chief factors in the restoration of the Emperor to supreme power. Since the revolution of 1868, the clansmen of Choshu have been highly influential in the Government, and as active in the adoption of Western civilization as they had been previously in opposition to its introduction.

MORI, mō′rē, Arinori (1848-89). A native of Satsuma, Japan, and one of the group of young samurai who were prominent in advocating the thorough modernization of the Empire after the restoration of the Emperor. Educated in England, he adopted modern manners in life and thought, and broke completely with the past. He held various high positions in the diplomatic and civil services, and became finally Minister of Education. He was raised to the peerage in 1889, with the title viscount. When the Constitution of Japan was promulgated, giving the Empire its place among progressive peoples, he was assassinated in his own house by a Shinto fanatic, who charged him with violating the sanctity of the shrine in Ise by lifting the curtain before the holy place with his cane.

MORI′AH. The name of the land whither Abraham was commanded to go to sacrifice his son Isaac upon a mountain, according to Gen. xxii. 2, and of the mountain upon which Solomon built the temple, acording to II. Chron. iii. 1. It is possible that the chronicler understood the passage in Genesis as affirming that Abraham's sacrifice was made in Jerusalem. He no doubt found 'the mountain of Moriah' as a designation of Zion, and it may already in his time have been popularly interpreted to mean 'the mountain of vision,' as it was by the Samaritan translator, Symmachus, and by Jerome. Originally it may have been pronounced *moreh Yah* and signified 'Yahweh is an oracle-giver,' or 'the Moriah' may have meant 'the oracle.' How old this name of the temple-mountain is cannot be determined. The Elohist in Gen. xxii. 2 refers to one of the mountains 'in the land of Moriah.' This particular shrine is called *Yahweh yireh,* 'Yahweh sees,' or *Yahweh yereh,* 'Yahweh gives oracles.' Bacon and Cheyne look for this sanctuary in the Negeb or Southern Palestine, and Gunkel thinks that it is identical with the Jeruel near Tekoa mentioned in II. Chron. xx. 16, though he admits that the distance from Beersheba does not preclude the identification with Jerusalem, and regards Ariel, a name of Jerusalem, as a corruption of Jeruel. It is possible that *Yahweh yereh* is an explanation of the meaning of Moriah, or that 'the Moriah,' 'the oracle,' is an appellative designation of a sanctuary also known by the kindred name Jeruel. But it is not certain that 'the land of Moriah' in Gen. xxii. 2 has anything to do with this sacred place. The Syriac version suggests that the original reading was 'the land of the Amorites.' 'Amorites' is the name of the pre-Israelitish inhabitants of Palestine used by the Elohist. It corresponded to the Assyrian Amurru or Martu, and the dropping of the prosthetic aleph can be easily accounted for. This explanation has the advantage of being based on very excellent ancient testimony to the pre-Massoretic text. Wellhausen thinks of 'the Hamorites' who lived in Shechem, in the neighborhood of which there was an *elon moreh* or 'sacred tree of the oracle-giver.' It is indeed doubtful whether the Ephraimitish writer would have made Jerusalem the great sanctuary where animal offerings were substituted for human sacrifices, and the change to 'Hamorites' is not necessary, since Shechem certainly was in the land of the Amorites. From the Jerahmeelite Negeb Shechem might be reached on the third day, though not so easily as. Jerusalem. The question of the site of the sacred mountain must therefore be left open. Consult: Dillmann, *Die Genesis* (6th ed., Leipzig, 1892); Gunkel, *Genesis* (Göttingen, 1901); Cheyne, article "Moriah," in *Encyclopædia Biblica,* vol. iii. (London, 1902).

MORIER, mō′rĭ-ẽr, James Justinian (c.1780-1849). A British diplomat, author, and traveler, born at Smyrna. He was educated at Harrow, and in 1807 became private secretary in Sir Harford Jones's mission to the Persian Court. On May 7, 1809, three months after his arrival at Teheran, he was sent home with dispatches and performed the famous journey of which he afterwards published an account under the title *A Journey Through Persia, Armenia, and Asia Minor to Constantinople in the Years 1808 and 1809* (1812). This book enjoyed a great vogue in Great Britain, and was translated into French (1813) and German (1815). In 1810 he went back to Teheran as Secretary of Legation under Sir Gore Ouseley, and after the latter's return to England in 1814 Morier acted for a time as British representative at the Court of Persia. He was recalled in 1815. In 1817 he was pensioned by the Government, and devoted most of his time thenceforth to literature, in which pursuit he attained such success that Sir Walter Scott styled him the best novelist of the day. His best works are: *The Adventures of Hajji Baba of Ispahan* (1824); *Zohrab the Hostage* (1832); and *Ayesha, the Maid of Kars* (1834).

MORIER, Sir Robert Burnett David (1826-93). An English diplomatist, born in Paris (where his father was consul-general), and educated at Balliol College, Oxford. After holding several other diplomatic offices, he was appointed chargé d'affaires at Stuttgart in 1871, and at Munich in 1872, whence he was transferred to Lisbon as English Minister (1876). When Morier was Ambassador to Saint Petersburg (1884-91) he and Bismarck were bitter enemies, and in 1888 Count Herbert Bismarck charged Morier with furnishing information to Bazaine at the outbreak of the Franco-Prussian War. Time showed that Morier had been innocent, and that French spies had gained the information in question. In 1891 he was transferred to Rome, but was forced by urgent business to remain in Russia.

MÖRIKE, mẽ′rĭ-ke, Eduard (1804-75). A German poet. He was born at Ludwigsburg, and studied theology at Tübingen, where from 1826 to 1843 he served as a clergyman. From 1851 to 1866 he was professor of German literature in a seminary at Stuttgart. One of the most prominent members of the Swabian school, he first appeared in 1832 with the fantastic tale *Maler Nolten* (revised in 1872, third edition 1890), which revealed his imaginative power. His collected *Gedichte* (1838, eleventh edition 1894) are marked not only by the idyllic cast common to the Swabian group, but by a delicate humor and a classical severity of form peculiarly their own. The exquisitely wrought novelette *Mozart auf der Reise nach Prag* (1856) has frequently been accounted his finest achievement. His further work includes the *Idylle vom Bodensee* (1846) and the caprice *Das Stutt-*

garter Hutzelmännlein (1855). Many of the poems are to-day established folk-songs. Consult the biographies by Notter (Stuttgart, 1875), Klaiber (ib., 1876), Maync (ib., 1901), and Fischer (Berlin, 1901).

MÖRIKOFER, mẽ′rĭ-kô′fẽr, JOHANN KASPAR (1799-1877). A Swiss literary and ecclesiastical historian, born at Frauenfeld. He studied at Zurich, taught in his birthplace, and was pastor at Gottlieben from 1851 to 1869. His historical works have scientific value and literary charm; they include *Die schweizerische Mundart im Verhältnis zur hochdeutschen Schriftsprache* (1838); *Klopstock in Zürich* (1851); *Die schweizerische Litteratur des achtzehnten Jahrhunderts* (1861); *Ulrich Zwingli* (1867-69); and *Geschichte der evangelischen Flüchtlinge in der Schweiz* (1876).

MORILLO, mô-rē′lyô, PABLO, Count of Cartagena and Marquis de la Puerta (1777-1838). A Spanish soldier. He was born in Fuentes de Malsa, in the Province of Toro, and entered the Spanish navy in 1793. During the war against Napoleon he raised a guerrilla corps, at the head of which he soon acquired fame, and became lieutenant-general. In 1815 he was placed in command of 12,000 men and sent to South America to conquer the insurgent provinces of Venezuela and New Granada. He speedily captured Caracas, Cartagena, and Bogotá, but met reverses later and was compelled to sign the armistice of Truxillo with Bolivar (1820). He returned to Spain, joined the Court party, and was believed to be one of the authors of an insurrection of the Guards in 1822. After this he went over to the patriots, obtained command of an army corps, changed back again, and submitted to the French (1823). Exiled by Ferdinand, he was recalled in 1832 and led an army against the Carlists. He published his *Mémoires* at Paris in 1826.

MORIN, mô′răN′, ARTHUR JULES (1795-1880). A French mathematician, born in Paris. He studied at the Ecole Polytechnique and at the Ecole d'Application in Metz, and in 1819 was commissioned lieutenant in an engineer battalion. He was professor at the Conservatoire des Arts et Métiers, and after 1847 its director. He devoted his attention to mechanics, and by his researches and inventions contributed materially to the progress of that science. The results of his labors are embodied in memoirs which he contributed to the *Comptes rendus de l'Académie des sciences de Paris*, and in a number of separate publications, among which are: *Aide-mémoire de mécanique pratique* (1838); *Salubrité des habitations* (2d ed. 1874); and *Fundamental Ideas of Mechanics and Experimental Data*, . . . translated by J. Bennet (New York, 1860).

MORIN, mô-rēn′, ENRICO CONSTANTINO (1841—). An Italian naval officer and statesman, born in Genoa. He rose through successive grades to that of vice-admiral (1893). In 1886 he was elected from Florence to the Chamber of Deputies, from 1888 to 1891 was Under-Secretary of State in the Ministry of Marine, in which post he urged an increase of the navy, and from 1893 to 1896 was Minister of Marine. He was appointed Senator in 1900, and in the same year again became Minister of Marine.

MORINUS, mô′rē′nụ′, JOHANNES, or JEAN MORIN (1591-1695). A French Catholic theologian and Orientalist, born at Blois of Protestant parents. He was educated at Leyden and at Paris, where he entered the Catholic Church, and in 1618 joined the Oratorians. He was head of the College of Angers, and in 1640 was summoned to Rome by Urban VIII. to assist in discussing the union of the Eastern and Western churches. He was suddenly recalled by Richelieu, who possibly feared that Morin would speak ill of him at Rome. Besides his works on Church history, and more important, Morin wrote on text criticism: *Exercitationes Ecclesiasticæ et Biblicæ* (1686, containing two earlier works of 1631 and 1639), which urges the priority and superiority of the Samaritan Pentateuch; *Opuscula Hebræo-Samaritica* (1657), with grammar and lexicon; and in Le Jay's *Polyglotte*, an edition of the Samaritan Pentateuch.

MORIOKA, mō′rê-ō′kȧ. The capital of the Prefecture of Iwate, Japan, situated in a mountainous district in the northern part of Hondo, about 40 miles from the coast (Map: Japan, G 4). It is celebrated for its kettles, silk goods, fruits, and vegetables. Population, in 1898, 32,989.

MORIORI, mō′rê-ō′rê. The aborigines of the Chatham Islands, linguistically and somatically close kinsmen of the Maori (q.v.). Their crania are distinctly more Polynesian than Melanesian, and some authorities see traces of race mixture in certain osteological peculiarities. Some anthropologists regard the Moriori as only a branch of the Maori, who reached the Chatham Islands before tattooing had come into general use or the carving and ornamentation of the New Zealand Maori had taken on their characteristic development. Tradition, supported by other indications, suggests two migrations to these islands, one before and the other after Maori art had become matured. The flat stone clubs of the Chatham Islanders are supposed to go back to the dark people who preceded them. The best stone axes of the Moriori exceed in fineness of polish those of the Maori. The general conclusion is that the culture of the Chatham Islanders is an outspur of that of New Zealand. Such marked peculiarities as exist are due to the poverty and limitations of the group. The influence of the antecedent 'dark race' is more marked there than in New Zealand itself. In 1831 they are said to have numbered 1200 to 1500; but the inroads of Maori from the Taranaki District of New Zealand in 1832-35 led almost to their extermination, and there were but 200 left in 1868. In 1889 the islands were reported to contain 27 pure-blooded Moriori, 5 half-bloods, 250 Maori, and a few Europeans. In 1896 their number was estimated at 30 to 50; but Schauinsland, who visited them in 1897, thought it not over 16 to 25.

MORISCOS, mô-rē′skôs (Sp., Moorish men). The name given in Spain after 1492 to those Moors who through intimidation or force were brought over to Christianity. See MOORS; SPAIN.

MOR′ISON, JAMES (1816-93). A Scotch clergyman, founder of the Evangelical Union. He was born at Bathgate, Linlithgowshire, February 14, 1816. He was educated at Edinburgh, and licensed to preach as a minister of the United Secession Church in 1839. In 1841 he was deposed for holding and advocating 'universal atonement.' With three other ministers of like views and their followers, he formed the Evangelical Union (q.v.). At the same time he established a theological academy, of which he continued principal till his death. He was pastor first of Kilmarnock, and from 1853 to 1884 in Glasgow, where he died, November 13, 1893. Consult his *Life* by A. Adamson (London, 1898).

MORISON, James Augustus Cotter (1832-88). An English author, born in London. His childhood was spent in Paris (1834-40), and he gained an intimate knowledge of French. An Oxford graduate (1859), he wrote for the *Saturday Review,* and in 1863 brought out a *Life of Saint Bernard,* followed by sketches of *Gibbon* (1878), *Macaulay* (1882), and *Mme. de Maintenon* (1885), while his last work, *The Service of Man: An Essay Towards the Religion of the Future* (1886), was the outcome of his Positivist beliefs. Morison was a founder and joint owner of the *Fortnightly Review.*

MORISON, Robert (1620-83). A British botanist, born at Aberdeen. He graduated at the university of his native city in 1638, but the next year, having taken up arms in the Royalist cause, he was compelled to flee to France. There he studied anatomy, zoölogy, botany, mineralogy, and chemistry, and in 1648 took the degree of M.D. at Angers. A year or two later Gaston, Duke of Orleans, appointed him one of his physicians, a position which he held until the Duke's death in 1660, and in which he made such a reputation that after the Restoration Charles II. appointed him his senior physician, King's botanist, and superintendent of all the royal gardens. In 1669 he became professor of botany at Oxford. His great service to botany was in classification, in which connection Franchet says of him that his works make an epoch in botanical literature. Among these are: *Præludia Botanica* (1669); *Plantarum Umbelliferarum Distributio Nova* (1672); and *Plantarum Historiæ Universalis Oxoniensis, Pars Secunda* (1680). Consult: Pulteney, *Sketches of the Progress of Botany* (London, 1790); Tournefort, *Eléments de botanique* (Lyons, 1797; in Latin, Paris, 1700); and Franchet, *Flore de Loir-et-Cher.*

MORITZ, mō'rĭts, Karl Philipp (1756-93). A German author, prominent in the Sturm-und-Drang period. He was born at Hameln, of poor parents. He taught for a short time at Dessau (1777), then at a military orphanage at Potsdam (1778), and soon after in Berlin. In 1786 he went to Italy, and in Rome became acquainted with Goethe, who recommended him to Duke Karl August, by whose influence Moritz was elected to the Berlin Academy, and in 1789 became professor of antiquities in the Academy of Art in Berlin. His adventurous life can to a great degree be reconstructed from the semi-biographical novels, *Anton Reiser* (1785-90) and *Andreas Hartknopf* (1786). He wrote, besides: *Versuch einer deutschen Prosodie* (1786); *Ueber die bildende Nachahmung des Schönen* (1788); *Götterlehre* (1791); *Reisen eines Deutschen in England* (1783); and *Reisen eines Deutschen in Italien* (1792-93). Consult Dessoir, *Moritz als Aesthetiker* (Berlin, 1889).

MORLACCHI, mōr-läk'kā, Francesco (1784-1841). An Italian composer, famous for his advanced style of composition, which has been described as a classical blending of Italian vivacity and methods with German contrapuntal profundity. He studied under Mazzetti, Caruso, Padre, Martini, and Zingarelli. His compositions include a coronation cantata, considerable church music, organ pieces, songs, chamber music, masses, and grand operas. In 1810 he became kapellmeister of the Italian opera at Dresden, where he is said to have composed his best work. His oratorios, *Isacco* (1817) and *La morte di Abele* (1821), are representative. He died at Innsbruck.

MORLAIX, mōr'lā'. The capital of an arrondissement and a seaport in the Department of Finistère, France, on the estuary of the Dossen, 6½ miles from the sea, and 38 miles east-northeast of Brest (Map: France, C 3). The estuary is spanned by a fine railway viaduct 934 feet long and 190 feet high. The town has a mediæval aspect, with its fifteenth-century church of Saint Mélaine, its narrow winding streets, and its quaintly gabled timbered houses. The port is accessible to ships of 400 tons burden. A considerable coastwise trade is carried on in horses, agricultural produce, leather, and paper. The industrial establishments include paper mills and an important Government tobacco factory. Population, in 1900, 16,086. Morlaix dates from the Roman occupation. In 1187 it was besieged and captured by Henry II. of England. In 1522 it was taken by the troops of Henry VIII. of England, but recaptured by the French in a night attack, when 600 Englishmen were killed.

MOR'LAKS. A Slavonic people belonging to the southern branch, and living along the coast of Dalmatia, Austria-Hungary. They settled in this locality during the great southern migration of the Serbs from the Carpathian region in the sixth and seventh centuries. They are a hardy, seafaring people, who furnish the best material for the Austrian Navy, and are prominent in the commerce of the Adriatic. They are generally classed with the Dalmatians. See Dalmatia.

MOR'LAND, George (1763-1804). An English genre, animal, and landscape painter, born in London. He inherited talent from his father, Henry Morland (1712-97), painter, engraver, and picture dealer, who gave him a good training. At sixteen he exhibited at the Royal Academy, and at seventeen he had attained a reputation as a copyist, especially of the Dutch and Flemish masters. After a rupture with his father he set up on his own account in 1784 or 1785, and dashed into a career of dissipation and prodigality, supporting himself by the sale of his pictures, painted with marvelous rapidity and cleverness. He lived with a picture dealer, and became the companion of hostlers, pot-boys, jockeys, pawnbrokers, and pugilists. In 1786 he married the sister of the engraver William Ward, and for a time reformed. At this period he painted many moralities in the style of Hogarth; but he soon returned to his profligate life, and produced his masterpiece, the "Interior of a Stable" (1791), now in the National Gallery, London. He became popular, and dealers flocked to him. Sometimes he painted two pictures a day, and once a large landscape with six figures in six hours. Every demand for money, tavern score, or bill was paid by a picture worth twice the charge. His subjects were scenes in humble life in town and country—cottages, stables, inn-yards, pastoral scenes, and domestic animals, especially pigs. Altogether he painted 4000 pictures, 250 of which were engraved. He died in a sponging-house in Holborn, October 27, 1804. His epitaph on himself was, "Here lies a drunken dog." He was generous, good-natured, and industrious despite his faults.

After a period of neglect Morland is now ranked among the best masters of genre and animals, not far below the Dutch artists on whom he modeled his style. He was a fine brushman; his color is rich, and his treatment, if light, is skillful. His representation is realistic and true to life. In the South Kensington Museum are six of his paintings, the best known of which is "The Reckoning." The Museum of Glasgow contains a "River Scene" and three seacoast landscapes. In the New York Historical Society are his "Old English Sportsman" and "Dogs Fighting;" in the Metropolitan Museum, "Midday Meal" and "Weary Wayfarers." His autoportrait is in the National Portrait Gallery, London. Consult: His *Life*, by George Dawe (London, 1807); his *Memoirs*, by Blogdon and Hassel (ib., 1806); William Collins, *Memoirs of a Picture* (London, 1803).

MORLAND, Sir Samuel (1625-95). An English diplomat and inventor. He was born in Sulhampstead, Berkshire, and studied at Winchester School and at Magdalene College, Cambridge. His first mission of importance was to the Duke of Savoy in 1655, to protest against the massacre of the Waldensians. Morland brought back with him materials, mostly clumsy forgeries, for a history of this sect, which he published in 1658. After the Restoration Morland received the title of baronet and many empty promises from the King. He devoted himself more and more to the study of mathematics and mechanics, and invented a speaking trumpet and some calculating machines. But his more important work was in hydrostatics, and especially in devising a steam pump.

MOR'LEY. A municipal borough in the West Riding of Yorkshire, England, four miles south-southwest of Leeds (Map: England, E 3). The new town-hall is a handsome building, and the municipality owns its waterworks, gas and electric lighting plants, maintains public baths, parks, and recreation grounds. It has important manufactures of woolens and mill machinery. There are coal mines and stone quarries. Morley is mentioned in *Domesday*, and in a tax list of Richard II. It was incorporated in 1885. Population, in 1891, 21,000; in 1901, 23,600. Consult Smith, *Morley, Ancient and Modern* (London, 1886).

MORLEY, Edward Williams (1838—). An American chemist, born at Newark, N. J. He graduated from Williams College in 1860, and in 1869 became professor of chemistry at Western Reserve College (afterwards Adelbert College). With this post he also held (1873-88) a chair of chemistry at the Cleveland Medical College. He was associated with A. A. Michelson in researches on the relative motion of ether and matter, and also in the determination of the meter in terms of the wave length of light. He was president of the American Association for the Advancement of Science (1895) and of the American Chemical Society (1899), and was elected a member of the National Academy of Sciences and associate of the American Academy of Science. In the proceedings of the latter academy for 1880 he first described his valuable apparatus for gas analysis; he also wrote *Atomic Weight of Oxygen* (1895).

MORLEY, Henry (1822-94). An English author, born in London, September 15, 1822. He was educated at a Moravian school at Neuwied on the Rhine, and at King's College, London (1838-43); practiced medicine at Madeley, in Shropshire (1844-48); and, having been fleeced by a colleague, he started a school on Moravian methods at Manchester, but after two years he started it afresh at Liverpool. A series of ironical essays entitled *How to Make Home Unhealthy* attracted the attention of Dickens, and eventually led to Morley's settling in London and taking a hand in *Household Words* and *All the Year Round* (1850-65). He also became connected with the *Examiner* as sub-editor and then as editor (1856-64). Meanwhile he was appointed lecturer in English at King's College (1857-65), and then professor of English at University College, London (1865-89). He died May 14, 1894. Chief among Morley's works are: *A Defence of Ignorance* (1851), a bit of irony; *Lives* of Palissy the Potter (1852), Jerome Cardan (1854), and Cornelius Agrippa (1856); *Memoirs of Bartholomew Fair* (1857); two volumes of fairy tales (1859-60); *English Writers*, to Dunbar (1864-67), rewritten and brought down to the seventeenth century (11 vols., 1887-95); *A First Sketch of English Literature* (1873; rev. 1886); and *English Literature in the Reign of Victoria* (1881). He also edited a *Library of English Literature* (5 vols., 1875-81); *Universal Library* (63 vols., 1883-88); *Cassell's National Library* (214 vols., 1886-90); and the *Carisbrooke Library*, a series of reprints (14 vols., 1889-91). Though Morley was not a critic and editor of the first rank, he had catholic tastes, a talent for finding the best in things, and he performed a most valuable service in making easily accessible the treasures of English literature.

MORLEY, John (1838—). An English statesman and author, born at Blackburn, in Lancashire, December 24, 1838. Having taken his degree at Lincoln College, Oxford (1859), he went to London to engage in literature. He soon became editor of the *Literary Gazette*, at that time in such a state of decrepitude that Morley, with all his energy and talent, could not quicken it to new life. His writings soon showed the influence of Auguste Comte, and he became known as an agnostic philosopher. From 1868 to 1870 he edited for a little while the daily *Morning Star*. In 1867 he succeeded Lewes as editor of the *Fortnightly Review*, which he conducted brilliantly till 1883, becoming, in that year, editor of *Macmillan's Magazine.* Under his guidance the Macmillans have issued since 1878 the "English Men of Letters Series," to which Morley contributed a short but excellent *Life of Edmund Burke* (1879). His *Burke*, an historical study, appeared in 1867. In 1880 he began ably to edit the *Pall Mall Gazette;* in 1881 he published his *Life of Cobden;* and in 1883, after two failures, he was at a by-election returned to Parliament for Newcastle-upon-Tyne. He soon became prominent, and in 1886 he was made Secretary for Ireland under Gladstone, thus getting an insight into Gladstonian politics and character to be shown later in his *Life of Gladstone* (1903). Morley sympathized with the Irish Nationalists, but, unlike Gladstone, he was unhampered by pledges and opinions. On the defeat of the Gladstonians in 1886 he was half in politics, half in letters, till Gladstone's return to power restored him to his former office. Morley's anti-imperialistic views helped to lose him his seat in 1895, but he was soon reëlected from the Montrose Burghs, Scotland. In 1898 and afterwards he upheld the Boers. Besides the books already mentioned, Morley is the author of monographs on *Voltaire* (1872), *Rousseau* (1873), one of the most sympathetic biographies ever written, *Diderot and the Encyclopædists* (1878), and *Walpole* (1889). In *Cromwell* (1900) he added something to historical knowledge, though his work is mainly a revision of Gardiner. In 1902 Andrew Carnegie presented to him the rich historical collection of Lord Acton, recently deceased, and Morley in turn presented it to Oxford University.

MORLEY, Mrs. The name adopted by Queen Anne in her correspondence with the Duchess of Marlborough. See **Freeman, Mrs.**

MORLEY, Thomas (1557-c.1604). An English musician and composer. The place of his birth cannot be definitely fixed, but it is supposed that he was born in London and educated at Saint Paul's Cathedral. According to his own statement he also studied under Bird. In 1588 he became bachelor of music at Oxford and in 1591 was deputy chorister at Saint Paul's, taking his regular turn of duty as organist. In 1592 he was made epistler of the Chapel Royal. He strove hard during his entire career for the advancement of English music, and devoted himself exclusively to the development of vocal music. His principal work and that upon which his reputation is chiefly based was *A Plaine and Easie Introduction to Practicall Musicke*, published in 1597. It was the first practical work on music issued in England; was translated into German and published throughout the German States by Trost of Halberstadt about 1660. In England it remained an authority up to so late a period as 1770. He wrote many compositions for the Church, none of them, however, being printed in his lifetime. Tallis's monopoly of music-printing expired in 1596 and two years later Morley obtained a similar one, and under his license "William Barley, Thomas Est, *alias* Snodham, Peter Short, John Windet, and others," printed several books as the "assigne of Thomas Morley." He resigned from the Chapel Royal in 1602. That he was an excellent musician his ballets and madrigals prove. He was also superior in melodic invention to any of his predecessors, and is generally credited with having disentangled music from the fettered condition in which he found it, and to have broken away from the slavish adherence to the 'Modes' which had characterized other composers. From his time forward composers designedly wrote melodies meant to express the emotional content of the text.

MOR'MOLUCOI'DES (Neo-Lat. nom. pl., from *mormoluca*, glowworm, from Gk. *μορμολύκειον*, *mormolykeion*, *μορμολύκιον*, *mormolykion*, hobgoblin, from *μορμολύττεσθαι*, *mormolyttesthai*, to frighten, from *μορμώ*, *mormō*, bugbear + *εἶδος*, *eidos*, form). The oldest known fossil insect larva, found in the shale of the Newark formation of the Jura-Triassic system in New Jersey, Connecticut, and Massachusetts. In general appearance it resembles the larva of the modern firefly, though it is considerably larger, being quite three-quarters of an inch in length. It is considered to be the young of a neuropteran insect allied to the modern dobsons (*Sialidæ*).

MORMON CRICKET. Either of the wingless migratory crickets, *Anabrus simplex* and *Anabrus purpurescens*. These are large, peculiarly shaped crickets, which occasionally multiply so greatly in their native home in the foothills of the Rocky Mountains that they migrate to the plains below, and destroy all cultivated crops. As they are wingless, they move but slowly, and may often be checked by ditches. A plowed field in their course forms a difficult barrier, and an approaching army may be destroyed by means of heavy rollers. They are pugnacious and will fight among themselves, and are to a certain extent carnivorous, devouring their injured comrades. For many years they have been especially abundant and injurious in portions of Montana and Idaho.

MORMONS, or more properly **The Church of Jesus Christ of Latter-Day Saints.** A religious sect of the United States. The early history of the Mormons is that of their founder, Joseph Smith, Jr., who was born at Sharon, Windsor County, Vt., December 23, 1805. According to contemporary anti-Mormon descriptions, or to the suppressed accounts of early Mormon apologists, Joseph's paternal grandfather was a man of distorted religious views; his maternal grandfather, Solomon Mack, was an infirm beggar, and superstitious to a high degree. Joseph's mother believed in cures by faith and in dreams as heavenly admonitions. The Prophet's father, after failing as a farmer, a storekeeper, and a root-digger in Vermont and New Hampshire, took up a land claim in Ontario County, N. Y., in 1815. Like his son, he was a confessed believer in witchcraft and demon possession. In his autobiography Smith called these the reports of evil-disposed and designing persons; by the later church historians they are either palliated or deprived of significance; however, to the student of heredity these details of Smith's ancestry are considered essential to a pathological estimate of his character. The Mormons quote, only to refute, the hostile statements that Smith was a visionary, a fanatic, an impostor, and a libertine; instead, they esteem him a prophet, a seer, a vicegerent of God, and a martyr (*Times and Seasons*, v. 856). They grant that Joseph's education was defective and that as a boy he could hardly write his name. He himself asserted that he was 'a rough stone' and desired 'the learning of heaven alone.' His mother said of him that in his nineteenth year he had never read the Bible through.

The 'conversion' of Joseph took place in 1820 near Palmyra. It was a time of great local excitement on the subject of religion. Joseph had retired to a solitary place and knelt in prayer to God. He fell into a trance, and was seized with a feeling of great depression and terror. "Just at this moment of great alarm," he continues in his description of the event, "I saw a pillar of light exactly over my head, above the brightness of the sun, which descended gradually until it fell upon me. When the light rested upon me, I saw two personages whose brightness and glory defy all description, standing above me in the air. One of them spake unto me. . . . When I came to myself again I found myself lying on my back, looking up into heaven." The second of the 'visions of Joseph' took place on September 21, 1823, when the heavenly messenger disclosed the hiding place of the gold plates upon which the *Book of Mormon* was asserted to be engraved. There was a series of seven visions in all, which extend over as many years, and which, as in the case of Mohammed, have been attributed by some to epilepsy.

Connected with these trances is the so-called "transcription of the gold plates." As a money-digger among Indian mounds young Smith made use of a 'peek-stone.' This became the famous 'Urim and Thummim,' whereby "Joseph the Seer translated the reformed Egyptian of the plates of Nephi." Students of abnormal psychology infer from recent investigation of the original document with its sprawling superscription 'Caractors' that it is analogous to the automatic writing of the semi-hypnotized crystal gazer, and urge that Smith's later methods of 'translating' bear out this supposition of a sub-conscious activity. Throwing himself into a condition of revery by gazing into his 'interpreters,' he dictated to his scribes what appeared to him to be communications of supernatural origin. Such an interpretation of Joseph's visions in terms of abnormal psychology is thought blasphemous by the Saints. They hold the records to be divinely inspired, while Smith compared his peculiar psychic experiences to those of Saint Paul. Of Smith's writings the first was the *Book of Mormon*, begun in September, 1827, at Manchester, N. Y., continued at Harmony, Pa., and finished at Fayette, N. Y., June, 1829. The original manuscript has disappeared. There remains only a duplicate made by Smith's principal scribe, the schoolmaster Oliver Cowdery. The first edition was printed at Palmyra in 1830. Two other editions were published within ten years. The fifteen books of this "Sacred History of Ancient America from the Earliest Ages After the Flood to the Beginning of the Fifth Century of the Christian Era" Smith himself thus summarized: "The history of America is unfolded from its first settlement by a colony that came from the Tower of Babel to the beginning of the fifth century of the Christian Era. We are informed by these records that America, in ancient times, has been inhabited by two distinct races of people. The first were called Jaredites, and came directly from the Tower of Babel. The second race came directly from the city of Jerusalem, about six hundred years before Christ. The Jaredites were destroyed about the time that the Israelites came from Jerusalem. The principal nation of the second race fell in battle toward the close of the fourth century. The remnant are the Indians. This book also tells us that our Saviour made His appearance upon this continent after His resurrection; that He planted the Gospel here in all its fullness and richness and power and blessing; that they had apostles, prophets, pastors, teachers, and evangelists; the same order, the same priesthood, the same ordinances, gifts, powers, and blessing, as was enjoyed on the Eastern Continent; that the people were cut off in consequence of their transgressions; that the last of their prophets who existed among them was commanded to write an abridgment of their prophecies, history, etc., and to hide it up in the earth."

Certain adverse critics dismiss the *Book of Mormon* as a mere hodge-podge of petty information, gross anachronisms, and biblical borrowings; this, in the opinion of another class of adverse critics, is to miss its significance both as a cryptic biography and as a characteristic bit of provincial Americana. The latter declare that in addition to private affairs inadvertently incorporated there are water marks of some historic interest to be found in the document. They detect, in Scriptural paraphrase, descriptions of the current agitations against Romanism, infidelity, and Freemasonry, and even references to the so-called Washingtonian movement for total abstinence. The widely prevalent theory that the Indians were the lost ten tribes of Israel is also embodied. The Nephites were not merely the modern red men in disguise, but in their mental habits they intimately resembled local sectarians. The speech of Nephi contains quotations from the Westminster Confession of Faith, and the speech of Lehi reflects the heretical tenets charged against the Presbytery of Geneva, in whose bounds Joseph himself lived. Applying the methods of the higher criticism, unbelievers note that the book is filled with the catchwords of the Methodist camp-meeting exhorter, and cite in particular the last section of the *Book of Mormon*, from its likeness to a Methodist book of discipline, as final proof of the writer's dependence on local theology. Believing the *Book of Mormon* to be the veritable word of God delivered through verbal inspiration, the Mormon apologists consider it unwarrantable to apply the higher criticism to their bible. Nevertheless such criticism renders untenable previous arguments against the authenticity of the work.

The ideas in the book were within the young author's ken. His Calvinism need not have been formally derived from the *New England Primer*, nor his arguments on Deism from Thomas Paine's *Age of Reason*, since the backwoods pulpit and the political gossip of the taverns supplied these notions. If the internal evidence makes the *Book of Mormon* indigenous, the external evidence is equally against a foreign authorship as presented in the ordinary Spaulding-Rigdon theory. This is, briefly, that a romance of prehistoric America, written in Ohio in 1812 by a Congregational minister, Solomon Spaulding, was the 'source, root, and inspiration' by which Smith's associate, Sidney Rigdon, concocted the scheme of a Golden Bible. The recovery in 1885 of the alleged original of Spaulding's "Manuscript Story" has been to the Mormons conclusive proof of its non-connection with the *Book of Mormon*, for there is no real resemblance between the two.

The day of the founding of the Mormon Church was April 6, 1830. On that day Smith claimed to have received a revelation beginning: "Thou shalt be called a seer, a translator, a prophet, an apostle." This is a characteristic sentence from the second half of the Mormon canon, the *Book of Commandments*. This rarest of original Mormon sources is in part a book of discipline, containing the "Articles and Covenants of the Church of Christ." To add to the confusion of contents, this pamphlet of 55 chapters has its biographical side. Like its enlargement, the revamped *Book of Doctrine and Covenants*, it comprises "revelations to Joseph Smith, Jr., for the building up of the Kingdom of God in the last days." Concerning the origin of these vaticinations, David Whitmer, the third witness of the gold plates, asserted that the revelations were given through the stone through which the *Book of Mormon* was translated, and Parley P. Pratt described how "each sentence was uttered slowly and very distinctly." Smith himself was more cautious as to the divine origin of his messages, saying, "We never inquire for special revelation only in case of there being no previous revelation to suit the case."

The local receptiveness, at that time, to new religious ideas is manifest by the success of other leaders. Jemima Wilkinson prophesied at Crooked Lake; William Miller predicted the end of the world at Rochester; and the Fox sisters started Spiritualism only ten miles from Joseph Smith's home. The return of apostolic gifts was hoped for by the local Quakers, Primitive Baptists, and Restorationists. A half-year later, during the revivalistic meetings of the Mormons at Kirtland, remarkable religious phenomena were reported.

The Kirtland revival was the turning point in the life of the infant Church. Because of it there came a "revelation to the churches in New York, commanding them to remove to Ohio." It was now that Sidney Rigdon played his part in the Latter-Day movement. He had been a Baptist preacher in Pittsburg, and a minister of the Disciples' Church in Ohio. He organized at Kirtland a branch of Saints of one hundred members, and in February, 1831, Smith betook himself thither. David Whitmer asserts that Rigdon soon obtained more influence over Smith than any other man living. In exchange for the home-made Mormon Bible, Rigdon gave a foreign framework to the Mormon Church. He got hold of some of the transplanted ideas of Fourier the French collectivist. Nineteen families in Rigdon's neighborhood had already formed themselves into a common stock company. A revelation of February, 1831, runs: "Thou shalt consecrate all thy properties which thou hast to impart unto me with a covenant and a deed which cannot be broken; the bishop shall appoint every man a steward over his own property, inasmuch as is sufficient for himself and family; the residue shall be kept in my storehouse, to administer to the poor and needy, and for the purpose of purchasing lands, and the building up of the New Jerusalem."

Smith's Ohio business enterprises brought financial loss. He first opened a general store at Hiram which failed. Land speculation also brought loss. Three farms at Kirtland, costing over $11,000, were to be turned into a permanent city of Zion with 32 streets. Like the Church tannery and the Church sawmill, this paper city had no financial foundation. At the same time a $40,000 temple was begun (the corner-stone was laid July 23, 1833), and although most of the Saints gave one-seventh of their time to its building without pay, a debt of from $15,000 to $20,000 was left upon it. Meanwhile an attempt was made to prevent financial disaster by establishing the Kirtland Safety Society Bank. Reorganized in 1837 as the Kirtland Society Anti-Banking Company and uttering at least $200,000 of its notes, the crash came within ten months, and Secretary Rigdon and Treasurer Smith fled to Missouri.

As president of the Church in Ohio, Smith's communistic ambitions were mingled with hierarchical schemes. Besides the United Firm and the Safety Bank, in 1833 he dedicated to the Lord the printing office of the *Latter-Day Saints' Messenger and Advocate*. In 1834 he organized the First High Council of the Church of Christ, with himself, Rigdon, and Williams as the First Presidency. In 1835 he chose the Twelve Apostles, among whom were Brigham Young, the Lion of the Lord; Parley Pratt, the Archer of Paradise; and Lyman Wright, the Wild Ram of the Mountain. In 1836 Smith instituted the several quorums or executive bodies of the Church, first the Presidency, then the Twelve, and the Seventy, also the counselors of Kirtland and Zion. In 1837 he set apart Apostles Kimball and Hyde to go on a mission to England, the first foreign mission of the Church.

In 1832, as a prophet of woe urging the Saints to sell all they had and flee from the wrath to come, Smith brought the mob upon himself and Rigdon at the town of Hiram. In the great apostasy of 1836 the Church lost some of its pillars. The three witnesses to the *Book of Mormon* were soon cut off. In the bull of excommunication David Whitmer, the anti-polygamist, was compared to Balaam's ass; Martin Harris was called a negro with a white skin, while all the "dissenters," says the Prophet, "are so far beneath my contempt that to notice any of them would be too great a sacrifice for a gentleman to make."

While the Saints were yet in Ohio there is evidence that polygamy was both practiced and sanctioned by those highest in authority. The Reorganized Church of Latter-Day Saints under the leadership of the Prophet's son, Joseph Smith, 3d, has claimed that the doctrine of 'spiritual wifery' was introduced, not by the Prophet, but by the older men, notably Hurlburt, Bennett, and Rigdon. The real acts of these scapegoats may never be known, for their testimony as to Smith's implication in their practices was declared unprintable. Hence what remains of the evidence against the Prophet is merely circumstantial, and is to be counterbalanced by his early attempts at ostensible suppression. In October, 1831, Smith admonished William E. McLellin through a revelation: "Commit not adultery, a temptation with which thou hast been troubled." In July, 1833, Smith wrote to the brethren in Zion to "guard against evils which may arise from accounts given of women." In 1835 the *Book of Doctrine and Covenants* declared: "Inasmuch as this Church of Christ has been reproached with the crime of fornication, and polygamy: we declare that we believe, that one man should have one wife; and one woman but one husband."

The third place of settlement by the Saints was Missouri. Smith's order to Oliver Cowdery to go and establish the Church among the Lamanites brought four Mormon missionaries to Jackson County as early as 1831. The town of Independence was declared the new city of Zion and a site for a temple was chosen there in August. The converts poured in from the Middle Atlantic States and Canada with such rapidity that the non-Mormons were somewhat alarmed. The printing of the *Book of Commandments* with its revelations to the Saints calling Missouri "the land of your inheritance, which is now the land of your enemies," led to acts of hostility from the citizens of Jackson County. The burning of barns and the shooting into Mormon houses at night was followed by demands for the removal of the Mormons from the country within a reasonable time, and for the prohibition of future Mormon settlement therein. The element of border ruffianism was doubtless responsible for the speedy destruction of the Church printing office, and for the tarring and feathering of Bishop Partridge, yet the Saints themselves were not without fault. Their agreement to depart within eight months was written, as they alleged, "supposing that before the time arrived the mob would see their error and stop the violence." Since Governor Dunklin was loath to call out the militia, the mob drove at least fifteen hundred Mormons across the Missouri, the women and children suffering terrible hardships in the November storms. The negotiations for financial redress proved fruitless, for, as the Governor himself confessed, conviction for any violence committed against a Mormon could not be had in Jackson County. Until 1838 the town of Far West was materially prosperous and on good terms with its neighbors, but upon the Prophet's arrival in that year there arose dissensions within and without. The Presidency was deposed on a charge of misappropriating trust funds and Oliver Cowdery expelled for counterfeiting. With the further defection of Thomas B. Marsh, president of the Twelve, and Orson Hyde, one of the original Apostles, there came the establishing of an organization called ultimately the Danite Band, and known popularly as the Avenging Angels. Bound to secrecy by blood oaths, obeying any behest of the Church against property or life, this American variety of thugs owed its origin to Smith's revelation of August 6, 1833—"Thine enemy is in thine hands, and if thou reward him according to his works thou art justified; if he has sought thy life, and thy life is endangered by him, thine enemy is in thine hands and thou art justified." The year 1838 also saw the establishment of the tithing system. Forty years afterwards the annual tithing revenues were estimated at a million dollars, appropriated, according to Brigham Young, to church erection, emigration, and poor relief.

The beginning of civil strife in Missouri dates from Rigdon's 'salt sermon,' a Fourth of July oration (1838), in which there was officially predicted a war of extermination between Saints and Gentiles. After the State election in August, it was reported to Governor Boggs that the Mormons were so numerous and well armed that the judicial power of Daviess and Caldwell counties was wholly unable to execute any civil or criminal process against a Mormon. A regiment of militia was thereupon called out, but General Doniphan, fearing that much blood would be spilled, disbanded most of his force. At the Prophet's suggestion the organization of the 'Fur Company' let loose foraging bands over the country. Then followed the killing of the Danite leader, 'Fear Not' Patten, the defeat of the Missouri Captain Bogart, and the retaliation upon the Mormons in the infamous Hawn's Mill Massacre. On October 27th the Governor issued orders that the Mormons must be treated as enemies, and must be exterminated or driven from the State. There ensued a determined campaign against the Mormons. The final terms of surrender, offered at Far West by General Lucas, included the payment of debts and the expulsion from the State of all the Mormons except the leaders, who were subject to trial. In the trial of Joseph and Hyrum Smith, Rigdon, and others at Liberty, testimony was given that the members of the Danite Band considered themselves as much bound to obey the heads of the Church as to obey God, and that Smith advised the people to spoil the Gentiles. The Prophet was confined in Liberty until April, 1839.

The fourth place of removal of the Saints was Illinois, and here their experience was but a repetition of their last migration. Friction was sure to arise because of the lawless squatters and timber thieves in the northern counties and because of the politicians at Quincy and their toadying for the Mormon vote. Smith purchased the city of Commerce on the banks of the Mississippi for about $70,000; the name of the town was changed to Nauvoo, supposedly derived from a Hebrew word meaning beautiful. The rapid growth of Nauvoo was largely due to the religious propaganda. At home, proselyting was extended from Maine to Michigan, while mass meetings were called in the Eastern cities to express sympathy with the Mormons as oppressed by the enemies of the freedom of religious opinion. Abroad, the press knew even less of Latter-Day ambitions, since the Mormon appeals in England were directed to the illiterate and superstitious. At Liverpool, Orson Pratt published his *Discovery of Ancient American Records* and the Mormon organ, the *Millennial Star*, advertised "Bones set through faith in Christ." But that which appealed most strongly to English weaver, Scotch miner, and Welsh peasant was the prospect of owning a farm in the land of Missouri, where "the Lord had been raining down manna in rich profusion." The success of the Mormon missionaries in Great Britain is evinced by the growth of the system of chartering ships for emigrants, from one vessel and 200 passengers in 1840, to 8 vessels and 1614 passengers in 1842.

In the meantime Mormondom in America was flourishing both financially and politically. Through efficient lobbying the Illinois Legislature granted charters for the city of Nauvoo, the Nauvoo Legion, and the University of the City of Nauvoo. Three-fourths of the university faculty was drawn from local talent, being composed of Orson Pratt, Orson Spencer, and Sidney Rigdon, with James Keeley, a graduate of Trinity College, Dublin, as president. An army officer, in 1842, praised the Nauvoo Legion, but expressed his fear of the growth of a Mormon corps filled with religious enthusiasm and led on by ambitious officers. This fear was justified by the attempted assassination of Governor Boggs, of Missouri, by O. P. Rockwell, a Mormon living at Nauvoo. The Prophet, having called Boggs a 'knave, butcher, and murderer,' was indicted as instigator of the plot. He was then released by his own municipal court. Smith's ability to swing votes led to an enlargement of his political ambitions. He called on President Van Buren with a claim for Mormon losses amounting to $1,381,044.55½. Failing to obtain redress from Congress, he addressed letters of appeal to Henry Clay and John C. Calhoun. On receiving non-committal answers from these rival Presidential candidates, he ran for President himself.

Smith was assassinated in jail at Carthage, Ill., June 27, 1844. The causes leading up to his death were not merely political, but also financial and social. He secured relief from his Kirtland creditors only by taking advantage of the bankruptcy act, and the numerous thefts around Nauvoo were laid to the Mormons. Smith was also in trouble with his associates; in 1843 he deposed Rigdon as his adviser. On July 12, 1843, there came the famous "Revelation on the Eternity of the Marriage Covenant, including Plurality of Wives. Given through Joseph, the Seer, in Nauvoo, Hancock County, Ill." This document was not promulgated until 1852; its authenticity is, however, proved by its similarity in style with the *Book of Mormon*. In this document the authority for polygamy is derived from the example of the Old Testament patriarchs, but the Mormon harem is confined to ten virgins. The Prophet's ideas on 'spiritual wifeism,' like his early gospel, appear to have been 'plain and simple' and without any philosophic basis. Whatever Smith taught on the 'mysteries of the kingdom' is derivable from the writings of the two Pratts, who excogitated a system of metaphysics justifying plurality of wives. According to Orson, called the Gauge of Philosophy, "celestial marriage opens the way for all women who wish to marry to fill the measure of their creation. . . . It shows how the innumerable creations of God [i.e. this world and other planets] may be peopled with intelligences. . . . Woman without man and man without woman cannot be saved. The larger the progeny a man has, the greater will be the fullness of his eternal glory." These were the esoteric teachings of the Saints, whispered as early as 1840. Smith's plural wives numbered over a score, most of whom were taken by the Apostles Kimball and Young after the Prophet's death. Outward proof of the practice of polygamy in the forties is to be sought in such virulent persecutions as caused the expulsion of fifteen thousand Saints from Missouri, and in such publications as the *Times and Seasons*' 'extract from a letter from the vicinity of Nauvoo,' which says, "The excitement on both sides of the river against the Mormons is increasing very fast. The conduct of Joseph Smith and the other leaders is such that no community of *white men* can tolerate." Turmoil now arose in the Mormon camp itself. Three well-informed men, Dr. Foster and the two Laws, started a paper called the *Expositor*, which, besides advocating 'disobedience to political revelations,' sought to 'explode the vicious principles of Joseph Smith.' The first and only number condemned the Church appropriation of property without accounting, the preaching of the doctrine of plural gods, sealing, and the plurality of wives. The wanton destruction of the *Expositor* press and property on June 10th under the order of Joseph Smith, as lieutenant-general of the Nauvoo Legion, was succeeded by great commotion among non-Mormons. Outlying counties raised men and money for a 'war' against the Saints, for Nauvoo was now declared under martial law. On June 22d the Prophet and a few others started to flee to the Rocky Mountains, but upon Governor Ford's promise of protection, Smith surrendered himself at Carthage on the 24th. The first arrest was made on a charge of riot, the second on a charge of treason in levying war against the State. In appointing the Carthage Grays, who were the avowed enemies of the Smiths, as a guard over the jail, the Governor made a fatal blunder. On June 27th, with the evident collusion of the guard, a band of disguised assailants, presumably from the Warsaw regiment, brutally murdered the Prophet and his brother Hyrum.

With the death of Smith rival claims to the prophetic successorship arose between Brigham Young, J. J. Strang, and Smith's own son. The 'Strangites' disappeared with the killing of their leader in 1856 because of his polygamous practices. The 'Young Josephites,' however, founded in 1852 the *Reorganized Church of Jesus Christ of Latter-Day Saints*, and the body still exists under the presidency of Joseph Smith, 3d. It claims to be the continuation of the original Church of Latter-Day Saints, and has been recognized as such by the courts. It maintains that the doctrines of plurality and community of wives are heresies. The headquarters of the Church are at Lamoni, Iowa. It has a publishing house, and issues two weekly papers (*Zion's Hope*, for Sunday-schools, and the *Saints' Herald*, a general religious weekly and the official organ), a monthly magazine (*Autumn Leaves*) for young people, and books and tracts. It maintains Graceland College and a home for the aged poor. There is another establishment at Independence, Mo., with a printing press, whence are issued *Zion's Ensign*, a weekly paper, books, and tracts. The Church has about 45,000 members.

The logical successor of Smith was Brigham Young. Young joined the Mormon Church in New York State on April 14, 1832, and in the same year was sent by the Prophet from Kirtland on a missionary tour in Canada. Returning to Ohio with a band of converts in 1834, he went with the 'Army of Zion' to Missouri as one of the 'captains of tens.' In 1835 he was appointed one of the original Quorum of Twelve. Young assisted Smith in his flight to Missouri in 1838, and two years after sailed to Liverpool on a mission. The Prophet was fond of him, and Young's faithfulness to the cause is shown by his being left President of the Twelve upon Smith's assassination.

The Prophet's tragic death was of no avail against the domestic enemies of the Church. In January, 1845, the Nauvoo charter was repealed. The situation being recognized as intolerable, Young officially arranged to leave the country in the spring, a delegation having previously been sent out to investigate locations in California and Oregon. The final choice of Utah was due to a chance meeting with some trappers from the Great Salt Lake Valley. The organization of the Mormon exodus was in many respects remarkable. A pioneer company of young men was first sent ahead to plant crops, which the following companies should reap. Meanwhile Nauvoo had been turned into a vast wagon shop, so that the first company comprised a train of one thousand wagons. This 'Camp of Israel,' which included President Young and the Twelve Apostles, was subdivided into companies of from fifty to sixty wagons in charge of captains of fifties, captains of tens, and contracting commissaries. The versatility of the American pioneer was displayed in the establishment of way stations, with various repair shops and with a flouring mill built by Young himself. The largest company, which started from Elk Horn River on July 4th, included 1553 persons, with 566 wagons. By 1848 all the Mormons had crossed the plains except a few left on the Missouri as forwarding agents for emigrants from the Eastern States and Europe.

By March, 1848, the population of Salt Lake City numbered 1671, with 423 houses built. In spite of the failure of the crops and the consequent suffering of the first winter, glowing accounts of the new Zion were sent to England, with the result that within two years the English immigrants included men of many professions and trades. Young early projected cotton, woolen, and glass factories, for there were no sources for manufactured goods nearer than one thousand miles. In all this the aim of the leaders was to establish a State entirely self-supporting. But the balance sheet in 1852 showed a deficit. Young undertook to retrench expenses by giving less assistance to immigrants, but this policy turned out disastrously. The economic salvation of Mormondom was not due to the financial abilities of the body, but to outside causes. Abundance of money was brought to Salt Lake City by those who were hastening to California for gold, and by the building of the Pacific Railroad.

The political success of Mormonism was equally fortuitous. The war with Mexico having transferred the sovereignty of this region to the United States Government, on March 4, 1849, a convention at Salt Lake City adopted a constitution for the State of Deseret. The confusion of the Mormon political ideas was manifested in calling Deseret a State and at the same time in dispatching a Territorial delegate to Washington. Babbitt's application was rejected largely because of the hostility of the Illinois Democrats.

The growth of Young's dictatorship depended on mixed personal and religious reasons. He was known as hard-working Brigham Young; and his word was counted the word of God to his people. The power of the head of the Church was also increased by the issuance of paper money, by the strict application of the tithing system, and by the order that no man should hoard up his property. Young's addresses in the temple show that, with the development of his despotism, there came a loss of personal liberty among the laity. In connection with the School of the Prophets he appointed Church confessors to go among all families. In 1856 occurred the so-called 'Reformation,' in which the discontented were weeded out. After the murder of the would-be apostate, William R. Parrish, a deed instigated by Young himself, there came the organization of four hundred 'Wolf Hunters,' whose object was to prevent such rare escapes as that of Frederick Loba and his wife. By 1856 the doctrine of blood atonement was in operation. Apostasy was practically declared a capital crime to be atoned for only by having the blood spilled upon the ground, and Rosmos Anderson, who wanted to marry his stepdaughter against the wishes of the ward bishop, had his throat cut by the ecclesiastical executioners, so that his blood might run into his freshly dug grave.

The murder of the Aikin party in 1857 came under Young's policy of keeping the Gentiles out of Utah. Six men from San Francisco, with an outfit valued at $25,000, were shot while being 'escorted' by 'Bill' Hickman, who was known as 'Brigham's Destroying Angel.' In the same year occurred the most wholesale of these affairs, the Mountain Meadows Massacre (q.v.).

Chief among the reasons for governmental neglect of the Mormons were the appointment of mere party hacks as Territorial officers and judges and the impotence of the Federal Government at the approach of the Civil War. Furthermore, the authorities were ignorant concerning Mormon practices and ambitions. Upon the establishment of the Territory of Utah, in 1851, Brigham Young was appointed Governor. When the Federal appointee, Judge Brocchus, ventured to criticise polygamy, Young publicly called him a coward and asked him to "apologize to the satisfaction of the ladies." President Pierce's offer of the Governorship to Lieutenant-Colonel Steptoe led Young to threaten vengeance for this 'infringement' upon his individual rights and privileges. By 1856 the political parties began to make capital out of the Mormon situation. Stephen A. Douglas asserted that it was the duty of the President to remove Brigham Young and all his followers from office. In his message of 1857, President Buchanan declared that there was no longer any government in Utah but Brigham Young. All this was declared to be a Democratic scheme to blind the North regarding the pending slavery issue. However, a force of 1500 troops was dispatched under General Scott, whereupon Young announced that he "would ask no odds of Uncle Sam or the devil." The Nauvoo Legion was recruited from all able-bodied males between eighteen and forty-five, martial law was declared in the Territory, and the Mormons harassed the Federal column by setting fire to the grass, stampeding their cattle, and burning the supply trains. An advance by winter into the Salt Lake Valley being deemed out of the question, Colonels Johnston and Alexander joined forces near Fort Bridger. Meanwhile Young, determined upon being the civil as really as he was the ecclesiastical head, commissioned Col. T. L. Kane as lobbyist at Washington. Taken with the pro-Mormon report of Governor Cumming, the result was a full and free pardon offered by President Buchanan to the very leaders whom Judge Eckles had charged with adultery. The attitude of the Church being considered treasonable during the Civil War, in May, 1862, Utah was put under military supervision. Colonel Connor's plans to overawe Young were frustrated by Lincoln's let-alone policy, and it was not until the lapse of a generation that the Mormon leaders unwillingly traded polygamy for Statehood.

The anti-polygamy legislation began with the Morrill bill of February, 1860. The severest punishment being merely the statutory penalty for bigamy, the measure was ineffective. The Cullom bill of 1869 was fought by Delegate Hooper on the ground that the Mormon views of the marriage relation were an essential part of their religious faith and therefore constitutionally guaranteed. Convictions under the Poland bill of 1874 being appealed, the United States Supreme Court ruled that religious belief cannot be accepted as a justification for an overt act made criminal by the law of the land. President Hayes, in his message of December, 1879, struck at the root of the matter by declaring that polygamy could only be suppressed by taking away the political power of the sect which encouraged and sustained it. Like remarks of Presidents Garfield and Arthur, in 1881, led to the Edmunds bill of 1882, which provided that no polygamist should be entitled to vote in any Territory or to hold office under the United States. Within two years 12,000 voters were disfranchised by this act, and within eight years 468 persons, mostly in the rural districts, were convicted for polygamy or unlawful cohabitation. When in 1890 the courts declared the ecclesiastical property confiscated because the Mormon Church was an organized rebellion, Young's successor, President Wilford Woodruff, issued a manifesto in which he advised the Latter-Day Saints to "refrain from contracting any marriage forbidden by the law of the land." The difficulties of obtaining Statehood and the unseating of Congressman Roberts in 1899 led the Church to so modify its views of political dominion as to declare that the Mormons "form not a rival power as against the Union, but an apostolic ministry to it, and their political gospel is State rights and self-government." A late estimate places the number of Mormons in the United States, exclusive of the Reorganized Church, at about 300,000. They are no longer receiving large accessions from foreign propaganda among Teutonic races.

According to the present official handbook, the religion of the Latter-Day Saints consists of doctrines, commandments, ordinances, and rites revealed from God to the present age. The first principle is faith in God and in Jesus Christ; the next is repentance from all sin, then follows baptism for the remission of sin, as a preparation for the gift of the Holy Ghost, bestowed by the laying on of hands. Obedience to these principles is necessary to membership in the Church of Jesus Christ of Latter-Day Saints. Faith in God is the beginning of religion, and confers spiritual gifts such as healings, miracles, tongues, the interpretation of tongues, discernment, visions, dreams, prophecy, and revelation. Authority to administer in the name of the Deity must of necessity come from God. This involves revelation. There having been no communication with heaven for hundreds of years, the world was without divine authority to administer gospel ordinances until Joseph Smith. By John the Baptist he was ordained to the lesser or Aaronic priesthood, and by Peter, James, and John to the higher or Melchizedek priesthood, receiving the Holy Apostleship and the keys of the kingdom with power to seal on earth so that it might be sealed in heaven. The religion of the Latter-Day Saints is progressive. It cannot be defined in a written creed. It is added to by the revelations of God as the capacities of the Saints enlarge and the needs of the Church increase. Every member of the Church is entitled to the blessings of divine communion and revelation for his or her own comfort and guidance. Revelations for the whole Church are only given through its President, who is its earthly head and holds the keys of the kingdom. Among the later revelations to the Church are the doctrines of baptism for the dead and of celestial marriage. As there was no authority among men to administer the ordinances of the gospel from the days of the early Apostles or shortly after, to the time of the restoration of the priesthood to Joseph Smith the Prophet, all the baptisms during the intervening period were void. The friends of the dead, however, are permitted to take their names and be baptized in their stead, the ceremony being duly witnessed and recorded on earth and accepted and ratified in heaven. Other ordinances may also be admitted by proxy, the living in behalf of the dead.

Celestial marriage is marriage unto all eternity. According to the revelation on this subject all the marriages entered into without divine authority are dissolved by death. Celestial marriage is entered into by those who have obeyed the gospel and become the sons and daughters of God by adoption. The woman is given to the man and they become one flesh. That which is thus sealed on earth is sealed in heaven, and is as valid as though performed in person by the Deity. If a wife thus sealed to her husband should precede him in death, it would be his privilege to wed another. The second wife, or third, if the second should die, would be sealed to him in the same manner as the first. They would all be his equally. In the resurrection he would have three wives, with their children, belonging to him in the everlasting covenant. The revelation on celestial marriage declares that if given to man in the everlasting covenant in the way appointed of God, he is not under condemnation, but is justified in receiving more wives than one. They are sealed to him and become his, and he cannot commit adultery with them because they are his and his alone. None of them are concubines or mistresses, or mere ministers of lust. Celestial marriage in its fullness is ordained of God. It is an establishment of religion. It is ecclesiastical in its nature and government. It is therefore outside the domain of constitutional law. Being within the pale of the Church, its free exercise cannot of right be prohibited.

The Mormon system of proselyting is simple. Twice each year, at the annual and semi-annual conferences held in Salt Lake City, a number of the faithful elders of the Church are selected by the authorities and 'called' by the assembled saints to visit the home or the foreign field. They travel at their own charges. Each mission is presided over by some elder selected by the general authorities of the Church, and the minor divisions of branches and conferences have their proper officers. The Utah missionaries remain in their fields of labor from two to four years and until released by competent authority to return home. Mormon missionaries have gone to every State and Territory of the Union, also to Canada, Mexico, the Antilles, Brazil and Peru, Great Britain, Germany, Switzerland, France, Italy, Denmark, Sweden, Norway, Iceland. Finland, South Africa, India, the East Indies, China, Australia, New Zealand, the Society Islands, and the Hawaiian Islands. The Church has an organization known as the Perpetual Emigration Fund Company, which makes advances of money to assist the faithful to Utah and adjoining districts.

The Mormon hierarchy is complicated. Joseph Smith and Oliver Cowdery were the first two elders and apostles in the Church. Smith, who bore the title of Prophet, Seer, and Revelator, stood at the head of the Melchizedek priesthood, of which three presiding High Priests, chosen by the body, form a quorum of the Presidency of the Church. The President of the Church and his two counselors form the First Presidency, and the three together represent the Trinity. The Twelve Apostles form a quorum equal in authority and power to the three Presidents previously mentioned. The Twelve are a traveling presiding High Council, under the direction of the Presidency of the Church, to build up the Church and regulate its affairs in all nations. The Seventies are also called to preach the gospel and form a quorum equal in authority to that of the Twelve. The Seventy Elders have seven presidents to preside over them, chosen out of the number of the Seventy. There are now over 120 of these Seventies. In addition to these the officers of the Melchizedek priesthood are high priests and elders. The officers of the Aaronic or lesser priesthood are priests, teachers, and deacons. There are twenty-one Stakes of Zion in Utah. Over each stake there is a presidency consisting of a president and two counselors, who are high priests. This presidency bears the same relation to the stake that the First Presidency bears to the whole Church. A high council in each stake, consisting of twelve members, who are also high priests, act for the stake as the traveling presiding High Council act for the Church in all the world. It is the province of the high priests to preside, while the special calling of the Seventy is to travel and preach the gospel and build up the Church.

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MORMYRIDÆ (Neo-Lat. nom. pl., from *Mormyrus*, from Gk. *μορμύρος*, *mormyros*, sort of sea-fish). A family of malacopterous fishes, allied to the pike family, but according to Cope forming a separate group, Scyphophori, having rather long, compressed bodies, and a slender tail, swelling out at the origin of the caudal fin. The skin of the head is naked, envelops the gill-covers and gill-rays, and leaves only a slit for gill-opening, and the color is dark. The mouth is small. All the dozen or more species inhabit the rivers of Northern Africa and are nocturnal in their activities. The beaked or sharp-nosed mormyrus (*Mormyrus Petersi*) is regarded as one of the best fishes of the Nile, and is distinguished by the production of the lower jaw into an elongated fleshy appendage. It is caught by lines baited with worms, and is represented on many Egyptian monuments.

MORNAY, môr'nā', Philippe de. A Huguenot statesman. See Du Plessis-Mornay, Philippe.

MORNING-GLORY. Various species of *Ipomœa*, especially *Ipomœa purpurea*, cultivated for their large funnel-shaped, diversely colored flowers, which open in the early morning, and close during the heat of the day. The garden varieties are propagated from seeds sown in sunny situations in ordinary garden soil. Their large and abundant, roundish heart-shaped leaves make an excellent screen, the vines often attaining a height of ten-feet or more by midsummer. See Plate of Dicotyledons.

MORNY, môr'nē', Charles Auguste Louis Joseph de, Duke (1811-65). A noted French politician of the second Empire. He was the illegitimate son of Queen Hortense and of the Comte de Flahault, and consequently half-brother to Louis Napoleon (later Napoleon III). He was born in Paris, October 23, 1811. The secret of his parentage was well kept for a time and the Comte de Morny received 800.000 francs to adopt him; but he was educated by his 'grandmother,' Madame de Souza-Flahault; and Queen

Hortense left him at her death, in 1837, an annuity of 40,000 francs. Morny took a nominal part in the Revolution of July, 1830, and entered the army in 1832 as a sublieutenant. He served with some distinction in Algeria, being made a Chevalier of the Legion of Honor; but he soon abandoned military life, and in 1838 made his appearance as a manufacturer of beet-root sugar, and published a pamphlet on the subject. From that time he was involved in all sorts of commercial and financial speculations. Chosen a Deputy in 1842, he became the leader of fashion at Paris, but his financial schemes began to go wrong, and after the Revolution of 1848 he attached himself to the cause of his half-brother and was one of the prime instigators of the subtle and treasonable policy which culminated in the coup d'état of 1851. The morning after the deed was done Morny was made Minister of the Interior. This office he soon resigned, however, and in 1854 he became President of the Corps Législatif, and was Ambassador to Russia during 1856-57, where he married the rich and handsome Princess Troubetzkoi. Morny was created a duke in 1862, and continued his gay and extravagant life up to the time of his death on March 10, 1865. His character was sketched by Alphonse Daudet as the Duc de Mora in *Le nabab*. An extract from his memoirs appeared under the title, *Une ambassade en Russie* (1856). Consult: Castille, *M. de Morny* (Paris, 1859); De la Guerronière, *Etudes et portraits politiques* (Paris, 1856); Imbert de Saint-Amand, *The Court of Napoleon III. and the Second Empire* (Eng. trans., New York, 1890).

MORO, mō′rō. A general designation for Mohammedan Malay peoples, with infusion of Semitic blood, living in the southern portions of the Philippines, chiefly in the Sulu Archipelago and the adjoining portions of Mindanao. In the fourteenth century Islam, with Mohammedan culture, reached the islands from Borneo, and its influence was still extending when the Spaniards arrived in 1521. Subdivisions are named Ilano, Joloano, Maguindanao, Samale, etc. See PHILIPPINE ISLANDS.

MOROCCO, or **MAROCCO**, mō-rŏk′ō, called by the natives *Maghrib-el-Aksa*, 'the extreme west,' or briefly *Maghrib*. An empire or sultanate in the northwest of Africa, bounded on the east by Algeria and on the north and west by the Mediterranean Sea, the Strait of Gibraltar, and the Atlantic Ocean. It extends southward into the Sahara, but the boundary in that direction is not exactly determined (Map: Africa, D 1). The Sultan has considerable influence as far south as the Sakiet-el-Hamra, south of Cape Juby; and the whole of the Dra territory, Tafilelt and Tekna, but not Tuat, are conceded to be parts of Morocco. The latest estimate of the area of Morocco is 234,000 square miles.

TOPOGRAPHY. The country is generally mountainous, the Atlas (q.v.) range, which attains an elevation of nearly 15,000 feet, traversing it in several parallel chains from southwest to northeast, and sending out numerous spurs to both the coast-country and the desert. There are, however, many level tracts, especially at the western and eastern extremities, and on the borders of the desert. Through the heart of Northern Morocco extending east and west is a depression, passing just north of Fez, the northern capital, to Oran, Algeria. The central range of the Atlas forms the water-parting separating the streams which flow into the Atlantic and Mediterranean from those which run southward to the desert. The former rivers have the shorter course and less volume, but they are perennial; while the latter become dry in summer, and even when running are lost in the sands of the Sahara. The chief river is the Muluya, with its tributary the Sharef, which drains the northeast of the country, and falls into the Mediterranean after a course of 400 miles. The Muluya is an old waterway of much commercial importance. The Sebu is the most important river of Northwest Morocco draining to the Atlantic. The Kus, Bu-Regreg, Um-er-Rebia, Tensift, Sus, and Assaka drain the central and western districts, and fall into the Atlantic; the Dra, Ziz, Ghir, and other streams irrigate the dry plains of Tafilelt, the first mentioned emptying into the Atlantic Ocean. The other rivers are lost in the desert. All the rivers flowing to the sea are obstructed at their mouths by sandbars, which only small vessels can cross at high tide.

CLIMATE. The climate between the central range of the Atlas and the sea is temperate, the thermometer seldom falling lower than 40° F., or rising above 90° F., owing partly to the regulating influence of the sea breeze, and the shelter afforded by the mountains from the scorching winds of the desert; but in the southeastern districts extremes of heat and cold prevail, and rain is there unknown. The entire country is very healthful. Malaria, the pest of the other Atlas lands, is almost unknown. Along the Atlantic coast the winter precipitation is so large that good pasturage is found as far south as Cape Juby. But dryness prevails throughout the Atlas region, though the winter precipitation covers the mountain-tops with snow; this fact, together with the infrequence of wide valleys, makes the mountain region unfavorable for a large population; the settlement among the mountains is confined to the valleys where irrigation is possible, and to the lower slopes. In the Saharan steppes cultivation is impossible, excepting where streams, fed by the mountain snows, bring surface or underground supplies of water.

FLORA. The flora is richer in flowers and shrubs than in trees. The forests that once covered Western Barbary have disappeared and Morocco is largely a treeless country, though some well-wooded valleys are found among the northern ranges. The cedar, walnut, and cork-oak are the principal trees. The date and oil palms, the fig tree, pomegranate, oranges and lemons, apricots, peaches, the almond, and other varieties of fruit and nut trees are all important.

FAUNA. The wild animals include the leopard, bear, hyena, and wild hog. The bustard, partridge, and water fowl abound. The domestic animals comprise the dromedary and the horse, both bred extensively, and mules, asses, cattle, fat-tailed sheep, and goats.

MINERAL RESOURCES. The country is rich in deposits of copper, iron ore, antimony, and rock salt (north of Fez), and gold and silver are reported. The exploitation of all this mineral wealth, however, is hardly to be thought of under the existing conditions on account of the deep aversion of the official classes to foreigners.

Agriculture. Agriculture and stock-raising are almost the only industries. The alluvial soil of the wide plains of the west and east is especially adapted to the cultivation of cereals, and could be brought to a high degree of productiveness by the application of modern agricultural methods. But the strict prohibition of the exportation of grain prevents the natives from utilizing the natural resources of the country and large tracts of fertile land remain idle. Agriculture is also greatly hindered by the general misrule prevailing in the country, and especially the corrupt system of taxation. The chief agricultural products, besides wheat, barley, and other cereals, are olives, dates, oranges, figs, and other kinds of southern fruit, as well as numerous varieties of vegetables. Cotton and sugar-cane, once extensively cultivated, have now entirely disappeared, and the cultivation of tobacco is greatly hindered by the adverse sentiment toward its use. The manufacturing industries of Morocco are chiefly devoted to the production of leather, pottery, textiles, including carpets, metal goods of copper and brass, and silver filigree. Fezes are chiefly imported from Austria.

Commerce. The chief exports are beans, skins and hides, fruits, olive oil, and wool. The export of grain, horses, cattle, and many other articles is forbidden. Imports include metal products, cotton, sugar, and tea. Purchases of clothing stuffs and metal wares from Europe are constantly increasing. The commerce with Europe is carried on through the ports of Tangier, Tetuan, Larash, Rabat, Mogador, Mazagan, and Safi, all of them, with the exception of Tetuan, situated on the Atlantic. Fez in the north and the city of Morocco in the south are the centres of the interior caravan trade. The commercial statistics of the country are very incomplete, but from the partial returns of most of the Moroccan ports it is estimated that the imports amount to about $6,000,000 and the exports to about $5,000,000 a year. The trade would be much smaller were it not that the European Powers have used their joint influence to keep the Atlantic ports open to commerce. Great Britain leads in the trade, with France, Germany, Belgium, and Spain following in the order named. As wagon roads and bridges are unknown, commodities can be moved only at large expense.

Government. In its form of government Morocco presents an example of perfect absolutism. The Sultan is in unrestricted control of both the secular and the religious affairs, but his Cabinet of six ministers has considerable influence in the management of the State. The country is divided into provinces administered by Governors, or 'Kaids,' whose sway is as absolute in the respective provinces as that of the Sultan. In some of these provinces, particularly among the Rif Mountains of the Mediterranean coast, the rule of the Sultan is hardly recognized. The revenue (for which no reliable statistics are available) is derived from monopolies, taxes, tithes, and gifts. The receipts from the tariff on foreign commerce at the seaports are from $1,500,000 to $2,000,000 a year. Taxes are collected without any system or control, each tax-gatherer being obliged to deliver a certain sum regardless of the amount actually collected. Any reluctance to pay taxes is usually followed by bloody punitive expeditions not infrequently under the personal direction of the Sultan. An impartial and well-regulated system of administration of justice is naturally out of the question. The evidence of a Jew or a Christian against a Mohammedan is considered invalid by the native judges. Persons who are under the protection of foreign consuls are exempted from the jurisdiction of native judges. The army of the Sultan consists of about 12,000 drilled men, of whom about 10,000 are infantry. Most of them are usually stationed at that one of the three capitals (Fez, Morocco, or Mekinez) where the Sultan is in residence; European officers are used to drill the army. The militia forces number about 18,000 men, and the number of men available in case of emergency is estimated at about 40,000.

Population. The number of inhabitants is believed to be about 8,000,000. The population consists of Berbers (about 4,000,000), Arabs and Moors (about 3,600,000), Jews (about 150,000), and negroes and mixed blood (about 250,000). The number of Europeans is between 4000 and 5000. The natives, with the exception of the Jews, are Mohammedans of the most fanatical stripe. The capitals are Fez (140,000 estimated), Morocco (50,000), and Mekinez (25,000). The population of Tangier, an important commercial centre and the seat of the foreign consuls, is estimated at 30,000.

History. Morocco was the Roman Province of Mauretania Tingitana, and shared in the vicissitudes of the other Roman provinces of Northern Africa during the decline of the Empire. It was reached by the tide of Arabian Mohammedan invasion in 698 and was reduced to submission and to Mohammedanism after a spirited resistance. Its people participated in the conquest of Spain. For a number of centuries its history is the rise and fall of successive dynasties, of which the most celebrated were the Almoravides and the Almohades (qq.v.), who passed over into Spain and established their power in that country. In fact, during the later Middle Ages Morocco was the source whence new reënforcements were constantly drawn for the declining power of the Moors in Spain. After the fall of Granada in 1492 the population of Morocco was reënforced by Moors expelled from the Peninsula. In 1546 the sherifs of Tafilelt conquered both Morocco proper and Fez, and united the whole country under one government. This is the present ruling dynasty, claiming direct descent from Ali, son-in-law of Mohammed. In the sixteenth century Morocco was compelled to meet attacks by Spain and Portugal. In 1578 Sebastian, King of Portugal, was defeated and slain in the battle of Kasr-el-Kebir (Alcazarquivir). In the middle of the seventeenth century the Empire of Morocco embraced part of the present Algeria, and extended south as far as Guinea. From that time, however, its decline has been almost unchecked. Morocco has had as little as possible to do with the outside world. Since the commencement of the nineteenth century the rebellion of the wild mountain tribes, the wars of the French in Algeria, and difficulties with foreign States, caused by the aggressions of the Rif pirates, have occupied the attention of the sultans. In 1814, under pressure from the Christian nations, the slavery of Christians was abolished; and in 1817 piracy was prohibited throughout Morocco. The Sultan Abderrahman, having espoused the cause of Abd-el-Kader, sustained a crushing defeat at the hands of the French at Isly in 1844. Mogador was bombarded and peace soon followed. In 1859 a Spanish force under Marshal O'Donnell invaded Morocco. Two battles were fought, several ports were bombarded, and Tetuan was taken. A treaty was signed April 27, 1860, by which the Sultan ceded some portions of his territory and granted commercial privileges to Spanish merchants. Since that time the history of Morocco has been externally uneventful; but the steady weakening of the Sultan's power has made future complications with foreign States not unlikely. Local revolts in 1892 nearly led to the intervention of the Powers, but mutual distrust still keeps them in check. Mulai Hassan, who became Sultan in 1873, died in 1894, and was succeeded by his son, Mulai Abd-el-Aziz, born February 24, 1878. The young Sultan was the son of a Circassian slave and had received an excellent education, which served to imbue him with a fondness for Western civilization. The Government, however, was in the hands of the powerful Grand Vizier, Sidi-Ahmed ibn-Musa, who left little opportunity for the Sultan to put his ideas into effect. After the Vizier's death, in May, 1900, Mulai Abd-el-Aziz assumed personal charge of the Government, and almost immediately entered upon a series of reforms looking toward the reconstruction of Morocco on something of a European basis. The improvement of the State prisons, which had become mere plague spots where atrocious cruelties were practiced on the prisoners, first received his attention. He also set about reducing the onerous customs duties which were levied on goods, especially food products, carried from port to port within the Empire. European influence was welcomed at the capital, British interests being especially favored. The mass of the population regarded the progressive policy of their sovereign with great dissatisfaction, and the introduction of such Western innovations as the railway and the automobile aroused profound disgust. A growing spirit of hatred for foreigners speedily asserted itself. In October, 1902, an English missionary was murdered by a fanatic in Fez and on the murderer's seeking refuge in a mosque, the Sultan caused him to be seized and punished, an act which was regarded by the Moslems as a breach of sanctuary and served to stir up further dissatisfaction. A formidable insurrection among the Berber tribes broke out late in 1902 under the leadership of one Omar Zarabuni, known also as Bu Hamara or Son of the She Ass. He proclaimed himself an elder brother of the Sultan and succeeded in rallying around him the tribes between Fez and Mekinez. Unchecked by several reverses, he succeeded finally in defeating the royal troops under a brother of the Sultan (November 29th), and toward the end of December made himself master of the country around Fez. In January, 1903, the capital was invested by the forces of Bu Hamara.

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MOROCCO, or **MAROCCO**. One of the capitals of the Sultanate of Morocco. It is situated on the north slope of the Great Atlas Range, 90 miles from the Atlantic coast and 250 miles southwest of Fez (Map: Africa, D 1). Its location is very favorable. The city has a healthful climate, but is in a very backward and dilapidated condition. It covers a large area, surrounded by high walls, now more or less in ruins. A large part of the space within is occupied by gardens, open areas, and market places, but in the built-up portions the streets are narrow, crooked, and dirty, and the houses are ill-kept, one-storied, lime-and-earth buildings, with unglazed window-openings. There are nineteen mosques in the city. The Imperial Palace comprises an irregular conglomeration of buildings and gardens in the southern part of the city, covering 180 acres, and surrounded by a wall. Of late years it is but seldom visited by the Sultan. The industries of the city are unimportant. There is still considerable local trade carried on with the surrounding country and with the port of Mogador (q.v.). Traffic is largely in the hands of the Jews, who number about 7000, but live under repressive conditions in a separate quarter of the city. The entire population is estimated at 50,000 to 60,000. There are no permanent European residents. Morocco was founded about 1072. It reached the height of its prosperity in the thirteenth and fourteenth centuries, when its population is said to have been 700,000. It was then a famous Mohammedan seat of learning. Its decline was brought about by several centuries of civil wars and rebellions.

MORÓN, or MORÓN DE LA FRONTERA, mŏ′rōn′ dȧ lȧ frôn-tā′rȧ. A town of Southern Spain, in the Province of Seville, 32 miles southeast of the city of that name, on the Guadaira (Map: Spain, C 4). On one of the high and steep hills surrounding the town are the remains of a once almost impregnable castle erected by the Moors on Roman foundations, and surrounded by triple walls and towers. The castle was occupied by the French in 1810, and was blown up by them on their departure. The inhabitants are engaged in the production of olive oil, and in the vicinity are marble quarries and mines of red hematite. Population, in 1900, 14,459.

MÓRONG. A town of Central Luzon, Philippines, in the Province of Rizal (Map: Philippine Islands, F 5). It is situated on the north shore of the Laguna de Bay, 17 miles east-southeast of

Manila, and has a population of 9430. It was the capital of the former Province of Mórong.

MORONG, Thomas (1827-94). An American botanist, born at Cahaba, Ala. The family removed to Massachusetts while he was a boy, and he graduated at Amherst in 1848. He studied law, but later entered Andover Theological Seminary, and completed his studies in 1853. During his early life he was devoted to botany as an amateur; and in 1888 he undertook an extended voyage of exploration and botanical collection in South America, and visited Argentina, Paraguay, and Chile. Upon his return, in 1890, he was made curator of the herbarium of Columbia College, in New York City. In conjunction with Dr. N. L. Britton he published *An Enumeration of the Plants Collected by Dr. Thomas Morong in Paraguay, 1888-90*. He was one of the contributors to the *International Encyclopædia*.

MORONI, mô-rō′nê, or **MORONE**, Giambattista (c.1525-78). An Italian portrait painter, born at Albino, near Bergamo. He was a pupil of Moretto, and became one of the most noted portraitists of the Venetian school. He passed his life in and about Bergamo. In the Uffizi Gallery in Florence there are five portraits by him, including one, of himself. The National Gallery in London has several of his works, including his masterpiece, the portrait of a tailor. His altarpieces are of less value.

MOROSINI, mō′rô-zē′nê, originally Morosi. A family of Venetian nobles, dating from the eighth century. Four of the family became doges and many of them occupied other public positions. The first celebrated member of the family was Domenico Morosini, who was Doge from 1148 to 1156.—Marino Morosini, who was Doge from 1249 to 1252, introduced the Inquisition into Venice.—Michele Morosini was Doge for less than a year (1382). He was celebrated as a financier.—Andrea Morosini (1558-1618) became historiographer of the Republic (1598), and held several public offices, besides being one of the Council of Ten. He wrote a history of Venice from 1521 to 1615, first published in 1623, and *Imprese ed espedizioni di Terra Santa e l'acquisto fatto dell' imperio di Constantinopoli dalla repubblica di Venezia* (1627), a history of the Fourth Crusade. His other works have not been edited.—Francesco Morosini (1618-94) gallantly but unsuccessfully defended the fortress of Candia against the Turks in 1667-69. About 20 years later he conquered nearly all of the Morea, which gained him the surname of il Peloponnesiaco. He was elected Doge in 1688. Consult: Morosini, *Francesco Morosini il Peloponnesiaco* (Venice, 1885); Bruzzo, *F. Morosini nella guerra di Candia e nella conquista di Morea* (Forli, 1890).

MOROT, mô′rô′, Aimé Nicolas (1850—). A French painter, born at Nancy. He studied under Cabanel, and at the Ecole des Beaux-Arts, where he was awarded the Prix de Rome in 1873. His pictures, mainly historical subjects and portraits, are notable in color and composition. One of the best of them, "La bataille de Reichshofen" (1887), is in the Luxembourg.

MOROTOCO, mō′rô-tō′kô. One of a group of sedentary agricultural tribes residing about the Oxuquis River, on the border of the Chaco region, in Southeastern Bolivia. The entire group constitutes a distinct linguistic stock, the *Samucuan*. Their language is singularly musical. The Morotoco are remarkable in being apparently ruled by the women. The men do the household drudgery, although they are tall and robust, and daring hunters. The women refuse to have more than two children, strangling any born above that number.

MOR′PETH. A market-town and municipal borough in Northumberland, England, on the Wansbeck, 15 miles north of Newcastle (Map: England, E 1). The principal buildings are the parish church, the free grammar school of Edward VI., founded in 1552, and the town hall, erected by Sir John Vanbrugh. The town owns remunerative property, the markets, and provides a free water supply. It has flannel manufactures, iron foundries, collieries, and quarries. There are remains of a castle and gateway. Morpeth was a Saxon town of importance before the Conquest, and was granted corporate privileges by Charles II. Population, in 1891, 5200; in 1901, 6150.

MORPHEUS, môr′fūs (Lat., from Gk. *μορφεύς*, shaper, fashioner). In classic mythology, the son of Somnus (Sleep), because he shapes or molds the dreams that visit the sleeper. He is first mentioned by Ovid, and is represented as an old man with wings, pouring somniferous vapor out of a horn.

MORPHINE, or **MORPHIA** (from Lat. *Morpheus*, god of dreams), $C_{17}H_{19}NO_3 + H_2O_1$. The most important of the eighteen alkaloids existing in opium, of which it constitutes one-eighth to one-sixteenth by weight. It was first isolated in 1816 by Sertürner, a chemist of Hanover. It occurs in combination with meconic and sometimes sulphuric acid, as colorless, shining, prismatic crystals, odorless, and having a bitter taste. It is soluble in 1000 parts of cold and in 400 parts of boiling water; in 20 parts of cold and in 13 parts of boiling alcohol. It is less soluble in ether and chloroform. The following are the ordinary tests for morphine: Concentrated nitric acid when applied to morphine or its salts gives an orange color, changing to yellow; when it is mixed with iodic acid iodine is liberated, which may be recognized by the well-known starch test; a neutral solution of a morphine salt produces a blue color with a neutral solution of ferric chloride.

Morphine is the only opium alkaloid soluble in lime water, and this property affords one of the best means of extracting it. Morphine combines with acids to form crystallizable salts, which are readily soluble in water and alcohol. Of these the sulphate hydrochlorate (or muriate) and acetate are used in medicine. Apomorphine (q.v.), a powerful emetic, is prepared by heating morphine for some hours with an excess of hydrochloric acid.

The therapeutic uses of morphine and its salts are similar to those of opium (q.v.), but morphine acts more certainly and quickly and is more readily absorbed than opium, is more suitable for hypodermic use, and is less apt to constipate and cause gastric disturbances. The ordinary dose for an adult is from one-eighth to one-half a grain.

The habitual taking of morphine is not uncommon. Those addicted to this habit become dependent for a comfortable existence on the drug, and gradually increase the dose until enormous amounts are taken. Their wills become utterly destroyed and their moral sense, especially in regard to truth, lost. The bodily functions are depressed, digestion disordered, and the individual becomes pale, sallow, and emaciated. Finally there is obstinate sleeplessness, a violent diarrhœa, and cramps in the muscles. The habit can be effectually treated only in institutions where the patient can be kept under constant surveillance. See OPIUM.

MOR′PHOGEN′ESIS (Neo-Lat., from Gk. μορφή, *morphē*, form + γένεσις, *genesis*, origin, from γίγνεσθαι, *gignesthai*, to become). A term proposed by Haeckel, who divides morphology into the two coördinateed branches of anatomy and morphogenesis or morphogeny. Morphogenesis is the equivalent of embryology or developmental history. It takes into account the gradual development and building up of the form of the adult; i.e. the series of changes and the mode by which the body and its organs become shaped. Haeckel further subdivides morphogenesis into ontogeny (q.v.) and phylogeny (q.v.). Consult Haeckel, *Generelle Morphologie* (Berlin, 1866).

MORPHOL′OGY (from Gk. μορφή, *morphē*, form + -λογία, *-logia*, account, from λέγειν, *legein*, to say). In zoölogy, the science of form and structure of animals. It is based on comparative anatomy and embryology, and lays the foundation for physiology. We cannot well understand the structure or anatomy of the fully grown animal unless we have the history of the development of the organism as a whole, and of the separate organs. The morphologist, whose methods of study are based on observation and comparison, must not only be a comparative anatomist, but also an embryologist. He should not only be acquainted with the individual development (ontogeny, q.v.), but also that of the class or phylum to which the organism belongs (phylogeny, q.v.). Moreover, as the existing living beings are the descendants of long lines of ancestry, the morphologist should have at his command all the available facts as to the fossil relatives of existing forms. Though we owe the word 'morphology' to Goethe, it was first brought into its present extended use by the zoölogists J. Müller and Leuckart. But long before the middle of the last century the general morphology of organisms was in part discussed by Oken, Carus, Goethe, Geoffroy Saint Hilaire, Lamarck, Cuvier, Savigny, Owen, and Agassiz. For example, Goethe compared the flowering plant to an axis bearing modified or metamorphosed parts or leaves; Savigny discovered that the mouth-parts or appendages of the heads of insects were modified legs; and Carus, Audouin, and Strauss-Durckheim perceived that their head was composed of a number of segments. Goethe, and also Oken, discovered the segmental nature of the vertebrate skull, a problem still earnestly discussed by morphologists. That portion of the history of zoölogy called the Period of Morphology was signalized by the brilliant results in developmental work of Von Baer, Pander, J. Müller, Rathke, followed by the later researches of Schwann, Schleiden, Koelliker, Huxley, Vogt, Gegenbaur, Haeckel, and their followers. As the result we see numerous morphological problems either solved or in a fair way of solution. See SYMMETRY.

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MORPHOLOGY (in Plants). The study which treats of the origin and structure of plants and their organs. The aims of plant morphology are in all respects the same as those of animal morphology. (See BOTANY.) The best conception of the present condition of plant morphology may be obtained by reading the general articles on BRYOPHYTES; PTERIDOPHYTES; SPERMATOPHYTES; THALLOPHYTES; and the more special articles on ALGÆ; ANGIOSPERMS; EQUISETUM; FERN; FUNGI; GYMNOSPERMS; HEPATICÆ; LYCOPODIALES; and MUSCI. A still more detailed account of plant structures may be obtained from the separate titles which deal with the prominent phenomena and organs, such as ALTERNATION OF GENERATIONS; ANTHERIDIUM; ARCHEGONIUM; HETEROSPORY; LEAF; ROOT; SEED; SPORE; STEM.

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MORPHOT′ROPISM (from Gk. μορφή, *morphē*, form + τροπή, *tropē*, a turning, from τρέπειν, *trepein*, to turn). The study of the exact rôle which each chemical constituent or each atomic (radical) group of a substance plays in modifying the form of its crystals. By comparing the crystal forms of a series of closely related substances, the part played by each constituent substance may be inferred, especially when the substitution methods of organic chemistry are applied to substances having very large chemical molecules. See CRYSTALLOGRAPHY.

MOR′PHY, PAUL CHARLES (1837-84). An American chess player, born in New Orleans, La. He was remarkably precocious, especially as a chess player, and before he was thirteen had defeated many well-known amateurs. He studied law for several years at the College of South Carolina, playing chess only occasionally. At the first American Chess Congress, which assembled in New York in 1857, Morphy defeated with ease the best players that could be brought to meet him. He visited Europe in 1858, and in England beat Löwenthal, Boden, and Bird, and performed the most astonishing feats in simultaneous games without the board. In Paris he won five out of eight games with Harrwitz, and continued his exhibitions of blindfold playing. After his return to the United States, in 1859, he won seven out of eleven games with the visiting German expert Anderssen. He was admitted to the bar, and began the practice of law in New Orleans. The strain occasioned by his blindfold contests, however, had been too great for his mental faculties, and, though he abandoned chess altogether, he was soon forced to relinquish all mental occupation, and died in retirement. During the comparatively short period of his activity Morphy displayed a skill that was inexplicable. He was at no time a close student of chess and he played without preparation and with little hesitation; but an analysis of his games reveals combinations remarkable for finesse, depth, elegance, and soundness. These qualities, combined with a wonderful memory, made him perhaps the most remarkable chess player in modern times. Consult Löwenthal, *Morphy's Games of Chess* (London, 1860).

MOR′RILL, Justin Smith (1810-98). An eminent American legislator and political leader. He was born in Strafford, Vt., received a common school education, became a clerk in a country store at the age of fifteen, and until 1855 was largely engaged in mercantile pursuits, though he devoted much of his time to private study. He entered the National House of Representatives in 1854, was five times reëlected, was transferred to the Senate in 1867, and retained his seat continuously until his death, having at that time served in Congress for a longer consecutive period than any other man in the history of the United States. During the latter part of his service in the House, he was the leading member of the Committee on Ways and Means, and chairman of the Sub-Committee on Tariff and Taxation, and in the Senate he was a member after 1867 and chairman for many years of the Committee on Finance, and was also at various times a member of the Committee on Public Buildings and Grounds, on Education and Labor, on the Census, and on Revolutionary Claims. He made many able speeches which attracted wide attention, and had much influence both in and out of Congress, but he will be remembered chiefly for his connection with two significant and important measures. In 1857 he introduced a bill for the establishment, through the aid of public land grants, of State colleges throughout the country primarily for the purpose of teaching agriculture and the mechanic arts, other subjects, however, not to be excluded. This bill was passed by both House and Senate, but was vetoed by President Buchanan. In 1861 it was again introduced by Morrill, was again passed, and this time became a law through the signature of President Lincoln. In 1890 Senator Morrill introduced a bill providing an additional grant for this purpose, which also was passed by both Houses and signed by the President. By virtue of these enactments there had been established by 1899, in the various States, sixty-four institutions giving instruction to 36,000 students. Morrill framed and introduced in the House the famous Morrill Tariff Act of 1861, which, with the enactments of 1862 and 1864, in the passage of which he also took a prominent part, modified the tariff system of the United States. (See Tariff.) Morrill was also conspicuous as an energetic opponent of Government paper money and especially of the Legal Tender Act of 1861-62, and of the annexation to the United States of outlying territory, such as Santo Domingo, Saint Thomas, Hawaii, Porto Rico, and the Philippines. He published *The Self-Consciousness of Noted Men* (Boston, 1886).

MORRILL, Lot Myrick (1813-83). An American legislator and Cabinet officer, born at Belgrade, Maine. He entered Waterville College (now Colby University) in 1833, but left before graduating to enter a law office at Readfield. In 1837 he was admitted to the bar, and for several years practiced in partnership with Timothy O. Howe. In 1841 he removed to Augusta, where he won wide distinction as a lawyer and public speaker. Although strongly opposed to the extension of slavery, he was in all other matters in perfect agreement with the Democratic Party, and became one of the leaders of the Maine Democracy. In 1853 and 1854 he was elected to the Lower House of the State Legislature, and in 1856 was elected to the State Senate. After Buchanan's nomination, disapproving of his party's platform, he resigned from the Democratic State Committee, and allied himself with the Republican Party. He was elected Governor of the State by that party in 1857, and was reëlected in 1858 and 1859. In 1861 he was chosen United States Senator to succeed Hannibal Hamlin. Reëlected for a full term in 1863, he was defeated by a single vote in 1868 by Hamlin, but in the following year was elected to succeed William P. Fessenden. In 1876 he resigned to enter the Cabinet of President Grant as Secretary of the Treasury. This portfolio he held until after the inauguration of President Hayes, when he became Collector of Customs at Portland, Maine.

MOR′RILLTON. A city and the county-seat of Conway County, Ark., 50 miles northwest of Little Rock; on the Arkansas River, and on a branch of the Saint Louis, Iron Mountain and Southern Railroad (Map: Arkansas, C 2). It has a trade in cotton and live stock, and manufactures of cottonseed oil, woolens, machine shop products, lumber, furniture, etc. Population, in 1890, 1644; in 1900, 1707.

MOR′RIS. A city and the county-seat of Grundy County, Ill., 62 miles southwest of Chicago; on the Illinois River, the Illinois and Michigan Canal, and the Chicago, Rock Island and Pacific Railroad (Map: Illinois, D 2). It has Saint Angela's Academy, a Roman Catholic institution for women. The city is the centre of a considerable trade in grain and cattle, and there are mines of bituminous coal, and manufactories of oatmeal, hardware, paper car wheels, leather, bricks, and tile. The water-works are owned by the municipality. Morris was settled in 1834 and incorporated first in 1857. Population, in 1890, 3653; in 1900, 4273.

MORRIS. A village and the county-seat of Stevens County, Minn., 157 miles west by north of Saint Paul; on the Northern Pacific and the Great Northern railroads (Map: Minnesota, C 5). It is near the Pomme de Terre River, which furnishes good water power. It is in a fertile agricultural region, and has several grain elevators and flour mills. There is a public library. Population, in 1890, 1266; in 1900, 1934.

MORRIS, Alexander (1826-90). A Canadian statesman, born at Perth, Ontario. He studied in Scotland at Saint Andrew's and Glasgow University, graduated at McGill University, Montreal, and was called to the bar in 1851. In 1861 he was elected Conservative member from South Lanark, in 1869 was made Minister of Inland Revenue, and later was Chief Justice of the Court of Queen's Bench in Manitoba (1872-77). He was elected to the Ontario Legislature (1878) as member for East Toronto. He was a strong advocate of the confederation of the provinces, and the author of *Treaties of Canada with the Indians of the Northwest* (1880); *Nova Britannia* (1884); and *Canada and Her Resources* (1885).

MORRIS, Benjamin Wistar (1819—). An American clergyman. He was born at Wellsboro, Pa., graduated from the General Theological Seminary in 1846, receiving that year the ordination of deacon of the Protestant Episcopal Church, and the following year was ordained priest. He was stationed as rector at Sunbury, Manayunk, and Germantown, all in Pennsylvania. In 1868 he was consecrated Bishop of Oregon and Washington, his diocese subsequently being restricted to the former State. During his incumbency he has actively advanced the educational and philanthropical interests of his diocese, being instrumental in establishing Saint Helen's Hall, a boarding and day school for girls, the Bishop Scott Academy, and the Good Samaritan Hospital in Portland. He is the author of *Presbyterian, Baptist, and Methodist Testimony to Confirmation* (1860).

MORRIS, Charles (1745-1838). An English song-writer of Welsh origin. He was reared by his mother, went to America in the 17th foot in 1764, and on his return to England he was for many years punch-maker and bard of the famous Beef Steak Club, a convivial society founded in 1735. He associated with the party of Fox, for which he wrote many political songs, as "Billy Pitt and the Farmer." Neglected by his Whig friends, he composed the lament, "The Old Whig Poet to His Buff Waistcoat." The French song-writer Béranger also wrote a charming ditty on an old coat of his, but quite unlike that by Morris. Morris met the Prince of Wales and was a frequent guest at Carlton House, where he was known as "The Sun of the Table." Among his best known pieces are: "The Town and the Country;" "A Reason Fair to Fill My Glass;" "The Triumph of Venus;" and "Ad Poculum." The Prince granted him an annuity of £200; and the Beef Steak Club gave him a villa near Dorking, where he passed his last years, living to be ninety-three. His songs were gathered under the title *Lyra Urbanica* (1840; 2d ed. 1844).

MORRIS, Charles (1784-1856). An American naval officer, born in Woodstock, Conn. He entered the United States Navy in 1799, took an active part in the war with Tripoli, and in the famous recapture of the *Philadelphia* (1804) in the harbor of Tripoli was the first of the boarders to reach the deck of that vessel. When the War of 1812 broke out he was executive officer of the *Constitution*, and in the engagement between that vessel and the *Guerrière* was wounded. He received command of the frigate *John Adams*, and after a successful cruise was blockaded in the Penobscot River by an English fleet and forced to destroy his vessel to prevent her capture. He commanded the *Congress* in the war with Algiers, and in 1825 carried Lafayette back to France in the *Brandywine*. He was for years naval commissioner, for a considerable time supervisor of the Naval Academy at Annapolis, and at his death, in 1856, was chief of the Bureau of Ordnance and Hydrography. Consult his *Autobiography* (Annapolis, 1880).

MORRIS, Charles d'Urban (1827-86). An American classical philologist and educator, born in Charmouth, Dorset. His grandmother was Mary Philipse Morris (q.v.). He was educated at Worcester College, Oxford, and after three years as a scholar at Lincoln College, was a fellow of Oriel (1851-54). In 1853 he came to New York, was rector of Trinity School until 1856, and then founded the Mohegan School, near Peekskill. From the University of the City of New York he went in 1876 to Johns Hopkins as collegiate professor of Latin and Greek. His publications, which are marked by many original pedagogical methods, are: *A Compendious Grammar of Attic Greek* (1869; 4th ed. 1876); a *Latin Grammar* (1870; 4th ed. 1876); and several Latin and Greek primers and readers.

MORRIS, Clara (1849?—). An American actress, especially noted for her success in the interpretation of 'emotional' rôles. She was born in Toronto, Canada (her real name being Morrison), but was reared in Cleveland, Ohio, where at the Academy of Music she became a member of the ballet and afterwards leading actress. Later she played in Cincinnati. She came to New York in 1870 as a member of Daly's company. In 1872 she made a sensation in *L'Article 47*. Conspicuous among her subsequent successes were those won in *Alixe* (1873), *Camille* (1874), and *Miss Multon* (Union Square Theatre, 1876), and she soon became well known as a star whose acting was distinguished for spontaneity and naturalness. She was married to F. C. Harriott in 1874. About 1885 she began to devote herself mainly to literary work, among her publications being: *Little Jim Crow, and Other Stories of Children* (1899); *A Silent Singer* (1899); *Life on the Stage: My Personal Experiences and Recollections* (1901); *A Pasteboard Crown* (1902); *Stage Confidences* (1902). Consult McKay and Wingate, *Famous American Actors of To-day* (New York, 1896); Matthews and Hutton, *Actors and Actresses of Great Britain and the United States* (ib., 1886).

MORRIS, Dinah. In George Eliot's *Adam Bede*, the character which really becomes the centre of interest for the novel. The book was suggested by, and the character partly drawn from, the author's aunt, who, like Dinah, was a Methodist evangelist; but the prominence which the character assumes is due to the criticism of Lewes. Sir Leslie Stephen calls it "not only an elaborate but a most skillful and loving portrait of a beautiful soul."

MORRIS, Edward Joy (1815-81). An American diplomat and translator, born in Philadelphia. He graduated at Harvard in 1836, and began the practice of the law in Philadelphia. He was a member of the Pennsylvania State Assembly in 1841-43, and in November, 1842, was elected as a Whig to the Twenty-eighth Congress, serving from 1843 to 1845. From 1850 to 1854 he was chargé d'affaires for the United

States at Naples. After his return he took a leading part in the movement for the organization of the Republican Party in Pennsylvania, and in 1856 was elected to Congress by that party, serving from 1857 to 1861. From 1861 to 1870 he was United States Minister to Turkey. He was a frequent contributor to American magazines for many years, and published *Notes of a Tour Through Turkey, Greece, Egypt, and Arabia Petræa to the Holy Land* (2 vols., 1842). He translated with copious notes and additions *The Turkish Empire, Social and Political* (1854), from the German of Alfred de Besse. He also translated Theodore Mügge's *Afraja, or Life and Love in Norway* (1854), and Ferdinand Gregorovius's *Corsica, Picturesque, Historical, and Social* (1856).

MORRIS, Edward Parmelee (1853—). An American Latinist. He was born at Auburn, N. Y., graduated at Yale in 1874, and afterwards studied at the universities of Leipzig and Jena. He was professor of Greek at Drury College (1879-84), professor of Latin, Williams College (1885-91), and in the latter year he was appointed to the same position in Yale University. He was editor of Plautus's *Mostellaria* (1880), *Pseudolus* (1890), and *Captives* and *Trinummus* (1898); also the author of various philological monographs and reviews and *On Principles and Methods in Latin Syntax* (1902).

MORRIS, George Pope (1802-64). An American journalist and poet, born in Philadelphia. He founded with Samuel Woodworth (q.v.) in New York *The Mirror* (1823-42), a literary weekly, which became *The New Mirror*, and *The Evening Mirror*. In these journals appeared much early work of Bryant, Halleck, Poe, Paulding, Willis, Hoffman, and others, making these periodicals important elements in the literary development of the time. Morris also founded *The National Press* (1845), out of which was developed *The Home Journal* (1846), in which Willis, who had long been associated with Morris, again collaborated. His drama *Briarcliff* (1825) was a popular success. His *Poems*, collected for the last time in 1860, contained the familiar ballads, "Woodman, Spare That Tree" (founded on a real incident), "My Mother's Bible," "We Were Boys Together," and "A Long Time Ago." He also published a number of prose sketches and was prominent in the New York militia. Morris died in New York, July 6, 1864.

MORRIS, George Sylvester (1840-89). An American educator and philosophical writer, born at Norwich, Vt. He graduated in 1861 at Dartmouth, served in the Federal Army during the first two years of the Civil War, and was a tutor at Dartmouth in 1863-64. After spending several years abroad in the study of philosophy ~~and theology~~, he was appointed, in 1870, professor of modern languages and literature in the University of Michigan, and in 1881 professor of logic, ethics, and the history of philosophy there. From 1878 to 1885 he also lectured on ethics and the history of philosophy at Johns Hopkins University. He translated Ueberweg's *History of Philosophy* (1871); edited Gregg's *Philosophical Classics;* and wrote *Kant's Critique of Pure Reason: A Critical Exposition* (1882); *Philosophy and Christianity* (1883); and *Hegel's Philosophy of the State and of History* (1887).

MORRIS, George Upham (1830-75). An American naval officer, born in Massachusetts. He entered the navy in 1846, was commissioned lieutenant in 1855, and still held that rank when Commander William Radford's absence on March 8, 1862, left him the senior officer on the *Cumberland* during its battle with the Confederate ram *Merrimac.* Lieutenant Morris's gallantry in fighting his ship until she sank with her flags still flying aroused the greatest enthusiasm in the North, and earned his promotion to the grade of lieutenant-commander, July 16, 1862, a rank which he held until 1866, when he was commissioned commander.

MORRIS, Gouverneur (1752-1816). An American statesman and diplomat. He was born at Morrisania, N. Y., January 31, 1752, and graduated at King's (now Columbia) College in 1768. He studied law and was admitted to the bar in 1771. In 1775 he was chosen to represent Westchester County in the first Provincial Congress of New York, and took a prominent part in the advocacy of the American cause. He served in two succeeding Congresses in the same and the following year. He was one of the recognized leaders of the Congresses; served on nearly all the important committees, among them the committee that drafted the Constitution of the State of New York; and with Jay and Livingston had much to do with framing the plan of government for the State. In 1777, when only twenty-five years of age, he was elected to the Continental Congress, in which he served until 1780. Immediately upon taking his seat he was appointed on a committee to investigate the condition of the army at Valley Forge, and afterwards devoted his energies to securing the adoption by Congress of Washington's plans for the organization and pay of the army. His ability won for him the chairmanship of the committee to confer with the British commissioners on reconciliation who arrived in 1778. As chairman of the committee to publish an address to the people of the colonies on the existing condition of affairs, he drew up a masterly account of the causes of the war, the efforts that had been made to achieve independence, and the transactions with the British commissioners. The address was entitled *Observations on the American Revolution.* In 1779 he was chairman of three other important committees and performed the whole duties of each. During his career in Congress Morris drew up several reports and papers on finance which showed evidence of marked ability. His services were recognized by his appointment as assistant superintendent of finance in 1781, a position which he held with great credit until 1785. It was in this capacity that he drew up a scheme for a system of coinage which, though not adopted at the time, ultimately became the basis of our present system. He represented Pennsylvania in the Constitutional Convention of 1787 at Philadelphia; took a leading part in the debates of that body, and the published proceedings showed that he made more speeches than any other member, always championing a strong national government. He urged the proportional representation of the States in the Senate, and favored a freehold suffrage, a good behavior tenure for the executive, and representation in Congress apportioned according to the number of free inhabitants. In 1789 Morris went to France on private business, and was in Paris at the outbreak of the French Revolution. He kept a diary during his stay, and wrote letters which threw much light on the character of the events which he witnessed. In 1790 he went to London as private agent to the British Government to conduct negotiations regarding the unfulfilled stipulations of the treaty of 1783. His mission was not successful, and he again returned to the Continent. In 1792, while still in Europe, he was appointed Minister to France, and served in that capacity during the stormy scenes of the two ensuing years. In 1794 the French Government requested and obtained his recall. He remained in Europe until 1798. In 1800 he was elected from New York to the United States Senate, where he acted with the Federalists. After his retirement from the Senate in 1803 he took great interest in the Erie Canal project, and served as chairman of the Canal Commission from 1810 to the time of his death, which occurred November 6, 1816. His biography has been written for the "American Statesmen Series" by Theodore Roosevelt (Boston, 1900). An elaborate biography was prepared by Jared Sparks (3 vols., Boston, 1832). Morris's diary and letters have been published in two volumes (New York, 1888).

MORRIS, Henry W. (1806-63). An American naval officer. He was born in New York City, entered the United States Navy in 1819, and became a captain in 1856. For some time after the outbreak of the Civil War he was in Washington superintending the construction of the *Pensacola*, which vessel, when completed in January, 1862, he took safely by the Confederate batteries on the Potomac. He then joined the Federal blockading squadron in the Gulf of Mexico, distinguishing himself in the attacks upon Forts Jackson and Saint Philip, and after the capture of New Orleans was in command for a short time of the squadron stationed there. He was made commander in July, 1862. His health giving way, he went to New York, where soon afterwards he died.

MORRIS, John Gottlieb (1803-95). An American clergyman, born at York, Pa. He graduated at Dickinson College in 1823, then studied theology at Princeton and at Gettysburg Seminary, and in 1827 was licensed as a preacher. In the same year he went to Baltimore, where he founded the Trinity English Lutheran Church, of which he continued to be pastor until 1860, when he became librarian of the Peabody Institute. In 1864 he became pastor of the Third English Lutheran Church, and in 1874 accepted a call to Lutherville, Md., where he was actively interested in the founding of the College for Women. He held a number of academic positions, founded the Lutheran Historical Society, presided over the General Synod in 1843 and in 1883, contributed frequently to scientific and religious journals, edited the *Lutheran Observer* (1823-34), and wrote a number of books, among which may be mentioned *Life of John Arndt* (1853); *Life of Catherine de Bora* (1856); *Quaint Sayings and Doings Concerning Luther* (1859); *and Fifty Years in the Lutheran Ministry* (1878).

MORRIS, John Thomas (1826—). An English Jesuit. He was born at Ootacamund, Madras, India; entered Trinity College, Cambridge, where he became a Roman Catholic; completed his education in the English college at Rome, and was ordained to the priesthood. After passing three years in the diocese of Northampton he returned to Rome and became vice-rector of the English college. At the end of three years he went back to England, where he was appointed canon residentiary of the London Chapter. He also acted as private secretary to Cardinal Wiseman and his successor, Cardinal Manning. In 1867 he became a member of the Society of Jesus. He was for a time rector of a Jesuit college in Malta, professor of canon law and Church history in Saint Bruno's College near Saint Asaph, and from 1879 rector and master of novices at Roehampton. He published a *Life of Saint Thomas of Canterbury* (1860; 2d ed. 1885); *Condition of Catholics Under James I.* (1871); *The Troubles of Our Catholic Forefathers* (1875); *The Letter-books of Sir Amias Paulet* (1874); and *Cardinal Wiseman's Last Illness* (1871).

MORRIS, Lewis (1671-1746). An American colonial Governor. He was born on Manhattan Island, the son of Richard Morris, an officer of Cromwell's army, who had emigrated to the West Indies after the Restoration and a few years later purchased a tract of 3000 acres of land on the west side of Manhattan Island, in the region later named Morrisania, after his family. Lewis Morris was well educated by private tutors, studied law, and after several years' practice was appointed a judge of the Superior Court in East Jersey. After the union of East and West Jersey and the establishment of New Jersey as a royal colony, he continued to take a prominent part in its affairs, serving for many years in both the Colonial Council and the Assembly. He served for a time as Chief Justice of both New Jersey and New York, was appointed Acting Governor of New Jersey in 1731, and from 1738 until his death was Governor of the colony.

MORRIS, Lewis (1726-98). An American patriot during the Revolutionary War, and one of the signers of the Declaration of Independence. He was born at Morrisania, N. Y., graduated at Yale in 1746, and as early as 1767 became conspicuous as an opponent of the restrictive measures of the British Ministry. He was elected to the Continental Congress in 1775, and at the close of the session was sent to Pittsburg to secure, if possible, the adherence of the Indians. In 1776 he again sat in Congress, and was one of the signers of the Declaration of Independence. Giving up his seat in 1776 in favor of his half-brother, Gouverneur Morris he returned to his estate, and subsequently served as a member of the New York Legislature and as major-general of the State militia.

MORRIS, Sir Lewis (1833—). An English poet, born at Carmarthen, Wales, in June, 1833. After graduating from Jesus College, Oxford (B.A. 1855, M.A. 1858), he studied law and was called to the bar at Lincoln's Inn (1861). He practiced as a conveyancer till 1880. He has taken an active part in higher education in Wales, serving on the governing boards of three Welsh colleges. On several occasions he has stood for Parliament in the Liberal interest, but without success. In 1895 he was knighted. His verse comprises *Songs of Two Worlds* (3 vols., 1871-74-75); the *Epic of Hades* (3 books, 1876-77); *Gwen: A Drama in Monologue* (1879); the *Ode of Life* (1880); *Songs Unsung* (1883); *Gycia: A Drama* (1886); *Songs of Britain* (1887); *A Vision of Saints* (1890); *Songs Without Notes* (1894); *Idylls and Lyrics* (1896); and *Harvest-Tide* (1901). To the critic, Morris writes slight and easy verse on pretentious themes. But he has been exceedingly popular.

MORRIS, MARY (PHILIPSE) (1730-1825). One of the celebrated Philipse family, born in the Philipse manor house on the Hudson. She possessed much personal beauty, and, according to tradition, she received an offer of marriage from Washington, whom she met in 1756 while visiting her brother-in-law Beverly Robinson in New York. Two years later she married Captain Roger Morris, an English officer, and lived for many years in an elegant mansion—now known as the Jumel mansion—on the outskirts of New York. When the Revolution broke out, she remained loyal to the Crown, and as a result she was attainted of treason and her property was confiscated. Her mansion was subsequently used by General Washington as his headquarters. In 1809 her children sold their reversionary rights in the confiscated property to John Jacob Astor for $100,000. In recognition of her loyalty, the English Government made her a grant of $85,000.

MORRIS, MICHAEL, Baron Killanin (1827-1901). An Irish jurist. He was born in Galway; studied at Trinity College, Dublin; and was called to the bar. His great popularity made his advance in politics very rapid. He was elected to Parliament in 1865 as a Conservative; was named Solicitor-General of Ireland in 1866, a puisne judge in the following year, and after the abolition of his post of Chief Justice of Common Pleas, Lord Chief Justice. In 1900 he retired from the bench, and the same year was made an hereditary baron.

MORRIS, RICHARD (1833-94). An English philologist. He was born in London, was educated at Saint John's College, Battersea, in 1869 became lecturer on the English language and literature in King's College School, and in 1871 took holy orders. Four years later he was made headmaster of the Royal Masonic Institution for Boys. He edited a number of publications for the Early English Text Society, the Chaucer Society, and the Philological Society; and in 1874 was elected president of the latter. Besides his editions of early English works, he published: *The Etymology of Local Names* (1857); *Specimens of Early English* (1867); *Historical Outlines of English Accidence* (1872); *Elementary Lessons in Historical English Grammar* (1874); *Primer of English Grammar* (1875).

MORRIS, ROBERT (1734-1806). An eminent American financier and one of the signers of the Declaration of Independence. He was born at Liverpool, England, January 31, 1734. At the age of fourteen he was sent to America and placed in the counting house of Charles Willing, a rich Philadelphia merchant, whose partner he became in 1754, continuing as such until 1793. The firm of Willing & Morris became one of the leading mercantile establishments in America, and by the outbreak of the Revolutionary War Morris had already acquired a large fortune. Although naturally averse to a rupture with Great Britain, he sacrificed his personal interests, signed the non-importation agreement of 1765, and served as a member of the citizens' committee that compelled the stamp distributer for Philadelphia practically to relinquish his office. In June, 1775, he became a member of the Pennsylvania Committee of Safety; in October of the same year he was elected to a seat in the Legislature of Pennsylvania (to which he was reëlected in 1776), and in November he was appointed by that body a delegate to the Continental Congress. All three of these offices were held by him at the same time. As a member of Congress he served on several important committees and signed the Declaration of Independence, although he had opposed Lee's resolution of June 7th and absented himself from the Congressional hall on July 4th, when the final vote was taken. At the expiration of his term in Congress, in 1778, he was elected again to the State Legislature, but on account of miscellaneous charges against him in connection with his mercantile operations, he failed of reëlection in the following year. In October, 1780, however, he was returned to the Legislature for the fourth time. It was at this time that the fortunes of the Colonial Army reached their lowest ebb. Charleston had fallen; Gates had been defeated by Cornwallis; Arnold's treachery cast gloom on the country. Munitions and supplies were sadly wanting, and Continental currency had depreciated until it was worth but little more than the paper on which it was printed. In this almost desperate situation, Congress resolved to supersede the old treasury board by a superintendent of finance. Morris was chosen to the position February 20, 1781, at a salary of $6000 a year, and received large powers over the finances of the Confederation. His chief programme was to relieve the situation by import duties, loans and subsidies from France, and to inaugurate a policy of retrenchment. He was unable, however, to carry out the first part of his scheme on account of the refusal of the States to confer the necessary power upon Congress for the laying of import duties. On several occasions he succeeded in borrowing large sums on his personal credit, without which some of the important campaigns of the war would have been impossible. Thus the means which enabled Washington and Greene to carry out the campaign of 1781 were raised mainly by his exertions. In 1781, with the approval of Congress, he founded the Bank of North America, and became a large stockholder in it. This institution became of great service to the American cause and was, to a certain extent, under the control of Morris. He continued to hold the difficult and vexatious office of Superintendent of Finance until November, 1784, when he resigned it with a sense of relief. In the same year the Pennsylvania Legislature had annulled the charter of the bank, and in order to obtain its reëstablishment Morris secured an election to the Legislature in 1785 and succeeded in having the charter renewed in 1786. In the latter year he was again elected to the Legislature, and in 1787 became a member of the Constitutional Convention at Philadelphia. He had the honor to nominate Washington for the Presidency of the Convention, but did not take a prominent part in the proceedings of that body. Upon the organization of the new Government, President Washington offered him the position of Secretary of the Treasury. He declined the offer and recommended Alexander Hamilton, who was appointed. At the same time, however, he accepted a seat in the United States Senate, where he served without special distinction until 1795. Unfortunate business speculations proved disastrous, and on February 16, 1798, he entered a debtor's prison in Philadelphia, where he was confined until August 26, 1801. He died May 8, 1806. A short biography of Robert Morris has been written by W. G. Sumner (New York, 1892). A more comprehensive work by the same author is *The Financier and the Finances of the American Revolution* (New York, 1891). Consult also Bolles, *The Financial Administration of Robert Morris* (1878).

MORRIS, Thomas (1776-1844). An American anti-slavery leader, born in Augusta County, Va. His father removed to Ohio in 1795. While working on a farm in Clermont County, he studied law, and was admitted to the bar in 1804. From 1806 to 1830 he was a member of the Ohio State Legislature. In 1832 he was elected to the United States Senate, as a Democrat. He very soon took ground on the slavery question, however, in radical opposition to that held by the majority of his party. He willingly presented anti-slavery petitions, and ardently defended the right of petition in the Senate. He also spoke strongly against Texan annexation. In 1838, when Calhoun introduced a series of resolutions touching the constitutional status of slavery, Morris introduced a set of alternative resolutions embodying a rational and explicit statement of the views of the anti-slavery men. On the expiration of his term as Senator his constituents, to whom his views on the slavery question had been displeasing in the extreme, discarded him for Benjamin Tappan. In January, 1840, at the Democratic State convention, he was read out of the party, and later in the year associated himself politically with the new Liberty Party (q.v.) movement. In May, 1841, he was nominated for Vice-President on the Liberty Party ticket, on which James G. Birney had been named for President. These nominations, which were for the campaign of 1844, were confirmed at the Buffalo convention of the party in 1843. Consult: Smith, *The Liberty and Free-Soil Parties in the Northwest* (New York, 1897); and B. F. Morris, *Life of Thomas Morris* (Cincinnati, 1856).

MORRIS, William (1834-96). An English poet, artist, and socialist, born at Walthamstow, near London, March 24, 1834. Morris's early boyhood was spent in the romantic region near Epping Forest, where he showed at the outset his love for nature. He was educated at Marlborough School and at Exeter College, Oxford. Here he mingled little in the college life, but he read swiftly and widely, thus quickly storing in his strong memory a stock of knowledge which he put to use. In 1854 distress of religion almost cast him upon the wave of Catholic feeling, but the impulse passed. He mastered Church history and Anglican theology, but he soon left them in a new enthusiasm for Carlyle, Ruskin, and Kingsley. In 1854 Morris visited France, whither he went again in 1855 with his friend Edward Burne-Jones (q.v.). On this tour he fell so wholly under the spell of French Gothic that he gave up his earlier purpose of founding a religious brotherhood and became an architect. After trying his hand at architecture and painting, he found his true calling in 1861, when with Rossetti, Burne-Jones, and other friends, he established a firm in London for designing and manufacturing artistic furniture and household decorations. As time went on, Morris took up the manufacture of tapestry and other textiles, dyeing, book-illumination, and printing. The old firm of decorative art was dissolved in 1871; and in 1881 Morris transferred his works to Merton in Surrey. In 1890 he founded the famous Kelmscott Press at Hammersmith. For the practical advancement of the lesser arts, and of the rare doctrine that all things should be made beautiful, Morris did more than any other man of his time. At Oxford, Morris showed his literary talent in several contributions in verse and prose to the *Oxford and Cambridge Magazine*, which he maintained (1856). Two years later he published the *Defence of Guenevere, and Other Poems.* This volume, pre-Chaucerian in tone, marks a date in later Romanticism; and never again did Morris equal it in force and concentration. Afterwards, Morris turned for his subjects to Greek, Old French, Norse, and other mediæval stories, which he clothed in verse with great facility. By the *Life and Death of Jason* (1867) and *The Earthly Paradise* (1868-70), he proved himself one of the best story-tellers since Chaucer, his avowed master. In the summer of 1871 he made a trip through Iceland. In 1876 appeared *Sigurd the Volsung and the Fall of the Niblungs*, a narrative poem approaching the dignity of an epic. Morris wrote many romances in prose or in prose and verse combined; among which are the *House of the Wolfings* (1888), *The Roots of the Mountains* (1890), *The Well at the World's End* (1896), and, best of all, the *Story of the Glittering Plain* (1891). In the same year he published a semi-utopian romance, *News from Nowhere*, in which he sought to popularize his socialistic ideals. As a translator, he succeeded capitally in his renderings from the *Sagas.* In 1885 he became an active socialist, delivering lectures to workmen and contributing to the *Commonweal*, the organ of the Socialistic League. He died October 3, 1896, leaving to the world an immortal example of the man who devotes his wealth and his genius to the bettering of visible things and to the spread of manly ideals. A collection of various papers, entitled *Architecture, Industry, and Wealth*, was not published till 1903. Consult: Vallance, *William Morris, His Art*, etc. (containing a bibliography, London, 1897); Mackail, *The Life of William Morris* (London and New York, 1899); Cary, *William Morris. Poet, Craftsman, and Socialist* (New York, 1902); Riegel, "Die Quellen von William Morris's Dichtung, The Earthly Paradise," in *Erlanger Beiträge zur englischen Philologie* (Leipzig, 1890); and see Pre-Raphaelites.

MOR'RISBURG. A port of entry of Dundas County, Ontario, Canada, on the left bank of the Saint Lawrence River, opposite Waddington, N. Y., 43 miles southeast of Ottawa (Map: Ontario, H 3). It is on the Grand Trunk Railway at the entrance to the Rapide du Plat Canal. It has a shipping trade and is the seat of a United

States consul. Population, in 1891, 1859; in 1901, 1693.

MORRIS DANCE (from OF. *morisque, moresque*, Fr. *moresque*, from Sp. *morisco*, Moorish, from *moro*, Moor, from ML. *Morus*, Lat. *Maurus*, Gk. Μαῦρος, *Mauros*, Moor). An obsolete English dance of Moorish origin. It seems to have been introduced into England about the time of Edward III., but it did not become universally popular until the time of Henry VII. During the succeeding reign it reached its highest development. When danced in connection with May Day it was an elaborate costume dance, and the characters of Robin Hood, Friar Tuck, Maid Marian, Little John, a dragon, and hobby-horse were introduced. The costumes of the performers were generally decorated with scores of small bells which were tuned in musical intervals. There were several variations of the Morris Dance, the two most notable being a sword dance, where the performers leaped over swords, and a ribbon dance, in which the girls danced back and forth between colored streamers. At the Restoration the Morris Dance was revived for a time, but soon died out. There is at present in Yorkshire a country dance called the Morris, but the time ($\frac{4}{4}$) is the only feature which it has in common with its prototype.

MORRIS ISLAND. An island at the southern entrance to the harbor of Charleston, S. C. Three small batteries on Cumming's Point, at the northern end, took part in the bombardment of Fort Sumter on April 12-13, 1861. Later the works were strengthened and called Battery Gregg, and Battery Wagner was constructed to the south. In the spring of 1863 Admiral Du Pont and General Hunter made unsuccessful attempts to reduce these defenses. When these officers were succeeded by Admiral Dahlgren and General Gillmore, early in July, a landing was effected on the southern part of the island, but on the 11th and 18th desperate assaults failed. A regular siege was established and five parallels were constructed. The guns of Fort Sumter, which were trained to protect the island, were silenced by the Federal fleet, and on September 7th General Beauregard ordered the evacuation of the island. Later Battery Gregg was remounted by the Federal forces and did much damage to the city.

MOR'RISON. A city and the county-seat of Whiteside County, Ill., 124 miles west of Chicago; on the Chicago and Northwestern Railroad (Map: Illinois, B 2). It is surrounded by a section interested largely in farming, stock-raising, and dairying, and manufactures refrigerators and school furniture, flour, carriages, and wagons. It has a public museum and library. Population, in 1890, 2088; in 1900, 2308.

MORRISON, Arthur (1863—). An English novelist, widely known for the remorseless realism with which he depicts London life. His publications comprise: *Tales of Mean Streets* (1894); *Martin Hewitt, Investigator* (1894); *Chronicles of Martin Hewitt* (1895); *Adventures of Martin Hewitt* (1896); *A Child of the Jago* (1896); *The Dorrington Deed-Box* (1897): *To London Town* (1899); *Cunning Murrell* (1900), the scene of which is laid in Essex; and *The Hole in the Wall*, a story of Wapping (1902).

MORRISON, James Dow (1844—). An American Episcopal bishop, born of Scottish parents in Waddington, N. Y. He received his early education in Canada, graduated from McGill University, Montreal, in 1865, and three years afterwards was ordained a deacon in Quebec. Becoming a priest in 1870, he took a charge in Canada, but the following year was called to Herkimer, N. Y., and thence to Ogdensburg in 1875, where he was archdeacon from 1881 until 1897, when he was consecrated first Protestant Episcopal Missionary Bishop of Duluth. In 1898 he was appointed Paddock lecturer by the General Theological Seminary of New York.

MORRISON, Robert (1782-1834). The first Protestant missionary to China, born at Buller's Green, Morpeth, England. Three years later his father removed to Newcastle. He learned the trade of boot-tree maker after leaving school. In 1797 he was converted, joined the Presbyterian Church, and began to improve himself by study. In 1803 he was admitted to Hoxton Independent Academy, and in the following year entered the Mission College of Gosport. The London Missionary Society decided in 1807 to begin mission work in China, and Morrison, having been ordained, was sent out as the first missionary. Under the protection of some merchants from the United States settled at Canton, he assumed Chinese dress and began the study of Chinese. In 1809 he was appointed translator to the East India Company's factory here, and while in this position he prepared a *Grammar of the Chinese Language*, published in 1815. Between 1815 and 1823 appeared the six thick quarto volumes of his *Dictionary of the Chinese Language*, a work of great learning, but now superseded. He also produced several vocabularies of Canton-English and English-Canton. His *New Testament* in Chinese was published in 1815, and the *Old Testament* appeared in 1818. In that year he founded the Anglo-Chinese College at Malacca. It was removed to Hong Kong in 1845. He died in Canton. Consult: the *Memoir* by his widow (2 vols., London, 1839); and Townsend, *Robert Morrison* (New York and Chicago, 1888).

MORRISON, William (c.1783-1866). A Canadian explorer and fur trader, born at Montreal. He began trapping and trading for Sir Alexander MacKenzie & Co. at Fond du Lac in 1802, and joined the Northwest Company in 1805. After John Jacob Astor gained control in 1818 of the business in the United States, Morrison worked for him until 1826. Morrison claimed to have explored during the winter of 1803-04 Lac La Biche, or Elk Lake, which was long afterwards (1832) identified as the source of the Mississippi by Schoolcraft and renamed Itasca. He was probably naturalized as an American citizen, but spent the last years of his life in Canada. Consult *Minnesota Historical Society Collections* (vol. i., Saint Paul, 1872; vol. vii., Minneapolis, 1893; vol. viii., Saint Paul, 1898).

MORRISON, William Ralls (1825—). An American politician and Congressman, born in Monroe County, Ill. He was educated at McKendree College, but left before graduation to enlist as a private in an Illinois volunteer regiment for the Mexican War, and participated in most of the battles of Taylor's campaign. After his return he studied law, was admitted to the bar, and from 1855 to 1859 was a Democratic member of the Lower House of the Illinois Legislature, serving as Speaker in the last year. At the outbreak of the Civil War he organized and became colonel of the Forty-ninth Illinois Infantry, serving in that capacity until December, 1863, when he resigned to take his seat as a Democrat in the Thirty-eighth Congress, to which he had been elected while at the front in the preceding year. He practiced law from 1865 until 1873, and from that year until 1887 was again a member of the National House of Representatives. During his Congressional career he attained wide distinction as an advocate of a radical reduction in the tariff, but was never able to secure the support of enough members of his own party to assure the passage of bills which as chairman of the Ways and Means Committee he introduced in 1876, 1884, and 1886. The bill of 1884, embodying the famous 'horizontal' tariff scheme, which proposed a straight (or horizontal) reduction of 20 per cent. from the tariff of 1883, was defeated by a slender majority obtained through the opposition of the protectionist Democrats under the lead of Samuel J. Randall. In 1885 Morrison was defeated for election to the United States Senate by John A. Logan by one vote, and in the following year failed of reëlection to the House. He was appointed by President Cleveland a member of the Interstate Commerce Commission in 1887, and served until 1897, for the last six years as chairman.

MOR′RISTOWN. A town and the county-seat of Morris County, N. J., 18 miles west of Newark; on the Lackawanna, the Rockaway Valley, and the Whippany River railroads (Map: New Jersey, C 2). Among the features of the town are Memorial and All Souls' hospitals, the Young Men's Christian Association and Young Men's Catholic Association buildings, a public park with a Soldiers' Monument, and a large public library and lyceum, occupying a handsome edifice. Here is the site of Fort Nonsense, erected by Washington and marked by a memorial monument. Four miles from the town, at Morris Plains, is the State Hospital for the Insane, which cost nearly $3,000,000, has accommodations for 1500 patients, and at the time of its completion was the largest institution of its character in the United States. Morristown is in the rose and peach belt of the country, on a tableland surrounded by hills, rising nearly 700 feet above sea level, and is in a great measure a wealthy residential place with large villas. No effort has been made to foster manufacturing, but the trade of the town with the surrounding country is active. Its comparatively dry and bracing winter climate attracts invalids. The government, as provided under the original charter of incorporation, is vested in a mayor and a municipal council, of which the executive is a member. The school commissioners are chosen by popular vote. Population, in 1890, 8150; in 1900, 11,267.

Settled about 1710, Morristown was known as West Hanover until in 1740 it received its present name in honor of Lewis Morris, then Governor of New Jersey. During the Revolution Washington made his headquarters here from January to May, 1777, and again from December, 1779, to June, 1780, occupying during the latter period the old Ford mansion, which now belongs to the Washington Association, and in which numerous Revolutionary relics are exhibited. At the old Speedwell Iron Works here the shaft of the *Savannah,* the first steamboat to cross the Atlantic, was cast, and here, from 1837 to 1843, Professor Morse and Alfred Vail perfected the electric telegraph. Morristown was incorporated in 1865. Consult: Colles, *Authors and Writers Associated with Morristown,* etc. (Morristown, 1893); Tuttle, *History of Morristown.*

MORRISTOWN. A city and the county-seat of Hamblen County, Tenn., 42 miles northeast of Knoxville; on the Morristown and Cumberland Gap and the Southern railroads (Map: Tennessee, H 4). It is the seat of the Morristown Normal College, a Methodist Episcopal institution for negroes. Morristown is the commercial centre of a rich agricultural section, and is an important stock market. The manufactures include flour, tobacco, stoves, wagons, leather, brooms, agricultural implements, and sash and blinds, and there are quarries of variegated marble and zinc, lead, and iron mines in the vicinity. Population, in 1890, 1999; in 1900, 2973.

MORS. The largest island in the Limfjord, in the northwestern part of Jutland, Denmark (Map: Denmark, B 2). Its area is 139 square miles. It is in marked contrast with the surrounding mainland, being much more fertile, and having a somewhat elevated (250 feet) interior, with steep coasts. Population, in 1901, 22,237. The chief town is Nykjöbing.

MORSE (probably from Icel. *mar,* sea + *ros,* horse, cf. Norweg. *rosmar,* walrus; less plausibly from Russ. *moryŭ, morzhŭ,* morse, from *more,* sea). An old name for the Atlantic walrus (q.v.).

MORSE, Edward Sylvester (1838—). An American naturalist and archæologist, born at Portland, Maine. He was educated at Bethel Academy, Maine, and at the Lawrence Scientific School, Cambridge. He was professor of comparative anatomy and zoölogy at Bowdoin College from 1871 to 1874, and at the Imperial University, Tokio, Japan, from 1877 to 1880. In 1881 he was appointed director of the Peabody Academy of Sciences, of which he was a founder. He also became known as a popular lecturer on natural history and Oriental travel. Morse established a reputation early as a zoölogist by the following studies of brachiopods, which proved them not to be mollusks: *Early Stages of Terebratulina* (1870); *Embryology of Terebratulina* (1872); *Systematic Position of Brachiopods* (1873). He also wrote *Ascending Process of the Astragalus in Birds* (1880). While in Japan Morse interested himself greatly in the art, antiquities, social customs, and folk-lore of the people, and he made extensive collections of pottery and investigated its prehistoric archæology. Some of the results were published in the books: *Japanese Homes and Their Surroundings* (1886); *On the Older Forms of Terra-Cotta Roofing Tiles* (1892); and other pamphlets and papers, which are regarded as highly important by specialists. His unique collection of Japanese pottery and objects of art was bought by the Museum of Fine Arts in Boston, where it is installed separately as the 'Morse Collection,' of which Professor Morse was made curator. An illustrated *Catalogue* of it, prepared by Morse, was published by the museum in 1901; it is regarded by critics as "a masterpiece of hard work and intelligence," and a fine example of beautiful book-making. Morse has also had charge for many years of the Museum of the Peabody Academy of Sciences at Salem, Mass.

MORSE, John Torrey (1840—). An American biographer. He graduated at Harvard College in 1860, lectured there on history (1876-79), was co-editor with Henry Cabot Lodge of the *International Review*, and practiced law in Boston. His work is to be found in various reviews. His books include: a *Treatise on the Law Relating to Banks and Banking* (1870); *Law of Arbitration and Award* (1872); *Famous Trials* (1874); a *Life of Alexander Hamilton* (1876); *Life and Letters of Oliver Wendell Holmes* (1896), and in "The American Statesmen Series," edited by him, the lives of *John Quincy Adams* (1883), *Thomas Jefferson* (1883), *John Adams* (1884), *Benjamin Franklin* (1889), and *Abraham Lincoln* (1893).

MORSE, Samuel Finley Breese (1791-1872). An American artist and inventor. He was born at Charlestown, Mass., and graduated at Yale College in 1810, later visiting England with the American painter Washington Allston, where he studied painting with him and Benjamin West. In 1813 he received the gold medal of the Adelphi Society of Arts for his first effort in sculpture, the "Dying Hercules." Returning to New York in 1815, he became in 1826 the first president of the National Academy of Design, and was appointed in 1835 professor of the arts of design in the University of the City of New York. He did not give his entire attention to art, but was interested in chemistry and especially in electrical and galvanic experiments; his interest doubtless being awakened in the subject of electro-magnetism through conversation with Prof. J. Freeman Dana, who lectured in New York on that subject in 1826-27, and exhibited an electro-magnet. Morse first conceived the idea of the telegraph while on board the packet-ship *Sully* on his way from Europe to America in 1832, while discussing the then recent discovery in France of a method for obtaining the electric spark from the magnet. Before the close of that year a portion of the apparatus which he had devised had been constructed in New York, but it was not until three years later that, in a room in the New York University building, he showed the telegraph operating with half a mile of wire. In September, 1837, he made a public exhibition of his discovery, and in that year filed his caveat at Washington. No result followed his appeal to Congress for aid during that session, and Professor Morse visited Europe with the hope of enlisting the interests of foreign governments in his invention. In this attempt he was unsuccessful, and he returned to New York, where, as well as in Washington, he struggled under serious privations during the four years which elapsed before he obtained (1843) Congressional aid. In that year, after he had almost yielded to despair, Congress at midnight, in the last moments of the session, appropriated $30,000 for an experimental line between Washington and Baltimore. After this aid had been granted, Morse succeeded after many difficulties in establishing a working telegraph line, and the first message, "What hath God wrought?" was sent from the rooms of the United States Supreme Court in the Capitol at Washington to Baltimore on May 24, 1844. From this time the telegraph was an assured success, but Professor Morse was frequently involved in litigation to maintain his rights under his patents. He also was engaged in numerous controversies. But the number and character of the honors heaped upon Professor Morse on account of his invaluable invention have probably never been equaled in the case of any other American. See Telegraph.

Professor Morse set up the first daguerreotype apparatus, and with Prof. John W. Draper was associated in taking the first daguerreotypes in America; he also laid the first submarine telegraph line (in New York Harbor in 1842); and from him, in a letter to the Secretary of the Treasury of the United States in 1843, seems to have come the first suggestion of an Atlantic telegraph. His death occurred about three months after his last public act—the unveiling of the statue of Benjamin Franklin, in Printing-house Square, New York. He died in New York, April 2, 1872. Consult Prime, *Life of S. F. B. Morse* (New York, 1875).

MORSE, Sidney Edwards (1794-1871). An American journalist, geographer, and inventor, a brother of Samuel F. B. Morse. He was born in Charlestown, Mass., graduated at Yale in 1811, studied theology and law, and in 1815 established the Boston *Recorder*, a weekly religious newspaper, which he edited for more than a year. In 1820 he published a small geography, and in 1823 a larger one called *A New System of Modern Geography*, of which more than five hundred thousand copies were ultimately sold. The success of the book was partly due to the later use in it of superior map-prints in color produced by a new process called cerography, which he, with the assistance of Henry A. Munson, developed in 1839. In 1823, with his brother Richard, he established the New York *Observer*, another religious weekly, and he continued to be its chief editor and proprietor until 1858.

MORSELLI, môr-sĕl'lā. Enrico Agostino (1852—). An Italian alienist and neurologist, born at Modena, and graduated at the university of that city in 1874. He studied psychiatry at Reggio under Livi, and anthropology at Florence under Mantegazza, and subsequently became professor of psychiatry in the Turin medical school and physician in charge of the insane asylum in the same city. He is the author of a number of medico-legal and neurological papers. Among his published works are: *Critica e riforma del metodo in antropologia* (Rome, 1880); *Suicide: An Essay on Comparative Moral Statistics* (New York, 1882); *Manuale delle malattie mentali* (Milan, 1885); *Il magnetismo animale* (Turin, 1886). Morselli was co-editor of the *Rivista sperimentale di freniatria e di medicina legale* in 1875; and of the *Archivio di psichiatria* in 1885.

MORSHANSK, môr-shänsk'. An important commercial town in the Government of Tambov, Russia, situated near the river Tsna, about 60 miles north-northeast of the city of Tambov (Map: Russia, F 4). It produces tallow, soap, and spirits on a large scale, and is the seat of an extensive trade in agricultural products and live stock. Population, in 1897, 27,756.

MORTALITY, STATISTICS OF. See VITAL STATISTICS.

MORTAL SIN. In Roman Catholic theology, the name given to the graver class of sins, in distinction from venial sins (q.v.). For a sin to be mortal, it must be a conscious violation of a known divine law, decided upon deliberately by a free will, and it must be in a matter of importance; thus, for example, the theft of a few pennies, without aggravating circumstances, would not be a mortal sin. Mortal sin, as its name implies, is believed to destroy absolutely the divine life of grace in the soul and render it deserving of eternal punishment, unless remitted by perfect contrition, or by attrition in conjunction with the sacrament of penance (q.v.).

MORTAR (OF., Fr. *mortier*, from Lat. *mortarium*, mortar; connected with *marcus*, hammer, Skt. *mar*, to crush). A mixture or paste of cement or lime and sand. Mortars may be classified according to the nature of the cementing substance used, into: Common lime mortar, hydraulic lime mortar, and cement mortar.

COMMON LIME MORTAR. Mortar made of common lime is extensively used because of its intrinsic cheapness and the ease with which it can be prepared. It sets or becomes hard only in air, however, and should consequently not be used under water or in wet places. Its small strength compared with cement mortar, however, limits its use to structures in which great strength is not required. In making lime mortar the proportions of the mixture are usually about one volume of lime to from two and one-half to three volumes of sand. The lime is placed in a layer in a shallow box or in a depression scooped out of the sand and then sprinkled with a quantity of water from two and one-half to three times the volume of the lime. This being done, the lime should be left to 'slack' undisturbed. It is generally held by engineers that the lime should be slacked at least twenty-four hours before it is mixed with the sand. This is frequently not done, through haste or carelessness, in common building operations. It is also important that all the water required for slacking should be added to the lime at one time, since the addition of water after slacking has begun retards that process and results in the production of a lumpy mortar. After the lime has been slacked the sand is spread in a layer over its top and the two materials are mixed and remixed by means of a hoe or shovel until a uniform paste is secured. The mortar is then ready for use.

HYDRAULIC LIME MORTAR. In hydraulic lime mortars the proportions of the ingredients and the manner of mixing them are substantially the same as for common lime mortar. The only change practically is the use of hydraulic lime instead of common lime. See CEMENT.

CEMENT MORTAR. The most valuable of all mortars are those made with hydraulic cements (see CEMENT) as a binding material. The proportions of the ingredients that are most commonly use are one part cement and two or three parts sand. To make the mixture about half the sand is spread in a layer over the bottom of the mixing box; the cement is then spread in a layer over this sand bed, and is in turn covered with the remainder of the sand. The mass of cement and sand is then turned and re-turned with a shovel until the two ingredients are thoroughly intermingled. Water is then added to the mixture, which is again turned by the shovel until it is uniformly wet.

GROUT. A thin or liquid mixture of lime or cement is called grout. It is used to fill up small interstices by pouring it upon the masonry, into the voids of which it is expected to find its way because of its liquid nature.

For a comprehensive discussion of mortars, see Baker, *A Treatise on Masonry Construction* (New York, 1902). See BUILDING.

MORTAR. A type or form of ordnance used for high-angle fire. In design it is short in length in proportion to its calibre or size of bore. In the United States and England mortars are almost entirely used for coast defense purposes. In the former country mortar batteries consist of either eight or sixteen mortars each, four mortars to a pit. The pits are fortified with parapets constructed of sand reënforced on the interior by a concrete wall. They are separated by substantial traverses which contain the necessary magazines, bomb-proofs, etc. (See illustration under FORTIFICATION.) The batteries are controlled by an officer (the predicting officer), who observes the plotting board, the target, and the effect or destination of the projectile, in order to give the proper direction and elevation to the men working the pieces in the pit. France has taken the lead in the manufacture of these types of ordnance, the Creusot works of Messrs. Schneider & Co. being perhaps the best known in the world.

The use of field mortars has not been as yet put to the test of modern battle conditions, so that their employment is largely a matter of conjecture. In 1903 Russia led the world with a regularly organized and equipped division of 24 batteries, 6 mortars to a battery. Austria and Germany come next, the latter country differing from Russia in details of organization. Although the advantages of field mortars are conceded to be greater than their disadvantages, the latter are still sufficiently important to delay their general immediate employment. The most important disadvantage is the difficulty of getting men so thoroughly trained that they are equally expert with the ordinary flat projectory field gun and the high-angle mortars. Another defect in field mortars is their utter inability of defending themselves at close range. For illustration of the 12-inch breech-loading mortar used in the United States service, see COAST ARTILLERY, and for an illustration of the 10-inch cast-iron muzzle-loading mortar, see ARTILLERY. See also COAST DEFENSE; HOWITZER; ORDNANCE. Under the latter head the construction of a modern mortar is described.

MORTARA, môr-tä'rȧ. A town in the Province of Pavia, Italy, situated on the Arbogna, and at the junction of several railroads, 25 miles southwest of Milan (Map: Italy, C 2). There are a Gothic church (San Lorenzo), with paintings, a theatre, and a high school. Manufactures of machines and hats are carried on. At the battle of Mortara, March 21, 1849, the Austrians defeated the Sardinians. Population (commune), in 1881, 8085; in 1901, 8631.

MORTARA, EDGAR. A Jewish boy whose alleged abduction excited much interest in Europe in 1858 and following years. He was the son of

Momolo Mortara, a resident of Bologna, and, as was said, was forcibly taken from his father's house on June 23, 1858, by the authorities on the ground that he had been baptized into Christianity by a Roman Catholic maid-servant. The efforts of the parents to recover the boy aroused much sympathy, but were unsuccessful. Apparently of his own choice, he remained with the Church authorities, was educated for the priesthood, became an Augustinian monk, and preached his first sermon in 1874. Consult *The True Story of the Jewish Boy Edgar Mortara* (London, 1860).

MORTAR VESSEL. A vessel fitted for carrying and operating a mortar. Such a vessel requires good beam and a strong deck to resist the recoil of the mortar. During the Civil War schooners were used as mortar vessels. In Europe, ketch-built vessels were largely used for this purpose, the so-called bomb-ketch being a frequent adjunct to a fleet in conducting operations against land defenses. Ketch-built vessels are not only stoutly framed and broad of beam, but the length of deck forward of the masts gives ample room for working a mortar.

MORTE D'ARTHUR, môrt där'tụr' (OF., the death of Arthur). The name applied, in slightly varying forms, to several versions of the Arthurian legend and cognate stories. (See ARTHUR.) There are two English metrical romances of the name, each existing in a single manuscript, and probably based on French originals. But in more than one way the most important work bearing this name is the celebrated reduction or blending by Sir Thomas Malory of French and English romances. It was completed in 1469 and first printed, by Caxton, in 1485. Of this edition but two copies exist, the only perfect one in New York: a scholarly reprint of it, with valuable editorial matter, was made by Sommer (London, 1889). Probably very popular for a time, this 'noble and joyous book,' as Caxton calls it, fell later into disrepute with an age out of harmony with its spirit, and was scornfully condemned by Ascham in a well-known passage of *The Schoolmaster.* But the nineteenth century recognized fully its extraordinary merits. "There was," says Saintsbury, "at Ascham's date, no more exquisite example of English prose in existence. There is not to this day a book, either in prose or in verse, which has more of the true romantic charm." Apart from the skillful combination of diverse elements to make a story, in which Malory shows little short of genius, his style, in its stately harmony and graceful picturesqueness, is most remarkable for its period. Indeed, he may be called the first English writer who shows a sense of the rhythmical flow and gracious music of which the language is so richly capable. The book probably did more than any other influence to nationalize the Arthurian legend; and the poets, from Spenser to Tennyson (in the *Idylls of the King*), have drawn abundantly on its treasures. The best modern editions, besides that mentioned above, are by Rhys (London, 1894); Wright (ib., 1856); Strachey (ib., 1868); and Gollancz, "Temple Classics" (ib., 1900).

MORTGAGE (OF. *mortgaige, morgage,* Fr. *mortgage,* from *mort,* from Lat. *mortuus,* dead, from *mori,* Skt. *mar,* to die + *gage,* ML. *vadium, wadium,* from Goth. *wadi,* OHG. *wetti,* Ger. *Wette,* AS. *wedd,* archaic Eng. *wed,* Lat. *vas,* pledge, Lith. *vaduti,* to redeem a pledge). Mortgage is the conveyance or transfer of property, either real or personal as security for the payment of a debt or the performance of a legal obligation.

The debtor or obligor may, and usually does, retain possession of the property mortgaged—the validity of the security not depending upon possession as in the case of pledge (q.v.) and common-law lien (q.v.) This method of securing performance of an obligation was known to the ancient law; and under the civil law the distinction was well settled between *hypotheca,* in which the property given as security remained in the possession of the debtor, and *pignus,* in which the property given as security was surrendered to the creditor.

Some writers have attributed the origin of the common-law mortgage to the civil law, while others assert that it grew out of the common-law conditional gift. However this may be, the giving of security by mortgage first became of importance at common law after the passage of the statute *Quia Emptores* (18 Edward I.), by which the restraints on alienation of lands held in fee were removed. Mortgages were then in form conditional grants, a form of gift or limitation peculiarly adapted to the giving of security without necessarily changing the possession of the security. At common law the owner of real estate might grant to another any estate in fee with the right on the part of the grantor or his heirs to reënter upon the property and revest the title in the grantee or his heirs upon the happening of a specified condition.

By making the condition of reëntry the payment of money or the performance of an obligation due from the grantor to the grantee, all the essentials of a common-law mortgage were created. Upon payment of the sum due when due, the condition of the grant or conveyance happened and title was thereby revested in the grantor or mortgagor, but if the mortgagor failed to pay the mortgaged debt when due, performance of the condition thereafter became impossible, and the mortgagor thereby lost all claim upon the mortgaged property.

Equity early exercised its jurisdiction to mitigate the harsh operation of the common-law rule relating to conditional conveyances by allowing the mortgagor who had failed to perform his obligation upon the due date (or the law day, as it was called) to redeem the mortgaged property upon payment of the sum due with interest. But as a means of limiting this equitable right of the mortgagor, equity also gave to the mortgagee the right to cut off the right of redemption by foreclosure, which was an equitable suit asking a judicial declaration that the right to redeem had been forfeited.

The modern law of mortgages, then, combines both legal and equitable doctrines; and many of its peculiarities, both of form and substance, will be explained by reference to the historical development of the law. While the mortgage in modern practice may, for most purposes, be regarded only as a lien created in favor of the mortgagee, it is still in form a conveyance vesting the title of the property in the mortgagee, and in the absence of statute, it is generally the rule that no mortgage valid at law can be created without a conveyance.

It is usual to incorporate in the mortgage a clause providing for the defeasance of the title upon payment of the mortgage indebtedness, but, as will appear, even that is not essential. In some States statutes have been passed authorizing a mortgage which is not a conveyance in form, but which for all practical purposes has the same effect as the common-law mortgage as modified by equity. One important consequence arising from the fact that at common law the mortgagee acquired a title was that his mortgage was valid against an innocent purchaser of the property for value without notice of the mortgage, which could not have been the result had the mortgage been a mere lien or right *in personam* against the mortgagor. See EQUITY; FRAUD.

This rule has been modified in the United States by statutes universally adopted requiring mortgagees and purchasers of property generally to record their documents of title in order to protect them against claims of purchasers without notice.

When the intention of an agreement is to create a mortgage, although it is not in effect a conveyance and consequently not a legal mortgage, equity will enforce the agreement against the mortgagor or third parties having notice of the agreement as though it were a valid mortgage.

Thus where the owner of real estate deposited his title deeds of the property with another for the purpose of scuring a debt or obligation, the English courts of equity have recognized in the transaction a valid mortgage. This doctrine of creating a mortgage by pledge of title deeds has not been recognized in the United States. (See LIEN.) When a conveyance is absolute on its face, equity, disregarding the parol-evidence rule, will inquire into all the circumstances of the transfer of title, and if it appear that the transfer was made only for the purpose of giving security, equity will treat the whole transaction as a mortgage and allow the grantor to redeem the property upon payment of the mortgage indebtedness. All mortgages, however, whether express or implied from the circumstances, are to be distinguished from conditional sales, which are agreements to sell and transfer title to the property upon the happening of a certain event. It will be observed that the position of a mortgagor is closely analogous to a conditional vendor who has agreed to sell property upon payment of a certain sum. There is, however, one important distinction between the two relations. In the case of conditional sales there is no existing indebtedness. The vendee is under no obligation to pay money to the vendor before electing to purchase, while the mortgagor is so bound. In determining in any given case whether the transaction is a conditional sale or a mortgage, courts will scrutinize the evidence with great care, and in case of doubt the tendency is to hold the transaction to be a mortgage. From the nature of mortgage it seems probable that a legal liability independent of the mortgage itself is not essential to its validity, but in general all mortgages are accompanied by some form of legal obligation for the performance of which the mortgage is given as security. This is usually a promissory note or bond payable to the mortgagee, and where the purpose is to issue numerous bonds secured by one mortgage, the practice is to make the mortgage or conveyance to a trustee, who holds the property as security for all the bondholders. Railroad mortgages are usually made in this manner. If the note or bond is illegal or there is any illegality in the mortgage transaction, the mortgage is invalid.

Mortgages are sometimes given to secure future advances to be made by the mortgagee. Such mortgages are valid and enforceable as between the mortgagor and mortgagee, but in some States they are held not to be valid against third parties, except as to advances actually made, of which the third party has actual or constructive notice at the time of acquiring an interest in the property. In a number of States, statutes provide that mortgages for future advances shall have no validity against third persons.

Any legal property, either real or personal, may be mortgaged, even including future or inchoate property, as crops planted but not yet grown, which the common law regards as being capable of present ownership. But a mortgage of property not yet acquired by the mortgagor could have no validity at common law. Mortgages of this character as well as mortgages of equitable interests were recognized and enforced by equity when the rights of innocent third parties were not involved. Such mortgages are now generally regarded as valid between mortgagor and mortgagee, but there are a variety of views held in the several States as to their validity against third parties—some courts, as those of Massachusetts, holding that they can have no validity against even creditors of the mortgagor unless the mortgaged property is delivered to the mortgagee, and some, as those of New Jersey, holding that they are valid against all parties having notice of the mortgage.

The mortgage, besides a description of the mortgaged property and the mortgage indebtedness, may, and usually does, contain clauses providing that the whole debt shall become due and payable upon failure to pay interest or taxes and assessments upon the mortgaged property. The mortgage may also include a power of sale enabling the mortgagee to sell the mortgaged property without foreclosure upon the mortgagor's failure to pay the debt. In many States such a provision is made inoperative by statutes which require foreclosure of the mortgage exclusively by judicial proceedings. A stipulation that the mortgagor shall have no right to redeem will be disregarded by the courts upon the same principle that courts of equity disregarded the condition of the common-law mortgage.

The estate of the mortgagor in possession has been likened to a tenancy at will or by sufferance, and as between himself and the mortgagee, the analogy is very close. At common law the mortgagee having the title could take possession at will, the sole right of the mortgagor, if the mortgagee exercised this right, being to redeem by payment of the mortgage indebtedness on the due date, but as to all others, the mortgagee in possession is clothed with substantial ownership. He is entitled to the rents, issues, and profits of the mortgaged property; he may sell or incumber it subject to the mortgage, and upon his death the property goes to his heirs at law.

In many States the mortgagee's common-law right to take possession of the mortgaged property by ejectment or other appropriate action has been cut off, and he can only secure possession of the mortgaged property through foreclosure.

Although the mortgagee holds the title to the mortgaged property, the law recognizes that he holds it as an incident to his claim against the debtor, which is personal property. The mortgagee's estate, therefore, in both real and personal property, is regarded as personal property only, and passes, upon his death, to his next of kin and not to his heirs.

In general, the mortgagee out of possession is in the position of one having a mere lien or personal claim against the mortgagor. But the mortgagee in possession of the mortgaged property, who was at common law substantially in the position of owner of the property, was compelled by equity to account for the rents, issues, and profits, and to apply them upon the mortgage indebtedness. This is now the established rule.

Both the mortgagor and the mortgagee may freely assign their interests. It is not unusual for the assignee of the mortgagor to assume the mortgage indebtedness by the instrument of assignment, and it is the general rule that the mortgagee may enforce this undertaking either upon the theory of subrogation or that the mortgagee may sue upon a contract made for his benefit. For other incidents of the estates of mortgagor and mortgagee, see CURTESY; DOWER; FIXTURES; WASTE.

When several mortgages are given upon the same property they have priority in the order of their creation unless otherwise provided. This rule may be varied by the operation of the various recording acts.

A mortgage may be extinguished by payment of the mortgage indebtedness, or by a legal tender of the amount due on the day when due. Tender after that time had no effect at common law, and in equity the only effect was to prevent interest accruing. A mortgage may also be terminated by a release of the mortgagor, or by a merger. If the merger is accomplished by a conveyance of the mortgaged property by the mortgagor to the mortgagee, the courts will scrutinize the transaction with the greatest care, and if there appear to have been any unfairness or undue influence on the part of the mortgagee, will allow the mortgagor to redeem. See MERGER.

A mortgage is extinguished by the final judgment or decree in an action to foreclose the mortgaged property or in an action to redeem it from the mortgagee. See FORECLOSURE; EQUITY OF REDEMPTION.

Courts have always favored the mortgagor's right to redeem, and at any time before the extinction of the mortgage will allow him to compel a cancellation and surrender of the mortgage upon payment of the mortgage indebtedness with interest, and, as an incident to the redemption, will compel the mortgagee to account for rents or other income which he has received from the mortgaged property. Consult: Jones, *Treatise on the Law of Mortgages of Real Property* (5th ed., Boston, 1894), and of *Personal Property* (4th ed., Boston, 1894); Pingrey, *Treatise on the Law of Chattel Mortgages* (Jersey City, 1891); *On the Law of Mortgages of Real Property* (Jersey City, 1893); and the authorities referred to under REAL PROPERTY.

MORTGAGE BANKS. Banks designed primarily to furnish credit on land, houses, mines, and other immovable property. The loans are usually for periods from ten to seventy-five years, and are secured by mortgage. The loan contract provides for the extinguishment of the debt by means of equal annual payments, comprising interest and amortization; but the debtor has the option of paying the principal in anticipation, and, as a matter of fact, a large percentage of the loans made by mortgage banks are canceled before maturity. The bank secures funds by selling its obligations or mortgage pledges, the difference between the interest on the loans made by the bank and the interest which it pays on its obligations constituting its profit. Mortgage banks are found in many European countries. The first important one was the Crédit Foncier of France, which has been in existence since 1852 and has had an organization similar to that of the Bank of France since 1854. It can make loans on first mortgages to the amount of one-half of the estimated value of houses and farms, and one-third of that of vineyards and other plantations. The rate of interest on loans must not exceed the rate paid by the bank on its obligations by more than six-tenths of one per cent. The Crédit Foncier of Algeria and the Crédit Foncier Colonial were formerly branches of the Crédit Foncier of France, but are now independent. Instead of one large national organization, Germany has forty mortgage banks, fourteen of which are in Prussia. In 1898 these institutions had an aggregate capital of 554,297,256 marks and held mortgages to the amount of 6,207,889,143 marks. Some of them, however, issued other forms of credit. In Belgium the only bank which deals in mortgages exclusively is the Crédit Foncier, but there are banks at Brussels and Antwerp which deal largely in land credit. Similar institutions are found in Austria-Hungary, Holland, Italy, Spain, Portugal, Sweden, and Russia. The chief service of mortgage banks consists in making mortgages negotiable. In Europe, the owners of land and houses are able to get loans at a low rate of interest—less than 3 per cent. in France and 4 per cent. in Germany. They can pay their debts in small yearly installments from the produce of their capital. In the United States, where there is no legislative provision for the establishment of mortgage banks, the lender and the property owner can be brought together only by a form of brokerage, and the terms of the debt usually require the payment of the principal in a few years. Consult the article on "Hypothekenbanken," in Conrad, *Handwörterbuch der Staatswissenschaften* (Jena, 1898-1901); Taft, "Mortgage Banks," in *Journal of Political Economy* (September, 1898).

MORTIER, môr'tyâ', EDOUARD ADOLPHE CASIMIR JOSEPH, Duke of Treviso (1768-1835). A French marshal. He was born at Cateau-Cambrésis, February 13, 1768. His father was a Deputy to the States-General in 1789, and though Mortier was educated for a business career, he entered the service of the Republic as a lieutenant of carbineers in 1791. He rose rapidly, and in 1793 became adjutant-general. After greatly distinguishing himself under Moreau and Kléber, he was made a general of division in 1799. In 1803 he was in command in Hanover, and in the administration of that country showed the utmost probity and sagacity. Created a marshal of the Empire in 1804, and placed in charge of an army corps in 1805, Mortier showed his military genius by holding in check a superior force of Russians at Leoben. In 1806 he occupied Hanover, Hesse-Cassel, and Hamburg, and defeated the Swedes in several encounters. He commanded the left wing of the French army at Friedland, and after the Peace of Tilsit was intrusted with the government of Silesia and created Duke of Treviso. Sent to Spain in 1808, he took part in the siege of Saragossa and defeated the Spaniards at Ocaña (November 19, 1809). After sharing in the Russian campaign of 1812 Mortier took a decisive part in the battle of Lützen (May 2, 1813) and in all the subsequent military events of 1813-14. When Napoleon's cause was lost, Mortier at last gave in his adhesion to the Government of Louis XVIII. During the period of the Hundred Days Mortier first saw the King safely out of France and then joined his old leader. After the second Bourbon restoration, he was crossed off the list of peers for refusing to sit on the court martial of Ney. He became a member of the Chamber of Deputies in 1816, and was restored to the Chamber of Peers in 1819. After the Revolution of 1830, he was made Ambassador at Saint Petersburg, became Grand Chancellor of the Legion of Honor in 1833, and Minister of War and president of the Council in 1834-35. He was killed on the Boulevard du Temple, July 28, 1835, by a missile from the infernal machine of Fieschi (q.v.).

MORTILLET, môr'tē'yȧ', LOUIS LAURENT GABRIEL DE (1821-98). A French anthropologist, born at Meylan, Isère. His interest in prehistoric archæology dates from a trip to Italy in 1858, and he began to study the Swiss lake dwellings. In 1864, after his return to France, he founded a review, *Matériaux pour l'histoire positive et philosophique de l'homme*, and in 1868 became an assistant at the Museum of Saint Germain. In 1876, with Broca, he planned the Ecole d'Anthropologie. His published work includes: *Signe de la croix avant le christianisme* (1866); *Les habitations lacustres du lac du Bourget* (1867); *Origine du bronze* (1876); *Le préhistorique* (1882); and *Origines de la chasse, de la pêche et de l'agriculture* (1890).

MOR'TIMER, JOHN HAMILTON (1741-79). An English painter and engraver, born at Eastbourne. He was a pupil of Hudson and of Reynolds, and won the first prize of the Society of Arts in 1763. His vigorous if somewhat uncertain talent and his love of the terrible are shown in such works as the "Battle of Agincourt," "Vortigern and Rowena," and "Hercules Slaying the Hydra," in the Victoria and Albert Museum, South Kensington. He was elected a Royal Academician in 1779. His etchings are notable for their bold execution. They include several after his own works. He also made designs for stained-glass windows in Salisbury Cathedral and Brasenose College, Oxford.

MORTIMER, ROGER DE (1287?-1330). First Earl of March and eighth Baron of Wigmore. For some years he was a faithful adherent of Edward II. of England, and from 1316 to 1321 his representative in Ireland to oppose Edward Bruce; but when recalled in 1321 Mortimer joined the insurgent barons who were hostile to the Despensers, with whom he had been allied for a year. In 1322 Mortimer submitted to Edward and was imprisoned in the Tower of London, but escaped to France two years later. There he met and fascinated Queen Isabella, wife of Edward, became her paramour, and determined upon the overthrow of the King. With a small force the two landed on the English coast in 1326, and were soon joined by large numbers of the discontented nobles and common people. The King was defeated, taken prisoner, and probably murdered in his prison in 1327. Mortimer took the title of Earl of March in 1328, and received confiscated estates and offices of immense value, while his creatures controlled the administration. Edward III. was a minor, and, though a council held the regency, Mortimer's influence was supreme. Mortimer became very unpopular when he made the 'Shameful Peace' with the Scots in 1328. Finally Edward III. resolved to be King in fact as well as in name, had the Earl of March seized at Nottingham Castle, and summoned a new Parliament. Mortimer was tried on charges of treason, condemned, and in 1330 hanged, drawn, and quartered. (See Edward III.) Consult: Stubbs, *Constitutional History*, vol. ii. (4th ed., Oxford, 1896), and Longman, *Edward III.*, vol. i. (London, 1869).

MORTIMER, HIS FALL. A fragment of a tragedy by Ben Jonson, consisting of only the argument and a few lines. It was completed in 1691 by W. Mountfort as *King Edward III., with the Fall of Mortimer.* Coxeter states that it was written by John Bancroft, who presented it to Mountfort.

MORTIMER'S CROSS, BATTLE OF. See EDWARD IV.; ROSES, WARS OF THE.

MORTISE (OF. *mortaise, mortoise*, Fr. *mortaise*, Sp. *mortaja*, mortise; possibly from Ar. *murtazz*, fixed, p.p. of *artazza*, to be fixed, from *razza*, to lay) **AND TENON** (OF., Fr. *tenon*, from *tenir*, to hold, from Lat. *tenere*, to hold). A form of joint in carpentry. The tenon is a projection, generally rectangular in form, on the end of a piece of wood, cut so as to fit exactly into a deep groove (called the mortise) in another piece, so that the two are united at a required angle. The framing of doors, shutters, and such pieces of joinery is usually fitted together with mortise and tenon joints. Mortise holes are also made to receive locks and other fittings.

MORTMAIN (OF. *mortemain*, from ML. *mortua manus*, dead hand), STATUTES OF. The term mortmain is applied to the perpetual tenure of lands by corporations, particularly church corporations, whose members and officers, being ecclesiastics, were by the early law deemed civilly dead, and hence the derivation of the term as signifying land held by the dead hand of the Church. In later times the term has been applied to the tenure of lands by corporations generally, whether ecclesiastical or lay.

Mortmain first became a matter for the serious attention of English legislators and lawyers as early as the reign of Edward I. The policy of the various ecclesiastical corporations of acquiring large holdings of land and retaining them became a menace to the well being of the State, partly because it afforded a ready means of accumulating wealth and power which were held in strict allegiance to the Church, whose interests were often in conflict with those of the civil authority, but primarily because the ownership of land by ecclesiastical corporations was inconsistent with feudal tenure. The feudal system presupposed the holding of land by a tenant who could render to his overlord certain services or dues upon the happening of certain events. The most important of these were: (a) *Relief.*—A sum which an heir was accustomed to pay to the lord upon coming into his ancestor's tenancy. (b) *Wardship.*—The right of the lord to become the guardian of the infant heir of his tenant. (c) *Marriage.*—The right of the lord to dispose of the tenant's daughter in marriage. (d) *Escheat.*—The right of the lord to the freehold upon the death of the tenant without heirs.

It is apparent that the acquisition of land by an ecclesiastical corporation which could not die or contract marriage, and which had not any of the other attributes of a natural person, struck at the very basis of the feudal system, and was regarded with jealousy by the great lords and civil officers of the Crown. The result was a series of legislative enactments, extending over a period of nearly six hundred years, having for their purpose the restraint of alienation in mortmain. No sooner did the will of the State find expression in appropriate legislation for this purpose than the powerful influence of the Church sought to evade or nullify it by judicial interpretation or by resort to legal fictions invented by skillful lawyers and urged by them upon the courts with such success that ultimately new legislation became necessary. To this historic struggle between the Church and the landed aristocracy are attributable many of the peculiarities of the common law of real property.

The earliest statute relating to the subject after the fall of the Western Empire was an edict of the Emperor Frederick Barbarossa in 1158 prohibiting conveyances to church corporations. In England there have been enacted in all twenty-one statutes affecting the power to alienate in mortmain. The earliest of these (a provision contained in the Magna Charta, ch. 43, that there should be no transfer of land to church corporations by a tenant without the consent of his lord) seems to have fallen into disuse or to have been evaded by conveyances direct to the officers of the religious houses, who held the property for the benefit of such houses.

The next statute of importance, and the first to curb effectively the acquisition of land by the ecclesiastical corporations, was the statute De Religiosis (7 Edw. I., Stat. II., ch. 13), passed in 1279. The preamble of this interesting piece of legislation reads as follows:

"Where of late it was provided that religious men should not enter into the fees of any without license and will of the chief lord of whom such fees be holden immediately, and notwithstanding such religious men have entered as well into their own fees as into the fees of other men, appropriating and buying them, and sometimes receiving them of the gift of others, whereby the services that are due of such fees and which at the beginning were provided for defense of the realm are wrongfully withdrawn, and the chief lords do lose their escheats of the same—" etc.

This statute made all alienations in mortmain unlawful, and made the provision effective by enacting that all such conveyances should work a forfeiture to the lord of the land attempted to be conveyed. The lawyers of the time, however, soon devised a method for evading the statute by the use of common recovery (q.v.). This development in the common law was met by a new legislative enactment (13 Edw. I., ch. 32), in 1285, which forbade alienation of lands in mortmain by common recovery, and attached the same penalty to such alienation as in case of the conveyances forbidden by the Statute De Religiosis. The Statute Quia Emptores (18 Edw. I., ch. 1), which removed some of the common-law restraints upon alienation, expressly excluded from its operation all alienation in mortmain.

These statutes in time were evaded by the practice of conveying lands to a layman to be by him held for the use or benefit of an ecclesiastical corporation, which obligation came to be enforced by the Chancellor. The *use* was the forerunner of the modern trust and the basis of equity jurisdiction over trusts. And it is to the great struggle over alienation in mortmain more than to any one other factor that the growth of the modern law of trusts is due. In 1391 this practice was forbidden on pain of forfeiture, unless such conveyance to *uses* was licensed by the King (15 Richard II., ch. 5).

The Statute of Wills, allowing testators to dispose of their property by will, did not in terms permit the testator to devise real estate to a corporation. By judicial interpretation, however, the power was established to devise lands to corporations for charitable purposes.

From this period down almost to the present time statutes have been enacted modifying or further restraining the power of alienation to corporations, whenever judicial interpretation or the ingenious devices of lawyers made such enactments necessary.

The statute 9 Geo. II., ch. 36 (1736), is noteworthy in that it shows that the policy on which the Statute of Mortmain had hitherto been based had then changed somewhat. This statute, reciting that "public mischief had greatly increased by many large and improvident dispositions made by languishing and dying persons to charitable uses, to take place after their deaths, to the disinhersion of their lawful heirs," enacted that in future no lands or sums of money to be laid out in land should be given to any person or body unless such gift or conveyance should be made or executed in presence of two witnesses twelve months before the death of the donor or grantor, and be enrolled in the Court of Chancery within six months after the execution. Under this act, therefore, a person on his deathbed cannot in England give land, or money to buy land, for a charitable purpose. It can only be done in the life of the donor at least twelve months before his death, and the property must be completely alienated so that he has no further control over it. The deed must have a present operation, and must not reserve any life interest to the donor; it must be done at once and forever. The policy of this statute has sometimes been questioned, and several well-known modes of evading the statute have been adopted from time to time.

All the English statutes of mortmain were revised and consolidated by the statute 51 and 52 Victoria, ch. 42. In general the statute still restricts alienation to corporations, but makes numerous exceptions in favor of gifts to churches, public parks, museums, and for literary and scientific purposes. Gifts to charity by will are regulated by 54 and 55 Victoria, ch. 73, which in general permits such gifts of land to charities if the land be sold within one year from the testator's death. Throughout the period of mortmain legislation it was possible for the Crown to grant a mortmain license enabling a corporation to purchase and hold lands, a prerogative which at times was freely exercised.

Owing generally to the absence of great religious corporations in this country, and to the fact that the feudal system never obtained a foothold here, the mortmain acts were not reenacted in the United States, with possibly one or two exceptions. Pennsylvania has a mortmain act, and New York has a statute which, like the statute of 9 George II., seems calculated rather to restrain a testator from making unwise and improvident gifts to charity than to prevent land-holding by corporations. The statute provides that a testator who leaves surviving him a wife, child, or parent shall not devise or bequeath more than one-fourth of his estate to a charitable corporation; and no such devise or bequest shall be valid unless made more than two months before the death of the testator.

In many States business corporations may not receive real estate by devise, but generally charitable corporations may do so; and in most States there is no restraint upon conveyance of lands *inter vivos* to corporations, unless the charter of the corporation or the general law under which it is created limits the total amount of land which the corporation may hold. See Charitable Trusts; Uses; and Trust; and consult the authorities there referred to, and also under Real Estate. Also consult: Highmore, *View of the History of Mortmain* (London, 1809); Rawlinson, *Notes on the Mortmain Acts* (London, 1877).

MORTO DA FELTRE, môr'tô dȧ fĕl'trȧ (c.1474-c.1519). An Italian painter, born at Feltre. His fame rests upon Vasari's statement that he was the first to use classic arabesques in ornamentation. Of his life nothing certain is known, nor do any authenticated works by him survive. Cambruzzo, a seventeenth-century historian of Feltre, identified him with Pietro Luzzi (also called Zarato) of that town, who was an assistant of Giorgione at Venice. Luzzi is recorded as having been at Rome in 1495, at Florence in 1506, and at Venice in 1508. He is known to have decorated with frescoes the town-hall, the Church of San Stefano, and two houses in his native town. According to the usual account, Morto was killed fighting in the Venetian army at the battle of Zara; but if he be identical with Luzzi, he cannot have died till after 1519, in which year the latter was active in his native town.

MORTON, Charles (1627-98). An English clergyman and educator, born at Pendavy, Cornwall, and educated at Wadham College, Oxford. He renounced the Royalist traditions of his family and became a Puritan, though he did not leave the Anglican communion until 1662. He opened a school for dissenters at Stoke Newington, near London, which he maintained until 1685, having Daniel Defoe among his pupils. Contrary to the custom of the universities, he made his pupils write their dissertations and hold their disputations in English—a practice which, Defoe affirms, made his pupils excel in English those of any other school. In 1686 he emigrated to New England. He settled first at Charlestown, Mass., and became the pastor of a church there. He became connected with Harvard College, and two of his manuscript works—*A System of Logic* and *Compendium Physicæ*—were used as text-books. He was made vice-president of the college at the establishment of that office, and hoped to succeed Increase Mather as president. His death prevented the fulfillment of this ambition. Consult Josiah Quincy, *History of Harvard University* (Cambridge, 1840).

MORTON, James Douglas, fourth Earl of (1530-81). Regent of Scotland. The second son of Sir George Douglas of Pittendriech, in 1553 he succeeded in right of his wife, Elizabeth, daughter of the third Earl of Douglas, to the title and estates of the earldom. He early favored the cause of the Reformation, and in 1557 was one of the original lords of the congregation. Sworn a Privy Councilor in 1561, he was appointed Lord High Chancellor of Scotland, January 7, 1563. As one of the chief conspirators against Rizzio (q.v.), he fled with his associates to England, but obtained his pardon from the Queen. Though privy to the design for the murder of Darnley, on the marriage of the Queen to Bothwell he joined the confederacy of the nobles against her. After Mary's imprisonment in the Castle of Lochleven, he was restored to the office of High Chancellor, of which he had been deprived, and constituted Lord High Admiral of Scotland. On the death of the Earl of Mar, in October, 1572, he was elected Regent of the kingdom. His rule, chiefly directed toward the benefit of the masses and toward the formation of a Protestant league with England, in anticipation of the union of the two kingdoms, made him obnoxious to many of the nobles, and as the young King, James VI., desired to assume the reins of government, Morton resigned the regency in March, 1578. Two months later, however, he obtained possession of the Castle of Stirling, with the person of the King, and for a time recovered his authority. Intrigue, however, was active against him; he was accused of having participated in the murder of Darnley, and was beheaded at Edinburgh, June 2, 1581, bearing himself with dignity and composure, and maintaining his innocence of 'art and part' in the murder of the King's father. Consult: Crawford, *Crown and State Officers of Scotland* (Edinburgh, 1726); Froude, *History of England*, ch. lxiii. (London, 1881-82).

MORTON, George (c.1585-c.1628). An English colonist in America. He was born in England, became a separatist, and removed to Holland with his brother, Thomas Morton, settling at Leyden, where for some years prior to 1620 he was an agent of the London Puritans. In 1623 he sailed for New England in the ship *Ann*, in charge of a party of new settlers for the Plymouth Colony. He remained at Plymouth several years, and then returned to England. The book known as *Mourt's Relation* (1622), which was the first published account of the New England settlement, comprising a journal of the first twelve months of the Plymouth Colony, has the name 'G. Mourt' subscribed to the preface, and for that reason has been ascribed to Morton. Careful investigators, however, among them Dr. H. M. Dexter, who reprinted the work with critical and historical notes in 1864, while agreeing that the name 'G. Mourt' evidently referred to George Morton, are inclined to think that the account itself was the work of Bradford and Winslow.

MORTON, HENRY (1836-1902). A distinguished American scientist and educator. He was born in New York, and was educated at the Episcopal Academy in Philadelphia and at the University of Pennsylvania. He first studied law, but afterwards took up chemistry, and in 1863 became professor of chemistry in the Philadelphia Dental College. In 1869 he took the chair of chemistry in the University of Pennsylvania. In 1870 he became president of the Stevens Institute of Technology, at Hoboken, N. J., toward the endowment of which he contributed over $60,000. Dr. Morton conducted the photographic work of the eclipse expedition that went to Iowa in 1869. In 1873 he carried out a series of important investigations on the fluorescent and absorption spectra of the uranian salts, on the fluorescent hydrocarbon thallene, discovered by him in petroleum residues, etc. In 1878 he was a member of Henry Draper's eclipse expedition, and while a member of the Lighthouse Board (1878-85) carried out valuable experiments on electric lighting, fog signals, illuminating buoys, etc. His publications include numerous papers in scientific periodicals and the *Student's Practical Chemistry* (written jointly with Leeds and published at Philadelphia in 1868).

MORTON, JAMES SAINT CLAIR (1829-64). An American soldier, a son of Samuel George Morton (q.v.). He graduated at West Point in 1851, and from 1855 to 1857 was assistant professor of engineering in that institution. In 1860 he conducted an exploration for a railway route across Central America for the Government; in 1861 was promoted to be captain; in 1862 became chief engineer of the Army of the Ohio, and later in the year was transferred to a like position in the Army of the Cumberland. He commanded a brigade at Stone River, was wounded at Chickamauga, and was made major of engineers in July, 1863. As chief engineer of the Ninth Army Corps he participated in Grant's Virginia campaign, and was killed while leading the assault on Petersburg. In recognition of his gallantry in this engagement Congress voted, after his death, that he be ranked as a brigadier-general in the Regular Army. Previous to the war he published a number of works on fortification and engineering.

MORTON, JOHN (1420?-1500). Archbishop of Canterbury and cardinal. He was born in Dorset, and educated at Cerne Abbey, a Benedictine foundation, and at Balliol College, Oxford. Having studied law, he took orders and began to practice in the Court of Arches, the ecclesiastical tribunal of the Archbishop of Canterbury. Here he attracted the attention of Archbishop Bourchier, who presented him to Henry VI., and the latter made him a member of the Privy Council about 1450, and also gave him valuable ecclesiastical benefices. Though he had followed for a time the fortunes of the Lancastrians, Edward IV. took him into favor, made him Master of the Rolls in 1473, and in 1479 Bishop of Ely. He was not in favor with Richard III., who arrested him and committed him to the custody of the Duke of Buckingham, from whom he escaped and fled to the Earl of Richmond on the Continent. He is said to have suggested the union of the houses of York and Lancaster by the marriage of Richmond with the daughter of Edward IV. Henry VII. on his accession made Morton a member of the Privy Council, and on the death of Cardinal Bourchier, in 1486, he was promoted to the See of Canterbury. In 1487 he was appointed Lord Chancellor, and in 1493 Pope Alexander VI. made him a cardinal. Morton was the chief councilor of Henry VII., and hence has been held responsible, perhaps unjustly, for Henry's avarice. (See MORTON'S FORK.) He died October 12, 1500. The history of Richard III. which bears the name of Sir Thomas More was probably written in Latin by Morton. At Ely he drained the fens by Morton's Dyke. Consult Hook, *Lives of the Archbishops of Canterbury*, vol. v. (London, 1867).

MORTON, JOHN (1724-77). One of the signers of the Declaration of Independence, born of Swedish ancestry, in Ridley Township, Chester County, Pa. He was a surveyor for some years, but subsequently became a lawyer. He was for several years a member of the Pennsylvania Assembly, and in 1765 was chosen a delegate to the Stamp Act Congress. From 1766 to 1770 he was high sheriff of Chester County. During all this period he continued to serve in the Pennsylvania Assembly, and from 1772 to 1775 was Speaker of that body. He was an earnest champion of the rights of the Colonies in the pre-Revolutionary controversies, and was active in furthering the cause of the Revolution after the outbreak of hostilities. In 1774 he was elected a member of the Continental Congress, and remained a member of that body until his death, taking a leading part in the debates and helping to frame the Articles of Confederation.

MORTON, JULIUS STERLING (1832-1902). An American political leader. He was born in Adams, Jefferson County, N. Y., and when two years old was taken to Michigan by his parents. He was educated in the Methodist Episcopal Academy at Albion, and in 1850 entered the University of Michigan. He completed his course at Union College, graduating in 1854, and in the year following settled in Nebraska, first at Bellevue and later at Nebraska City. where he founded and edited the Nebraska City *News*, the first newspaper to be established in the State. In 1856 and 1857 he was elected to the Nebraska Territorial Legislature, and in 1858 was appointed by President Buchanan secretary of the Territory, and became Acting Governor upon the resignation of Gov. W. A. Richardson, a few months later. In 1866 he was the Democratic candidate for Governor, but was defeated. From that time until 1881, when he was again a candidate for Governor, he took no part in politics. In 1893 he entered the Cabinet of President Cleveland as Secretary of Agriculture, remaining in office until 1897. Upon the advent of William Jennings Bryan into Nebraska politics he became one of his most active opponents, and identified himself with the Gold-Democratic wing of the Democratic Party. In 1901 he was appointed by President McKinley one of the United States Commissioners for the Louisiana Purchase Exposition. He was a student of forestry, and was the originator of 'Arbor Day' in Nebraska, the observance of which has extended to many other States. At the time of his death he was editing a weekly paper entitled *The Conservative*, in which he opposed most of the doctrines advocated in Bryan's *Commoner*.

MORTON, LEVI PARSONS (1824—). An American banker and political leader. He was born at Shoreham, Vt., and was educated at the academy in that town. In 1843 he established himself in a mercantile business in Hanover, N. H. In 1850 he removed to Boston, where he entered the banking business, and four years later he settled in New York City, where he was successful from the start. In 1863 he founded the banking-house of Levi P. Morton & Co., later Morton, Bliss & Co., which became one of the most successful private banking firms in the country. A London branch, Morton, Rose & Co., was subsequently established. In 1878 Morton was elected to Congress as a Republican. From the completion of his term until 1885 he was United States Minister to France. In 1888 he was the successful candidate for Vice-President on the Republican ticket. From 1894 until 1896 he was Governor of New York.

MORTON, MARCUS (1784-1864). An American lawyer and politician, born at Freetown, Mass. He graduated at Brown University in 1804, and at the Litchfield (Conn.) Law School, was admitted to the bar in 1807, and established himself in the practice of his profession at Taunton, Mass., where he remained for the rest of his life. From 1817 until 1821 he was a member of Congress. In 1823 he was a member of the Governor's Council, in 1824 was Lieutenant-Governor, and in 1825 began a notable career as judge of the Supreme Court. He remained on the bench until 1839, when he was the candidate of the Democratic Party for Governor, and was elected by one vote over Edward Everett, the Whig nominee, although the Whigs carried the State electoral ticket. In 1840 he failed of reelection, but in 1842 was again elected. From 1845 to 1848 he was Collector of the Port of Boston. In the same year he became a violent opponent of the Democratic policy as to slavery extension, and took a leading part in the organization of the Free-Soil Party, by which he was elected to the State Legislature for one term. Later he identified himself with the Republican Party.

MORTON, NATHANIEL (1613-85). An American colonial historian, born of English blood in Leyden, Holland. He came to Plymouth, Mass., in 1623, and dwelt there till his death. On the death of his father he was taken into the family of Governor Bradford, whose wife was his maternal aunt, and early helped the Governor in public business. He was Secretary of the Colony from 1645 till his death. In 1669, at the request of the commissioners of the New England colonies, he compiled and published at Cambridge, Mass., his *New England's Memorial, or a Brief Relation of the Most Remarkable and Memorable Passages of the Providence of God Manifested to the Planters of New England*, etc., a work which was reprinted in England and several times in the colonies, and was the chief authority for the events of which it treated until the discovery in 1855 of Bradford's *History of Plymouth*, on which, together with the journals of Winslow, Morton, who had little originality, drew largely. Morton also wrote a *Synopsis of the Church History of Plymouth* (1680), and obituary poems of the style then in vogue.

MORTON, OLIVER PERRY (1823-77). An American political leader, best known as the 'War Governor' of Indiana. He was born in Salisbury, Wayne County, Ind., August 4, 1823, attended the Wayne County Seminary, spent two years at Miami University, studied law, and in 1847 was admitted to practice. He soon became a prominent member of the Indiana bar, and in 1852 was elected circuit judge. He entered politics as a Democrat, but opposition to the Kansas-Nebraska Bill led him on May 2, 1854, to withdraw from the Democratic State convention; and ultimately he assisted in the formation of the Republican Party, to whose first national convention he was a delegate. In 1856 the People's Party, as the Republican Party in Indiana was at first called, nominated him for Governor, but after a close contest he was defeated. Four years later he was elected Lieutenant-Governor, and, upon the Governor's election as United States Senator, Morton became Governor, January 16, 1861. Upon the outbreak of the Civil War he threw himself with extraordinary energy and success into the work of raising troops. The election of 1862, however, resulted in the choice of a Democratic Legislature and Democratic State officers, who bitterly opposed the war, and threw obstacles in his way. His task was still further complicated by the presence in the State of a large secret society called the Knights of the Golden Circle (q.v.), which resisted the draft, encouraged desertion, and even plotted the assassination of the Governor and the carrying of Indiana out of the Union. But Morton triumphed over all difficulties. He borrowed sufficient money on his own personal responsibility to meet the exigencies of the situation; put down the treasonable associations and brought the leaders to trial; and he secured the triumph of his party and his own reelection as Governor in 1864. In the opinion of such men as Chase and Stanton his services during this period were greater than those rendered by any other of the great 'War Governors.' Shortly after the close of the war, Morton was stricken with paralysis, and was obliged to go to Europe. On his return to the United States, he resumed his duties as Governor. In 1867 he was elected United States Senator, and was reelected in 1873. In the Senate he became a recognized leader of the Republicans, and, despite his poor health, accomplished a prodigious amount of work, serving on the committees on foreign relations, agriculture, military affairs, private land claims, and privileges and elections. At first an opponent of suffrage for the freedmen, he ultimately did much to promote the passage of the Fifteenth Amendment. He was one of President Grant's chief advisers, and sustained the Administration in the unsuccessful attempt to carry through the Senate the proposed treaty for the annexation of Santo Domingo. In return for this last service, the English mission was offered to him, but he refused it. In 1873, on the death of Chief Justice Chase, he declined also to become Chief Justice of the Supreme Court. At the Republican national convention in 1876 he was a strong candidate for the Presidential nomination, and received 124 votes on the first ballot. He subsequently served on the Electoral Commission (q.v.). At this time his infirmities were such that he required assistance in moving about, and had to be carried from the lobby of the Senate chamber to his carriage. He died at Indianapolis, November 1, 1877, as the result of an attack of paralysis. Morton possessed a powerful intellect, a determined will, and high executive ability, and was an orator of great popularity and force. An admirable biography has been written by W. D. Foulke (2 vols., Indianapolis, 1899).

MORTON, Samuel George (1799-1851). An American physician and natural scientist. He was born in Philadelphia. He became a student of medicine under Dr. Joseph Parrish, and was assisted in his studies by Dr. Richard Harlan, the natural historian, from whom he imbibed the strong taste for general science which always distinguished him. He became a doctor of medicine in 1820, and after three years of European study received a degree from Edinburgh University. In 1824 he began practice in Philadelphia, and soon attained a prominent position. In 1839 he was appointed professor of anatomy in the Pennsylvania College at Philadelphia, which chair he continued to fill until 1843. Besides his contributions to medical literature Morton was always engaged in general scientific investigation and writing. While abroad he studied the geology of Scotland, and on his return presented to the Academy of Science a collection of the greenstone rocks of Scotland. In 1827 he published an *Analysis of Tubular Spar from Bucks County*, and in the succeeding year some *Geological Observations.* He was besides an ethnologist of wide fame, and possessed an immense collection of skulls from all races of the world. His medical works are: *Illustrations of Pulmonary Consumption* (Philadelphia, 1834); an American edition of Mackintosh's *Principles of Pathology and Practice of Physic* (Philadelphia, 1836); *An Illustrated System of Human Anatomy* (Philadelphia, 1839); and *Crania Americana* (Philadelphia, 1839).

MORTON, Thomas (1564-1659). An English prelate, born in York, and educated at Cambridge. He was ordained a deacon in 1592, and became chaplain to Lord Huntingdon. Upon the death of Elizabeth he became chaplain to the Earl of Rutland. In his first work, *Apologia Catholica* (1605), he defended the Church of England and attacked the Jesuits, which he continued to do throughout his life. A royal chaplain, he was also successively Bishop of Chester, of Lichfield and Coventry, and of Durham. In 1641 he was mobbed by the people and was one of the twelve bishops impeached by the Parliament for high treason. Morton suffered four months' imprisonment and never resumed his seat in the House of Lords. His works include: *A Treatise of the Threefolde State of Man* (1596); *An Exact Discoverie of Romish Doctrine* (1605); *A Catholic Appeal for Protestants* (1610); *The Grand Imposture of the Church of Rome* (1628); *The Necessity of Christian Subjection* (1643); and *A Treatise of the Nature of God* (1669).

MORTON, Thomas (c.1590-1646). An English adventurer, by profession an attorney. He visited New England with Weston's expedition in 1622; and in 1625 he returned with Captain Wollaston's colony, which settled at Mount Wollaston, within the present limits of Quincy, Mass. After Wollaston's departure to Virginia the next year, Morton ousted Fitcher, who had been left in charge, and changed the name of the settlement to Ma-re-Mount or Merry-Mount. He began to trade with the Indians, and the settlement became the rendezvous for the reckless and dissolute. In 1627 he erected a May-pole eighty feet high, and the revels lasted for days. When this and the fact that he was supplying the Indians with firearms in defiance of King James's proclamation of 1622 became known at Plymouth, a remonstrance was sent to him. In 1628 he was captured by Capt. Miles Standish and sent back to England with charges. There he ingratiated himself with Sir Ferdinando Gorges. Meanwhile Endecott visited Merry-Mount, cut down the May-pole, and renamed the place Mount Dagon. In 1629 Morton returned to Plymouth and to Merry-Mount. In 1630 he was again arrested after several unsuccessful attempts, and was placed in the stocks, while his house was burned, and his property seized, on a charge of disorderly conduct and oppression of the Indians. When sent to England he again joined the Gorges claimants and furnished much information against the Massachusetts Colony. When the New England Council surrendered its charter in 1635 and divided the territory, Morton was appointed solicitor to press the confirmation of the deeds and the revocation of the Massachusetts charter. Only want of money prevented the destruction of the colony. In 1637 he published the *New English Canaan*, which had probably been written in 1634-35. The first part is an account of the Indians, the second a description of the country, and the third a confused, somewhat humorous account of the 'precise separatists' of Plymouth and Massachusetts Bay. In 1643 he again appeared in Plymouth, and remained through the winter. He then appeared in Maine and Rhode Island. In 1644 he was captured by the Massachusetts authorities, kept in prison a year, and fined £100 on charge of having made a complaint of the colonies to the council. He was released without payment of the fine, and died in Maine. Morton's life and his settlement at Merry-Mount form the subject of John Lothrop Motley's novels, *Morton's Hope* (1839) and *Merry-Mount* (1849), and one of Hawthorne's short stories is entitled *The Maypole of Merry-Mount.* Motley's book has been reprinted with an elaborate memoir and full notes by C. F. Adams, Jr., in the "Prince Society Publications" (Boston, 1883). Consult Adams, *Three Episodes in Massachusetts History* (Boston, 1892).

MORTON, William James (1845—). An American physician, son of William T. G. Morton, the introducer of ether anæsthesia. He was born in Boston, Mass., educated at the Boston Latin School, and graduated at Harvard in 1867. He engaged in teaching for a year, and then entered the Harvard Medical School, where he graduated in 1872, taking the Boylston prize for his thesis on Anæsthetics. After a hospital experience he engaged in practice in Bar Harbor, Maine, and in Boston. From 1873 to 1874 he pursued his studies at Vienna, going from there to Kimberley, in South Africa, where he built up a large practice and engaged in diamond mining. After two more years of European study he returned to America and settled in New York. Here he was for a time editor of the *Journal of Nervous and Mental Diseases;* was adjunct professor of nervous diseases at the New York Post-Graduate Medical School from 1882 to 1885; neurologist to the New York Infant Asylum from 1887 to 1890. Since 1890 he has been professor of nervous diseases and electro-therapeutics at the New York Post-Graduate Medical School. Dr. Morton's name has been intimately connected with the recent advances in electro-therapeutics, and he has contributed not a little to the advancement of this science. In 1880 he devised a mechanism consisting of a Holtz machine and Leyden jars by means of which a new variety of electric current was established (condensed currents in rapid discharge) and named by him the 'static induced current.' By the aid of this Morton current, as it is called in the scientific world, the X-ray can be produced, and Dr. Morton probably made the first X-ray picture in this country. He has made many contributions to medical literature, and is a member of numerous scientific bodies. He is a member of the State and county societies; of the New York Academy of Medicine; was president of the New York Neurological Society in 1874; of the New York Electro-therapeutic Society in 1894; of the American Electro-therapeutic Association in 1893; and is a member of several foreign societies.

MORTON, WILLIAM THOMAS GREEN (1819-68). An American dentist, exploiter of the general anæsthetic properties of sulphuric ether. He was born at Charlton, Mass. In 1840 he took up the study of dentistry at the Baltimore College of Dental Surgery, then recently established by the new Society of American Dental Surgeons. On his return to Boston in 1842 to practice Morton's attention was drawn toward medicine, and in 1844 he began study with Dr. Jackson of Boston, and continued in the Harvard Medical School. He did not complete his course, but was afterwards awarded the degree of M.D. *honoris causa* by the present College of Physicians and Surgeons, Baltimore. The art of dentistry was at that time in a transition stage, and Morton's inventive genius discovered many improvements, especially in attaching false teeth. He first devised a new solder by which teeth could be attached to gold plates, and further contrived to obviate dependence upon old fangs in inserting new teeth. The removal of these stumps or roots was attended with great pain, and alcoholic stimulation, laudanum, and the galvanic current were tried to diminish it, without avail. In the course of his investigations Morton became acquainted with the value of sulphuric ether as a local anæsthetic and used it in minor operations. After a long series of experiments on animals, he finally succeeded in proving the efficacy of vaporized ether, and making known his results to Dr. John C. Warren, he administered ether at the latter's request in the Massachusetts General Hospital, the operation being that of removing a tumor from the jaw. The first public demonstration was made October 16, 1846. At the suggestion of Dr. Oliver Wendell Holmes the new form of narcosis was christened 'anæsthesia.' Dr. Morton obtained a patent for the use of ether, under the name of 'letheon,' in 1846, a month after the operation in the hospital, and a month after this, in England, Dr. C. T. Jackson also claimed the honor of having made the discovery, and the Montyon prize of the French Academy was equally awarded to Dr. Morton and to Dr. Jackson, but Dr. Morton declined to accept it, which resulted in his receiving in 1852 the large gold medal, the Montyon prize in medicine and surgery. He claimed compensation from Congress for his invention, the Government having used it, and also from individuals, and he was involved in many suits. He received, however, no compensation, and his life was spent in contests, literary and legal, in regard to his invention. Memorials were presented to Congress signed by many physicians, but for one reason or another they failed to secure what was asked.

MORTON'S FORK. A famous dilemma said to have been proposed by the Chancellor of Henry VII. of England, John Morton (q.v.). In 1491 Henry resorted to the unconstitutional method of obtaining money by a benevolence (q.v.), and Morton in carrying out the scheme is supposed to have told those who lived well that their opulence was proved by their large expenditure; while those who spent little were told that they must have saved considerable by their economy. Either class could well afford to assist the sovereign.

MORTUARY CUSTOMS. Observances connected with death and burial. The care of the dying and of the dead is a marked feature of religion among all peoples, from the lowest to the highest, and is associated most closely with spirit belief and custom. It is possible to treat the subject ethnically, enumerating and classifying peoples by their mortuary customs, or culturally, studying the genesis and development of each class of actions and beliefs involved. The latter method is here adopted. Mortuary customs, for the convenience of study, may be considered under the following heads, which by their characteristics as well as by their presence or absence are worthy of note.

(1) Customs concerning the dying.

(2) Treatment of the corpse, including the posture of the body, bathing, cutting, decapitating, embalming, or cremating the corpse, or scraping the bones.

(3) Clothing or wrappings of the corpse.

(4) Incasement of the corpse in the crate, basket, jar, box, or other receptacle which may answer to the coffin. In this, protection and convenience of carrying are the ends desired.

(5) Watching the corpse, including the wake and funeral feast.

(6) Bearing the corpse to the place intended for it, the funeral, with all its apparatus, processions, and rites.

(7) Disposal of the corpse.

(8) Post-mortem ceremonies, passing under the general term mourning.

(9) Cult of and for the dead, beliefs about the dead, the ghost, necromancy.

(10) Memorials for the dead, mementos preserved or worn, and monuments of every kind.

(11) Ascriptions to the dead, epitaphs, mortuary sayings, and literature.

CUSTOMS CONCERNING THE DYING. In the belief of the lower races, death from natural causes is a thing unknown; it is always the act of some god or personage, designed and chiefly malevolent. Every disease and every death among the Polynesians is held to be caused by the gods for some crime against taboo or as the result of some offering by an enemy. Hence the neglect and cruel treatment of the sick. Even death caused by poison is thought to be due to the displeasure of the gods.

Care for the dying can scarcely be said to exist among savages, although the most strenuous efforts of the magician and friends are put forth to exorcise the destroying angel and thus to restore the patient. The moment hope has departed, the preparations for burial are begun almost before the breath has left the body. So strong is the belief in the necessary connection between magic and death among the Australians that when a man believes he has been 'pointed at' or run through with a magic spear that has been 'sung' he frequently dies. Well authenticated cases are on record in which the slightest ailment or wound has resulted fatally, because the victim was convinced that the instrument had been charmed by magic. For many forms of conjuring there is no remedy. In others a cure is possible by the aid of a magician belonging to the totem of the person who 'pointed' at the sick man. The practices of the medicine men are almost universally the same. They make the same passes, suck the wound, and mutter incantations, and the imagination of the patient often effects a cure.

Treatment of the Corpse. No sooner has life become extinct than the preparation of the body begins. For economy's sake most primitive tribes double the corpse into the smallest compass, the chin resting on the knees. Even among such an advanced people as the ancient Peruvians this custom of packing the body into the smallest compass prevailed, a strong rope being used to draw the limbs into place and bind them fast. It has been said that the motive in this is to imitate the posture of the unborn infant, but aside from the fact that crouching is a common position in life among savages, economy of space in the grave or tomb has much to do with the custom.

Embalming the dead was at first only a natural process. There are regions where the arid climate desiccates all flesh, as on the plains of the West, and in Peru, Egypt, and Arabia. Here, the drying up of the body suggested to the primitive mind religious ceremonies which found their culmination in the all-absorbing mortuary cult of Egypt. The Polynesians when first discovered had an elaborate ceremony of embalming their dead priests. The brains and intestines were removed, and all moisture was carefully wiped from the body, which was anointed with fragrant oils and dried in the sun. It was then clothed and seated in a little house erected for the purpose, where a table was set before it for food, fruits, and flowers. Here also belong such ceremonies as calling the dead, anointing, closing the eyes and lips, bathing, kissing, placing coin in the mouth, all of which have symbolical meanings with reference to the future well-being of the dead, as well as to the immediate relations of the ghost with the living.

Clothing or Wrappings of the Corpse. Scarcely any people consigns its dead to the last resting place naked. The corpse is clad either with the clothing worn in life, or the best attire, or special grave cloths, shrouds, or winding sheets. Futhermore, masks are frequently placed over the whole body or over the face. Among the very lowest peoples the corpse may be put away naked, but this takes place only among those tribes that wear no clothing. The preparation of a special shroud has its prototype even among very primitive races, and begins with the chiefs or leading men, who in life wear an official or professional dress. The order of the development of cerements seems to have been first, the disposal of the body naked; second, dressing the corpse as in life in order to take up the new life in the spirit world at once; third, arraying it in its best clothing, to make a good impression on the ghosts among whom it goes; fourth, wrapping it in a shroud for sentimental reasons. Among the Egyptians the corpse was wrapped with narrow strips of linen. In Turkestan a similar practice is now in vogue, in Kimbondo leather is used, and in Mashonaland the toes and fingers are tied up each in a separate piece of cloth.

Incasement of the Corpse. The receptacles for the dead body are of many sorts. Among the ancient Aleuts the corpse was doubled up and fully clothed. It was then crated, hung on the wall of a cave, or set in a safe place on the floor. The Eskimo employ tough walrus hide as a case for the dead. The Pacific Coast tribes, wherever the giant cedar grows, make boxes or hollow logs for the corpse. The Plains Indians crated the bodies of the dead and all their belongings before placing them on the platforms, and the old cave people of Utah packed them in burden baskets.

The Southern Indians made hurdles of cane and rolled them about the corpse. Farther south no coffin was needed, for the bodies were exposed in *quiobogons* or dead houses until the flesh was gone, after which the bones were buried in the earth or in jars. Some of the ancient mound-builders made a stone box or coffin in the grave for the bones.

A common motive among primitive tribes in using the coffin was to hold the bones together for burial. Custom demanded it, and the ever watchful and jealous ghost required it. Again, the coffin or its substitute guarded the corpse from ravenous beasts and birds of prey, and it may also be possible that among some tribes the dead are boxed up to prevent them from escaping or being spirited away by unfriendly ghosts. In many tribes the habitation motive prevails; the coffin or tomb is regarded as the house of the dead.

Watching the Corpse. Between death and burial the spirit or the double of the dead hovers around the body, and expects the most rigid adherence to custom. This belief is the origin of the widespread custom of lykewake, or watching the corpse. Among many primitive tribes the dead are not hurried to burial, but the ceremonies of mourning begin around the corpse. The Polynesians placed the body of the dead on a bier-like frame covered with white tapa, which was decorated with flowers, or upon a bed of fragrant leaves. Relatives sat around lamenting and cutting themselves with sharks' teeth. Vigils about the dead are widespread among the white races. The folk-lore of the civilized abounds in customs during the day or two that intervene between death and burial. The watch feast, or wake, has dwindled to a company of a few friends. Salt is placed on the breast of the dead, a candle burns night and day at the head of the coffin. The sin-eater takes bread and publicly devours it for the misdeeds of the deceased.

Removing the Corpse to the Place Intended for It. The funeral proper is one of the most solemn of rites the world over. Among many tribes the corpse must be taken out of the dwelling through the roof or by some roundabout way, in order that the ghost may get bewildered and not return. The procession to the grave, among savages, has changed little in the course of centuries. Usually, mutilations of a more or less cruel character are then observed by certain persons, while among other tribes only a small number carry the dead away and are thereafter unclean.

Disposal of the Corpse. The disposal of the corpse does not necessarily mean interment. We may distinguish five methods which have undergone countless modifications as outgrowths of race, climate, soil, and grade of culture. (1) *Exposure.*—The bodies are not sealed up, but are left to destruction on the ground (rare), or are hidden in clefts, caves, or grottoes; in the hut where the death took place; on trees, posts, scaffolds, or platforms; in boxes or canoes; in log pens, or dead houses; or in Towers of Silence. (2) *Aquatic Burial.*—The corpse is placed on the water or under the water, as among the Hindus, who consign dead bodies to the Ganges. (3) *Inhumation.*—The corpse is buried in a single grave, which is often shelved or recessed; in pits or Golgothas; in cairns, or under mounds or tumuli; under the floor of the home or in consecrated structures. (4) *Encysted.*—The body is inclosed in rude boxes of wood, stone, or other materials, which are placed in dolmens, vaults, sepulchres, house-tombs, kistvaens, or mausoleums. (5) *Cremation.*—The corpse is burned and the ashes are abandoned, scattered, buried, boxed, or inurned.

In this connection belongs the custom of making deposits with the dead. No other part of this complicated series of customs comes so near to the world of shades. Thus in Dahomey the bodies of wives and slaves were sacrificed without number, and in the days of knighthood the horse and armor accompanied the warrior. It is through these relics found with the dead that archæology is to a large extent possible. Most extinct peoples were without the art of writing; but stone implements, pottery, objects in bone and metal, and even textile fabrics reveal enough to enable the archæologist to reconstruct ancient society. Among some American tribes articles of use were punctured or broken before being placed in the grave. One of the tribe who robbed a grave would not be tolerated, but an inimical tribe might be tempted. The Polynesians would rob sacred inclosures of the enemies' dead in time of war and steal the bones of distinguished men to make tools, fish-hooks, and other degrading implements. To avoid this, bones were carried to the caverns far away and hidden in clefts of rocks. In the Fiji Islands favorite wives as well as slaves were strangled on the death of a chief in order that they might wait upon him and be happy with him in the spirit world. To this they gladly submitted, not only in the prospect of greater happiness, but to avoid unspeakable miseries in after life.

Post-Mortem Ceremonies. These may be grouped together under the general head of mourning, including both what is done and what is left undone in dress, conduct, etiquette, and rites. As soon as a burial takes place among the Australians and other savage races, the camp is burned down, everything in it is destroyed, and the people move to another place. During the mourning period no person may mention the name of the dead except in case of necessity, when it must be done in a whisper for fear of annoying the ghost. If the ghost should hear the name mentioned it would come to the conclusion that the relatives were not properly mourning, and they would be in consequence liable to his vengeance; for, if their grief were genuine, it would cause them too much pain to hear his name mentioned to allow them to speak it.

Many seemingly absurd customs about the graves or tombs of the dead are easily explained when it is kept in mind that the dead are not regarded as really dead. Putting rags or parts of torn clothing about the tombs, or on trees near by, as a notice to the ghost that the appropriate rending of garments had taken place, is one of these customs. A complete list of them would fill a volume. It is enough to mention the tolling of bells, choice and fashions of mourning, cutting one's flesh, calling the dead, turning pictures toward the wall, feeding the dead, scrupulous care of the grave, hired mourners, and the imperative customs as to who shall mourn, when, how long, and how, sacrifices at the grave, naming the dead, and the widow's lot.

Cult of and for the Dead. The ghostly world of savages is never far away. The anthropomorphism of nature does not end with this life. The dead go at once to some place on the earth or under the earth where the most congenial occupations are renewed. When the ghost of the Polynesian leaves the body it is drawn out through the head as the sword is pulled out from the scabbard. Evil powers also lie in wait for the ghost to seize it when it is drawn out. Arriving safely at the place of the blessed, it is devoured by the gods, cannibalism being in full vogue above.

Not in savagery only, but in all races, ages, and grades of culture this belief in the nearness of lost ones is held. More than this, reincarnation and metempsychosis are believed to be possible. The savage woman complacently murders her babe thinking that the same one will enter into the mother's womb and be born again. As the dead are not considered dead, but are even more powerful as ghosts than they were as men, a complex and wide-reaching cult of almost universal extent has been evolved, which has for its object the propitiation and gratification of the spirits of the dead. See Demonology; Ghosts.

Memorials for the Dead. Combined with the fear of the dead is a desire, primarily, perhaps, based on anxiety to propitiate the ghost by a proof of suitable mourning, and later founded on real affection, to preserve the memory of the departed. The Andamanese widow carefully dries the skull of her deceased husband, paints it with ochre, decorates it with rude lace-work, and wears it for a memorial about the neck. Analogous synecdochic preservation of the dead is almost universal among primitive peoples. The Eskimo place by the side of the grave the huge jaw of a whale. The Northern Pacific tribes set up great posts of cedar. The ancient people of the Mississippi Valley built mounds of earth and stone. In Easter Island images cut in lava were memorials. The Tahitians set up little models of their houses about six feet high where the body of a chief clothed and rubbed with aromatic substances was laid while offerings were made. These all tell the same story. As culture advanced monuments (q.v.) became more elaborate, and the modern cemetery differs from the primitive memorials in degree rather than in kind.

Ascriptions to the Dead. The custom of eulogizing the dead is extremely primitive and ancient. The Polynesians had professional bards who composed elegies which were committed to memory and preserved. These were recited on special occasions when the dead were mentioned. The American Indians had a solemn style of speech for such occasions quite above the grasp of the ordinary man, while the great epics of Greece and Rome abound in passages over the dead of deepest pathos. Here, too, belong the entire body of epitaphs, or memorial inscriptions placed on tombs in honor of the dead who are laid in them. See Burial.

MORVI, môr-vē′. A native Gujarat State of Bombay, India, on the Kathiawar Peninsula. Area, 821 square miles. Population, estimated at 106,000. Capital, Morvi.

MOSAIC (ML. *mosaïcus*, Gk. *μουσαῖος*, *mousaios*, mosaic, artistic, relating to the Muses, from *μοῦσα*, *mousa*, Muse). A branch of fine art which was especially prominent during the Middle Ages, though not unknown to antiquity, and is still practiced to a limited extent. Mosaic work, when it attained full growth, had various branches. It was used: (1) on floors; (2) on walls; (3) on detached objects, monuments or furniture. It consisted of the grouping of pieces of marble, glass, or enamel so as to form ornamental or figured compositions. In the *opus sectile* the thin marble plates were cut so as to follow the outlines of the design, and it is not properly a branch of mosaic. *Opus tessellatum* is the best technical term, the *tessellæ* meaning the small cubes forming the mosaic. Marble cubes were used for floors altogether, though glass was occasionally mingled with them in the Middle Ages. For wall compositions, architectural details, and furniture, though marbles were at first used almost exclusively, the possibility of producing a greater variety of shades in artificial enamels led to their exclusive use on walls as early as the fifth century and in furniture after the eleventh century. The cubes used for figures were usually smaller than those used for decorative work. Some are as small as three millimeters, more than one hundred thousand being contained in a square meter. Gilt cubes were made by inclosing the gold leaf between two pieces of white glass. The cubes were colored with metallic oxides. Colored glass was first cut into long narrow sticks and these again broken into the cubes, which were sorted into their separate cases, according to colors and shades, like printers' type. To execute a wall composition the mosaicist prepared his cartoons; the mason plastered as large a section of the wall as could be covered in a day; the mosaicist stenciled or dotted his cartoon on to the wet plaster and then rapidly fastened to it the mosaic cubes. The surfaces were flattened, washed, and burnished. In the best work the cubes are not absolutely even or adjacent, so that mechanical effects are avoided.

Origin. The Greeks before Alexander apparently did not practice any kind of mosaic work; it first appears in the Alexandrian age, and probably originated in Egypt. It came into prominence for its reproductions in permanent form of famous paintings on the floors of public and private buildings. We even hear that scenes from the Trojan War were represented on floors of the great ship of Hiero of Syracuse. A famous floor at Pompeii represents in a grand composition a scene of Alexander's victory at Issus, full of action and variety. Even larger and more complicated is the Nile scene of a floor found at Palestrina, with its inundated city, its fishing and other genre scenes.

Roman Mosaics. Although the Romans were not ignorant of the use of glass cubes on walls, they never developed this branch of mosaic work; the fountains and niches at Pompeii and Ostia are almost the only surviving examples. But in their pavements they showed the greatest variety, from the simple crude geometric designs in black and white to the exquisite gradations of color and form in such works as the Capitoline doves, the landscapes from Hadrian's villa in Rome and Berlin, the Pompeian actors by Dioscorides in Naples, the portraits of poets and philosophers at Cologne, and many more. Midway between stand such colossal works as the gladiator pavement of the Baths of Caracalla. Roman mosaic pavements of artistic value have been found not only throughout Italy, but in France, Spain, Germany, Hungary, North Africa, Syria, and Asia Minor.

Early Christian. In the fourth century, Christian artists perceived the value for church interiors of the rich coloring and permanency of mosaic. No form of painting harmonizes so well with architecture. Mosaics were placed nearly always in the apses and on the triumphal arches of the early Christian basilicas, and in important cases upon the walls of the nave, and sometimes both on the inside and outside walls of the façades. The interiors of mausoleums and baptisteries were covered with them on dome, walls, and apse. While the upper part of the walls was decorated in this way with figured mosaic composition, the geometric mosaics or *opus sectile* were used on the dadoes below, and the marble geometric mosaics covered the floors. In the later Middle Ages, the twisted columns, sepulchral monuments, altar canopies, pulpits, choir screens, and other details were entirely inlaid in geometric designs, in the East and in Italy. The wealth of works is concentrated in Italy and in the purely Hellenic world. Rome and Ravenna had special schools with offshoots at Naples, Milan, Grado, and Parenzo. Constantinople and Thessalonica, also, were independent centres, radiating over Greek lands.

Rome preserves the earliest Christian works at Santa Costanza, similar to Catacomb frescoes, and at Santa Pudenziana, the counterpart of the Christian sarcophagi with Christ and the Apostles. The earliest series where mosaic painting attempts a great scheme of subjects taken from the Old and New Testaments is in Santa Maria Maggiore in Rome, on apse, triumphal arch, and nave. The mosaics over the chancel arch of Saint Paul's, representing subjects from the Apocalypse, date from the fifth century. In both cases the composition is still confused, the art has not yet found itself. It was from Greek artists that the solution came, in the introduction of the uniform gold background, against which the figures stood out clearly, as compared with the old white ground. At Ravenna we see this style in its earliest glory in the two baptisteries (fifth century), and especially in the mausoleum of Galla Placidia (440) and later in the Church of Sant' Apollinare Nuovo (c.500-550). The latter monument has its entire main walls covered with a triple row of mosaics. Thoroughly Greek also is the culminating work of the sixth century, the decoration of San Vitale, also at Ravenna, with its two great historic panels of Justinian and Theodora, the Byzantine court and the ecclesiastical grandees.

Meanwhile the Roman school had somewhat fallen from its supremacy, for the only great work after Saint Paul's was the mosaic of Saints Cosmas and Damian (530), after which Rome suffered from the wars between the Goths and Byzantines and the attacks of the Lombards. The decline reached Ravenna in the seventh century, as is shown at Sant' Apollinare in Classe, and continued in Rome, with Italo-Byzantine stiffness, as in the works at San Lorenzo, Sant' Agnese, and San Venanzio. The coloring is still superb, but the figures are rigid and staring.

MEDIÆVAL. The Carolingian era saw a revival in both East and West about the year 800, which lasted for less than a century in Italy, but continued in the East from Basil the Macedonian to the capture of Constantinople by the Crusaders in 1204. In Rome the mosaics of the Church of Santa Prassede, especially the scenes from the Apocalypse, are a masterpiece, while Santi Nereo ed Achilleo and San Marco are of secondary importance. The art did not then spread beyond Rome, as in the earlier period. Only in the Orient was it still supreme. The real revival of the art in the West came in the eleventh century and was due to Byzantine influence and imported Byzantine artists. The two great schools were that of Sicily and Campania, with its masterpieces of Cefalù, Palermo, and Monreale, and that of Venice, represented at San Marco, Torcello, and Murano. In variety of subject, in splendor of color, and in sheer amount, these works surpass the mosaics of the fifth and sixth centuries.

The Roman school took part in this revival, but mingled antique traditions with Byzantinism, and retained a freedom and beauty of decoration and detail foreign to the other schools. It can best be studied at San Clemente, Santa Maria in Trastevere, Santa Maria Maggiore, and Saint John Lateran. In some of these works we can trace the first steps in the great revival of painting usually connected with the names of Cimabue and Giotto.

PAVEMENTS AND DECORATION. Meanwhile the mediæval mosaicists had been executing pavements far more beautiful than any geometric floors of antiquity. The Byzantine school, as usual, took the lead, and the exquisite designs and coloring of the pavements of San Marco and the Torcello Cathedral at Venice are but repetitions of the pavements of the churches of Constantinople, Saloniki, Mount Athos, Chios, and elsewhere. The Italian school, though centring at Rome, did similar work in Campania and Sicily. The small marble cubes were worked in patterns around large circular, square, long, or polygonal slabs of porphyry, serpentine, verde antico, rosso antico, or other rich marbles which formed the centre of each design.

It was not long before the geometric designs of the floors were transferred to the various details and objects in the church interiors, thus forming a perfectly harmonious whole. The altar fronts and canopies at Ferentino, the canopies at Santa Cecilia and San Paolo at Rome, the choir seats at Cività Castellana and San Lorenzo at Rome, the pulpits at Alba Fucense, San Lorenzo, Palermo, Salerno, and Ravello, the choir screens at the two latter cathedrals and at Alba, the Paschal candlesticks at Anagni, Ferentino, Santa Cecilia, and Salerno, the episcopal thrones at San Lorenzo and Fondi, the sepulchral monuments at San Francesco in Viterbo, at the Cathedral of Perugia, at Orvieto, at Assisi, Rome (Santa Maria Maggiore, Sopra Minerva, Ara Cœli, etc.), are a few among hundreds which made the interiors of churches wonderfully rich in this part of Italy.

The geometrical mosaic patterns even invaded the field of architecture. The portals were surrounded by it; it formed the main decoration of the colonnaded porticoes, and even of the cloisters. The cloisters of San Paolo and of the Lateran at Rome would lose all their beauty if their columns and friezes were divested of the color and design given by these mosaics. Even Tuscan church architecture felt this influence to the extent of obtaining a faintly similar effect by *opus sectile* with broader design—as at Pisa (baptistery) and San Miniato, near Florence.

None of the European countries besides Italy and Greece used mosaics. An occasional work is found in Germany, France, or England; but, as at Westminster Abbey, it is the work of an Italian or a Greek. Only in Russia, as at Kiev and Novgorod, can we trace the existence of a regular branch of the art.

MOHAMMEDAN. The art passed from the Byzantine Greeks in the East to the Mohammedans, and was used by them for pavements and the revetments of walls in nearly all the schools, but especially in Egypt, Spain, and Syria. Figured mosaics were substantially forbidden by the law of the Prophet, so that decorative, and especially geometric, patterns were alone used. Mosques, fountains, palaces, baths, and other buildings, between the tenth and fifteenth centuries, had them in profusion. The mosques of Cairo (see MOSQUE) contain an unbroken series which is paralleled in the old Coptic churches of the city. It is probable, in fact, that most of the mosaicists of the mosques were Christian Copts. The Alhambra at Granada contains dadoes of this geometric ornament, though here and in Syria, and especially in Persia, it was less used than the enameled tiles.

MODERN. With the rise of the Giottesque school early in the fourteenth century the golden age of mosaic painting ended, frescoes taking its place. Such works as appear on the façades of Orvieto and Siena cathedrals by Orcagna and his contemporaries in the fourteenth century are purely decorative. Henceforth mosaic loses its individuality, and seeks to imitate the delicate soft tones of fresco and then of oil. Great artists like Raphael (Santa Maria del Popolo, Rome), Titian, and Tintoretto (San Marco, Venice) furnished cartoons to be carried out by mosaicists, who are no longer artists, but mechanics. The atelier of the Vatican, busy producing altar-pieces for Saint Peter in exact imitation of masterpieces in oils, multiplying shades and minimizing the size of the mosaic cubes, has perfected this mechanical method. The atelier at Venice is the only other modern centre of importance. These modern artisans, in their restorations of mediæval mosaics, have done immense damage by trying to 'improve' on the originals, setting the cubes closer together and with greater regularity and smoothness, thus ruining their art. They have long since abandoned the method of working directly on the wall, which had previously been universal, and they either set the cubes, face up, in portable compartments, which when filled are covered with linen prepared with glue and then transferred to the wall, the linen or paper being then wet and removed, or else they set the cubes, face down, directly on the adhesive paper or linen, on which the design is marked, with similar frames, and then effect the transfer to the prepared wall.

Bibliography. The subject of mosaics is well treated in Woltmann and Woermann, *History of Painting* (Eng. trans. New York, 1880); a good general monograph is Gerspach, *La mosaïque* (Paris, 1885). The technique is carefully described by E. Müntz in *La mosaïque chrétienne* (Paris, 1893). All the mosaics of the Roman churches are reproduced in large colored plates and described by De Rossi, *Musaici cristiani di Roma* (Rome, 1876-94). The same has been done for those of Saint Mark's in Venice by Organia in *La basilica di S. Marco* (Venice, 1881-88); for Monreale by Gravina, *Il duomo di Monreale* (Palermo, 1859). All the figured mosaics earlier than A.D. 900 are outlined and described in Garrucci, *Storia dell' arte cristiana* (Prato, 1873-81). Consult also: Pohl, *Die altchristliche Fresko- und Mosaikmalerei* (Leipzig, 1888), and Kurth, *Die Mosaiken der christlichen Aera* (ib., 1902 et seq.).

MOSAIC DISEASE. See Tobacco.

MOSAIC WOOL. See Rugs.

MO'SASAU'RIA (Neo-Lat., from Lat. *Mosa*, the river Meuse + Gk. σαῦρος, *sauros*, lizard). An order of extinct marine reptiles—the Pythonomorpha of Cope. The reptiles possessed the slenderness of a snake combined with strong paddles, such as those of the whale, together with many lizard-like characters. The first specimen of a nearly perfect head skeleton was discovered in 1780 in the upper chalk of Saint Pietersberg, in Holland, on the Meuse River. A few other specimens have been found in the Cretaceous of England and Europe. In North America this reptile seems to have attained its most flourishing existence, for over fifty species, included in several genera, have been found. The Cretaceous of New Jersey has yielded fifteen species. The Yale College collection contains a great number of specimens. *Mosasaurus princeps* from New Jersey is estimated to have been 40 feet long, and *Tylosaurus dyspelor* from Kansas was about 30 feet in length. Consult: Marsh, "Cretaceous Vertebrates of the West," *United States Geological Survey Reports* (Washington, 1875); Lucas, *Animals of the Past* (New York, 1901).

MOSBY, mōz'bĭ, John Singleton (1833—). An American soldier in the Confederate service, born at Edgemont, Powhatan County, Va. He was educated at the University of Virginia, studied law, and was practicing his profession at Bristol, Washington County, Va., at the outbreak of the Civil War. After serving under Joseph E. Johnston in the Shenandoah Valley, in the winter of 1861-62, he was appointed by Gen. J. E. B. Stuart an independent scout, and guided that officer's cavalry in a bold raid in the rear of McClellan's army on the Chickahominy, in June, 1862. Returning to Richmond after a short captivity early in 1863, Mosby recruited an independent body of cavalry for scouting and raiding purposes, and he then began his remarkable career as a 'partisan' leader of an irregular force known as rangers, with which, until the close of hostilities, he operated in Virginia and Maryland. His force was subsequently organized as a regular branch of the Confederate service as the Forty-third Battalion of Virginia Cavalry. His most brilliant exploit was the capture, in March, 1863, of Brigadier-General Stoughton, U.S.A., at that officer's headquarters at Fairfax Courthouse, which he accomplished by a raid inside the Federal lines. Promoted to be major as a reward for this capture, he followed Lee's army into Pennsylvania in June, 1863, and worried the flanks of the Federal army as it moved southward after Gettysburg. In January, 1864, he was repulsed with considerable loss in a night attack on Harper's Ferry. In May he harassed the rear of Grant's army as it advanced on Fredericksburg, and later made a long raid in Maryland. In August he made one of the most important captures of his career, consisting of Sheridan's entire supply train, which he surprised near Berryville. The loss was such a heavy one to Sheridan as to compel him to fall back on Harper's Ferry. In September he was wounded at Falls Church, but in the following month was again in the saddle, captured two Federal paymasters with $168,000 in greenbacks, tore up the Baltimore and Ohio Railway tracks, destroyed rolling stock and made a prisoner of Brigadier-General Duffié. In December, 1864, he was promoted to be colonel. After being disabled for a short time by a wound, he continued his operations until Lee's surrender, when he disbanded his troops, gave himself up, and by General Grant's intercession was paroled. After the war he opened a law office at Warrenton, Va., and became a member of the Republican Party, which he thought could best settle the question of reconstruction satisfactorily. From 1878 to 1885 he was United States Consul at Hong Kong. On his return to America he established himself in law practice in San Francisco. He published an account of his exploits entitled *War Reminiscences* (1887). Consult also: Scott, *Partisan Life with Mosby* (New York, 1867); Crawford, *Mosby and His Men* (1867); Williamson, *Mosby's Rangers* (New York, 1896).

MOSCHELES, mŏ'she-lĕs, Felix (1833—). An English painter and author. He was born in London, and studied art in Paris and under Van Lerius in Antwerp. Afterwards he exhibited in Antwerp, at the Paris Salon, and at the Academy and New Gallery in London. His works include genre scenes and portraits of Mazzini, Gounod, Browning, Rubinstein, Stanley, and ex-President Cleveland. He wrote: *Felix Mendelssohn's Letters to Ignaz and Charlotte Moscheles* (1888); *In Bohemia with Du Maurier* (1897); and *Fragments of an Autobiography* (1899). He also wrote pamphlets on the subject of international arbitration and peace associations, such as *Patriotism as an Incentive to Warfare.*

MOSCHELES, IGNAZ (1794-1870). An Austrian piano virtuoso and composer, born in Prague, of Jewish parentage. After a course of study at the Prague Conservatory he went to Vienna, where he became a pupil of Albrechtsberger and Salieri. He was a remarkable improvisator, and won his greatest successes as much by that gift as by the more important discovery of the 'singing tone' by which he secured modifications of tone and variations in tone color by means of touch—an art subsequently developed by Liszt and his school. Although he was very successful in his tours of Russia, Holland, Germany, and France, his greatest fame was won in London, in which city he took up his residence in 1821. He did not, however, sever his connection with the Continent, for in 1824 he was giving lessons in Berlin, where he numbered Mendelssohn among his pupils, and formed a friendship with him that was of great mutual profit. He was of much assistance to Mendelssohn when that master first visited England, and was in turn persuaded to join Mendelssohn in the management of the newly formed Leipzig Conservatory (1824). With the exception of five concertos and a collection of studies which are still highly esteemed, his compositions are gradually being forgotten. His works include piano concertos, arrangements, instrumental chamber music, sonatas, and numerous études, about 140 opus numbers altogether. He died in Leipzig. Consult *Aus Moscheles' Leben. Nach Briefen und Tagebüchern herausgegeben* (Leipzig, 1872); English translation by Coleridge.

MOSCHEROSCH, mŏ′she-rôsh, JOHANN MICHAEL (1601-69). A German satirist of the seventeenth century. He came of an old Spanish family, and was born at Willstett, near Strassburg, and wrote under the name Philander von Sittewald. He studied in Strassburg, and held various diplomatic positions. He was admitted to the Fruchtbringende Gesellschaft in 1645 with the name of 'Dreamer,' and about 1640 published his "Book of Visions," *Wunderliche und wahrhaftige Geschichte,* apparently patterned after Quevedo's *Sueños.* Consult: Nickels, *Moscherosch als Pädagog* (Leipzig, 1883), and Pariser, *Beiträge zu einer Biographie von Moscherosch* (Munich, 1891).

MOSCHI, mŏs′ki (Lat., from Gk. Μόσχοι, *Moschoi*). An ancient people of Asia, living south of the Caucasus. According to Pliny they dwelt around the sources of the Phasis between the Euxine and Caspian seas. Their name by early writers is often coupled with that of the Tibareni, and the two people are generally identified with the Meshech and Tubal of Scripture. Under the appellation of Muskai they appear in the cuneiform inscriptions as carrying on war against Tiglathpileser, King of Assyria (c.1150 B.C.), who defeated their forces and overthrew their five kings. Consult Rawlinson, *Five Great Monarchies, Assyria* (London, 1867).

MOSCHUS, mŏs′kŭs (Lat., from Gk. Μόσχος, *Moschos*). A Greek bucolic poet of the second century B.C., apparently a native of Southern Italy. Besides some short poems we possess his "Lament for Bion" ('Επιτάφιος Βίωνος), his teacher, which is an imitation of Bion's "Lament for Adonis;" also his "Rape of Europa" (Εὐρώπη) and his "Cupid the Runaway" (Ἔρως δραπέτης). His poems were united in antiquity with those of Theocritus and Bion, and appear with them in modern editions also. He was translated by Lang (London, 1896).

MOSCOSO DE ALVARADO, môs-kō′sô dâ äl′vȧ-rä′dô, LUIS DE (1505-61). A Spanish soldier and explorer in America. He was born in Badajoz, and was a kinsman of Alvarado, whom he followed to Peru. Four years afterwards, with De Soto, he started for Florida, and succeeded him in command in 1542. After terrible privations and with decimated forces he reached Mexico in 1543. There Mendoza received him kindly. In 1551 Moscoso accompanied Mendoza to Peru, where he died.

MOSCOW, mŏs′kô (Russ. *Moskva*). A government of Central Russia, bounded by the Government of Tver on the northwest, Vladimir on the northeast, Ryazan on the east, Tula and Kaluga on the south, and Smolensk on the west (Map: Russia, E 3). Area, 12,875 square miles. It occupies a portion of the central plateau of Russia, and slopes eastward toward the Oka. It belongs to the basin of the Volga, and is watered by that river and the Oka on the boundaries, and by the Klyama, Moskva, and other rivers in the interior. Geologically the government belongs to the Moscow coal basin, the carboniferous formation being covered up with various clays, sandstone, and marble. The soil is loamy and not very fertile. About 40 per cent. of the area is clothed in forests, mostly belonging to private persons.

Agriculture is highly developed, and the farm products are of great diversity. Rye, potatoes, and oats are the staples. Gardening is carried on extensively, and vegetables are raised in quantities sufficient to be exported to Saint Petersburg and Kronstadt. Stock-raising is also important.

Moscow is the leading manufacturing government of Russia. In 1896 it had 1755 manufacturing establishments, employing over 207,000 hands. The value of the output of that year was over $130,000,000. The chief products are textiles (especially cotton and silk), which were manufactured in that year to the value of over $80,000,000. Other important products are machinery, brick, chemicals, knit goods, etc. An important item in the economic life of the government is the house industry, which has reached here a higher degree of development than in any other part of Russia. It exists all over the province, groups of villages being engaged in the manufacturing of one product. The articles manufactured in this way are of a very wide range, including leather and leather products, hats, pins, brushes, cheap chromos, carriages and wagons, lace, gloves, etc. It is estimated that agriculture furnishes on the average only about 40 per cent. of the income of a peasant family in the government.

The commerce in the products of the house industry is of great extent, and is centred chiefly in the city of Moscow. The government is well supplied with transportation facilities, being traversed by six of the most important railway lines of the Empire. Education is meagrely provided for. The proportion of illiterates is estimated at 80 per cent. Population, in 1897, 2,433,356, chiefly Great Russians. Capital, Moscow.

MOSCOW. The second capital and historically the most famous city of the Russian Empire, capital of the military district and government of the same name, and the second largest city of Russia. It is situated on the river Moskva (a tributary of the Oka) in latitude 55° 45′ N., and longitude 37° 37′ E., 400 miles southeast of Saint Petersburg, at an altitude of from 500 to 850 feet above the level of the sea (Map: Russia, E 3). It has a rather cold climate, the annual temperature being 39° F., ranging from a mean of 12° in January to 66° in July.

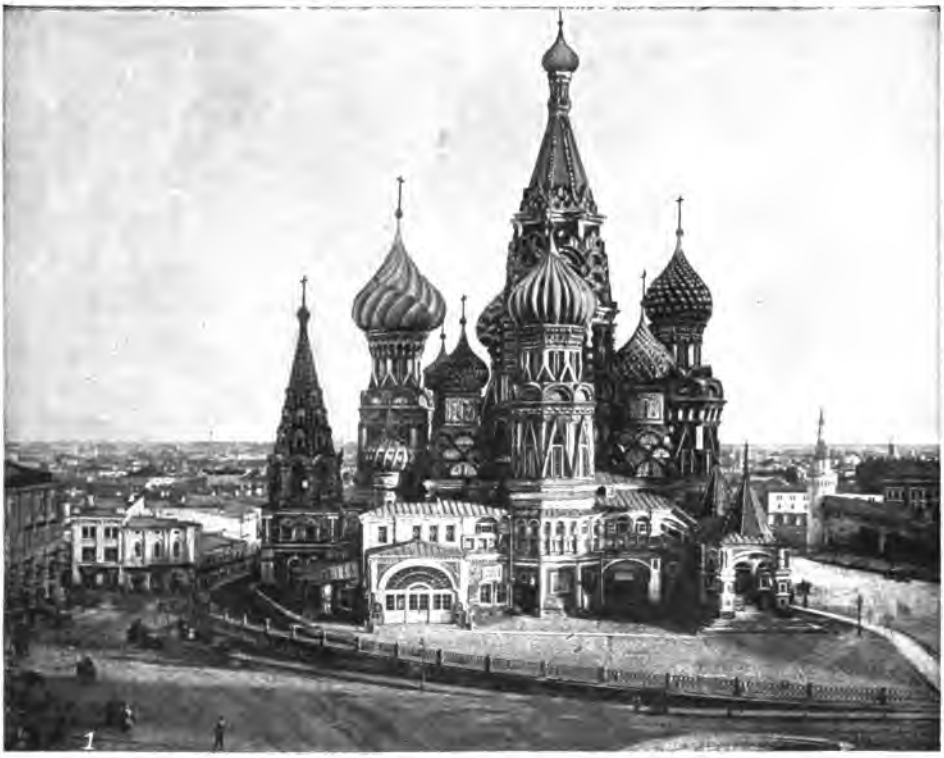
The city is irregularly built. On the northern bank of the river rises the Kremlin, the acropolis of old Moscow, for many centuries the centre of the political and religious life of Russia and still the most venerated place in the heart of every Russian. It was the nucleus of the modern city and contained in the early periods of the history of Moscow the palace of the Czar, the chief churches and monasteries, and the palaces of the nobility. As the city developed, the merchants and the numerous artisans began to settle outside of the walls. Thus grew up the commercial quarter east of the Kremlin, known as the Kitai Gorod (Chinatown), still constituting the commercial centre of Moscow, and numerous small communities independent in their internal administration and composed mostly of members of the same trade. These divisions are still retained to a large extent in the parishes into which the city is divided. They were subsequently grouped together and surrounded by walls, and now form the Byely Gorod (white town), surrounding the Kremlin and the Kitai Gorod, and the Zemlyanoi Gorod (earthen town), inclosing all the abovementioned quarters as well as Zamoskvoryetchye on the southern bank of the river. There is also a fourth inclosure (Kramer-Kollezh, earthen wall) surrounding the outer parts of the city and forming the limits of Moscow proper. Only the walls of the Kremlin and of the Kitai Gorod have been preserved, all others having been converted into boulevards and avenues. See KREMLIN for illustration.

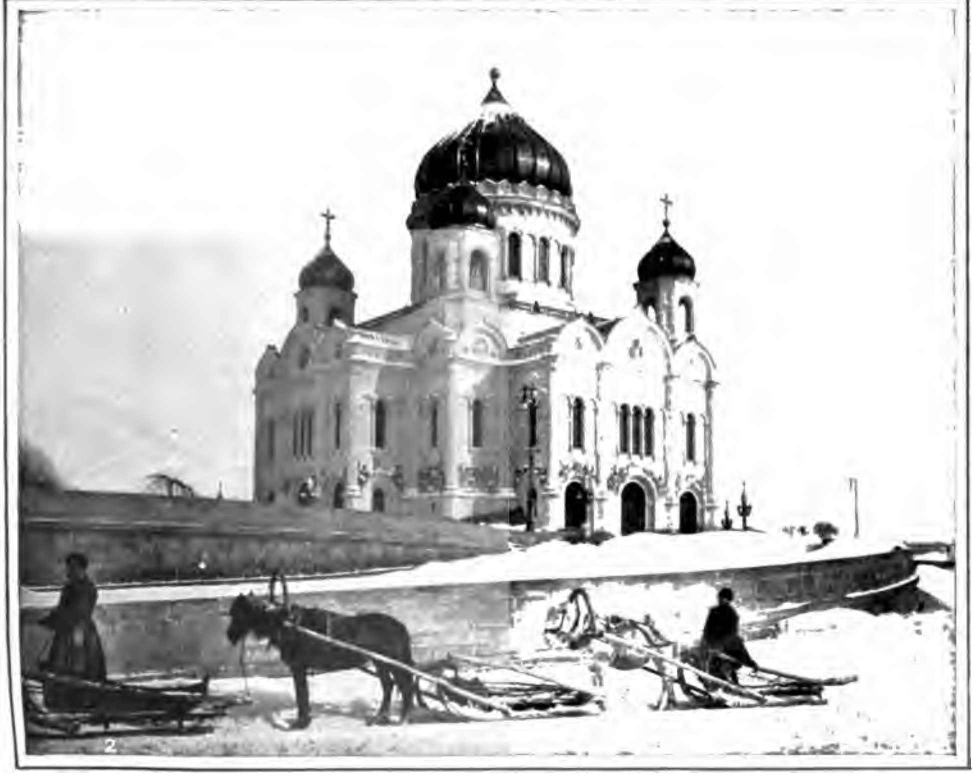
Although one of the oldest cities of Russia, Moscow has preserved comparatively few architectural monuments outside of its churches and monasteries, most of the old buildings having perished in the destructive conflagrations which figure so prominently in the history of the city. With the introduction of Western civilization into Russia by Peter the Great and his successors, the Russian style of architecture gradually disappeared in connection with the secular and private buildings, and the application of Western standards not infrequently produced very peculiar results. Under Alexander II. a revival of Russian architecture was inaugurated and a number of successful restorations have been accomplished. The chief interest of Moscow, as already stated, is centred in the Kremlin, both for its historical associations and for its churches and monasteries with their semi-barbaric splendor and curious architecture. The Kremlin is nearly triangular in shape and surrounded by a wall about a mile and a half long. The wall is surmounted by 18 towers and pierced by 5 gates, among which is the Spasskiya Vorota (Gate of the Saviour)—one of the most revered historical places of Russia, and associated with many of the chief events of national history. Within the walls of the Kremlin, the most famous edifice is the Uspenski Sobor (Cathedral of the Assumption), in which all the Russian monarchs since Ivan IV. have been crowned. The present building was erected by Aristotele Fioraventi in the fifteenth century on the site of an older church founded in 1326. It is Lombardo-Byzantine in style, with Indian cupolas. The semi-dark interior is adorned with numerous icons, covered with gems and precious metals. They are of great antiquity, one of them being attributed to Saint Luke. The treasury of the cathedral, one of the richest in Russia, contains many valuable Bibles, manuscripts, and sacred vessels, as well as numerous relics of saints. The Cathedral of Saint Michael the Archangel is the former burial place of the Russian monarchs. It dates in its present form from the beginning of the sixteenth century and is surmounted by five domes, the central one being of gilt. The interior is richly decorated and its walls are covered with the portraits of the Russian monarchs interred there. In the partly Gothic Cathedral of the Ascension, founded in 1397, the walls and the thick pillars are covered with portraits of saints and Greek philosophers, and the floor is made of semi-precious stones of various colors.

One of the sights of the Kremlin is the tower of Ivan the Great, 322 feet high and crowned by a gilt dome; it contains 34 bells, weighing altogether about 580,000 pounds. In former times the Kremlin contained numerous monasteries and convents, of which only a few have been retained. The most interesting of these are the Maiden Convent, for centuries the burial place of the Russian princesses, and the Tchudov Monastery, an institution of great historical importance and a great factor in the development of ecclesiastical learning in Russia. Near the Tower of Ivan the Great stand two objects very famous in Russia. One is the Czar Bell, cast in 1735, and now resting on a stone pedestal. Part of the bell, broken off during the fire of 1737, lies near by. It is over 60 feet in circumference around the rim, 19 feet high, and weighs nearly 199 tons. The other, near the Museum of Arms, is the Czar Cannon, cast in 1586, and weighing nearly 40 tons. The palaces of the Kremlin are mostly modern, and only a few portions of the old abode of the Russian monarchs have survived. The great palace, finished in 1849, is a vast building of white stone with a gilt cupola, and possessing numerous magnificent halls devoted to the different orders of Russia. Attached to it are the living rooms of the old Russian rulers, known as the Terem, and dating from the seventeenth century. They are of great architectural value and well preserved. Connected with the palace are the old banquet hall known as Granovitaya Palata, with its red stoop, from which Russian monarchs used to address the populace; and the Oruzheijnaya Palata (hall of arms), containing immense treasures in the form of crowns, sceptres, thrones, costumes, banners, armor, gold and silver plate, carriages, etc. The palace of the patriarch, built by Nikon in 1655, has one of the most valuable libraries in Russia, and a treasury of fabulous wealth. The arsenal of the Kremlin is one of the largest in the world.

The Kitai Gorod, adjoining the Kremlin, also has many historical associations. Especially noteworthy is the Red Square, used repeatedly as a camp by the besieging Mongols, as a forum by the Russian monarchs, and as a place of

MOSCOW





1. **CATHEDRAL OF VASILI THE BEATIFIED**
2. **CHURCH OF THE SAVIOUR**

execution. Facing the Red Square is the Cathedral of Vasili the Beatified, which for mixture of styles, colors, and architectural lines has few rivals in the civilized world.. It was built by an Italian architect at the command of Ivan the Terrible in 1554 to commemorate the conquest of Kazan, and consists of a number of separate buildings under separate cupolas, differing from each other in form, dimension, and glaring colorings. The interior does not differ essentially from that of the other great churches of Moscow, being dark, close, and covered with paintings, gold, and gems in great profusion. Contrasting favorably with the Cathedral of Vasili the Beatified is the modern Church of the Saviour, consecrated in 1881 in commemoration of the destruction of Napoleon's Grand Army in 1812. It is Lombardo-Byzantine in style, cruciform, and well proportioned, built of white marble and surmounted with five cupolas. The paintings and the marble reliefs of the interior have been executed by the best artists of Russia.

In the centre of the Red Square stands the monument to Minin and Pozharski, who liberated Moscow from the Poles in 1612. The Greek Monastery of Saint Nicholas in the Kitai Gorod deserves mention for its influence on education in Russia. It was under the auspices of the monks of Saint Nicholas that the first academy for classical education was established in the seventeenth century. It numbered, among its pupils, Lomonosoff and many others prominent in the literary and the political life of the country. The Kitai Gorod possesses a number of old residences of the boyars (q.v.), of which the most interesting is the family house of the Romanoffs, faithfully restored in 1859. The Gostinoy Dvor, the centre of the retail trade of Moscow, is also very interesting architecturally. Other noteworthy secular buildings and monuments are the Petrovski Palace, occupied by Napoleon during his stay at Moscow, the town hall (duma), the Sukhareff Tower (1692-95) with the reservoir, the triumphal arch, etc. Moscow has extensive markets, of which probably the most interesting is the Tolkutchy, where old clothes are sold to the poorer classes. In the most northern quarter of the Zemlyanoi Gorod are still found many stately although somewhat decayed mansions of the old nobility, while Zamoskvoryetchye, on the opposite side of the river, is the stronghold of the wealthy merchant class.

Economically, Moscow is exceedingly important, both with regard to industries and commerce. The manufacturing industries date from the time when the city was the residence of the Court and attracted skilled artisans from all over Russia as well as from foreign countries. At present Moscow is the second largest manufacturing city of the Empire and the centre of the textile industries, furnishing a considerable portion of the cotton goods for the Asiatic trade. According to the industrial census of 1895 there were more than 800 large manufacturing establishments, employing over 65,000 persons and yielding an output of over $67,000,000, of which textiles represented over one-third. Next to textiles are foodstuffs, metal products, paper, leather and wood products, and machinery. As early as the fourteenth century Moscow was an important commercial centre. Its trade grew up with the political power of the Principality of Moscow, and received a great stimulus from the settlement of the Novgorod merchants. The advantageous position of the city at the converging of six railway lines, which connect it with every part of European Russia as well as with Siberia, has played an important part in its recent commercial development. Manufactures, agricultural products from the southern and the central provinces of Russia, minerals from the coast, and tea from Asia, all find their way to Moscow and go partly to supply the local demand and partly to supply the trade with the interior or with foreign countries. The rise of Saint Petersburg had at first a detrimental effect on the foreign trade of Moscow, but the development of the Asiatic trade, of which Moscow is the natural centre, has more than compensated for the loss in any other direction. The trade by water is important. The chief imports of Moscow are tea, iron and steel products, raw silk, indigo, cotton yarn, etc.

Moscow is administered by a Governor-General, who is also at the head of the military district of Moscow. The municipal council of 160 members is elected by owners of real estate and merchants of the first class, and has an executive committee of six members. Both the municipal council and the executive committee are presided over by the mayor or 'golova,' who, unlike the mayors of all other Russian towns except Saint Petersburg, is appointed by the Government from two candidates suggested by the council.

The budget of the city for 1901 balanced at $7,000,000. The chief items of revenue are real estate and internal taxes, subvention from the Imperial Government, the zemstvo, and returns from municipal property and enterprises. Nearly one-fourth of the revenue is spent on sanitation, about 12 per cent. on municipal improvements, and less than 8 per cent. on education. The municipality owns the waterworks, slaughter-houses, and baths, and a number of lodging-houses. In regard to facilities for local transportation Moscow is far behind most European cities of its size and importance. Moscow has many prominent educational establishments. Besides the university (see Moscow, UNIVERSITY OF) there are a theological seminary, a technical school, an agricultural institute, an institute for the study of Oriental languages, schools of art, painting, and architecture, a school of engineering, two seminaries for teachers, a number of dramatic schools, a commercial institute, 21 gymnasia, 5 *Realschulen*, a school of church music, and numerous other special schools. Libraries are numerous. The most important museums and collections are the Rumyantzeff Museum, consisting of a fine library and collections of paintings, sculptures, ethnography, etc.; the historical museum, and the Tretyakoff Gallery of modern paintings, now belonging to the city. A number of prominent scientific organizations have their home at Moscow, including the society of naturalists and the society of Russian history and antiquities. The numerous archives of Moscow are also noteworthy. The benevolent institutions are among the largest in Russia, especially the foundling asylum. The theatres of Moscow, especially the 'small theatre,' have played a prominent part in the development of the Russian drama. The periodical publications of Moscow are numerous, and the book trade of the city, especially popular publications, is very extensive.

The population was 753,469 in 1882, and 977,269 in 1897. A very large percentage is made up of persons born outside of Moscow. The predominance of males is very marked (about 131 to 100 in 1897). About 50 per cent. of the population belong to the peasantry. The Greek Orthodox inhabitants constitute 94 per cent. of the total population of Moscow, as compared with 84 per cent. in Saint Petersburg. The environs of the city are replete with historical interest, and contain many estates of the old nobility and royal favorites, among which may be mentioned the Petrovsko-Razymovskoie, with its extensive park and academy of agriculture. There are also many large parks and groves, where the masses amuse themselves on holidays.

History. The site of the city was probably inhabited long before the twelfth century, but the first mention of Moscow dates from 1147, when it was the estate of the Suzdal Prince Yuri Dolgoruki. The city began to rise with the Principality of Moscow under Daniel, the son of Alexander Nevski, in the thirteenth century, and especially under Ivan Kalita (1328-40), who with the aid of the Mongols succeeded in annexing many of the minor principalities to Moscow, and greatly embellished the capital. About this time the Metropolitan Peter transferred his seat to Moscow, thereby laying the foundation of its future position as the religious capital of Russia. With the union of the Russian principalities under Ivan III. (1462-1505) Moscow became the capital of Russia and began to assume the proportions and appearance of a large city. It was surrounded by stone walls, and architects from foreign countries were summoned to build its churches and palaces. But the growth of the city was not infrequently interrupted by the invasions of the Tatars, repeated conflagrations, and pests. It also suffered from the internal dissensions and revolts during the seventeenth century, notably the Polish occupation in 1610-12, the revolt of the people against the corrupt favorites of the Czar, the riots following the introduction of religious reforms by Nikon, and the rise of the *Streltsi* (q.v.) against the reforms of Peter the Great. Peter found Moscow, the bulwark of Russian orthodoxy, extremely unfavorable for the introduction of his reforms, and transferred the Court to Saint Petersburg. In the eighteenth century the city was visited by a number of disastrous conflagrations and the plague of 1771. On September 14, 1812, Moscow, almost entirely deserted and with its treasures and archives removed to Vladimir, was occupied by the army of Napoleon, seven days after his disastrous victory at Borodino (q.v.). On the following day the Emperor made his entry into the city. On the night of the 15th to the 16th, in accordance with a prearranged plan, fires were started in several parts of the city, and soon the entire place was in flames, so that, on September 16th, Napoleon was compelled to remove his headquarters from the Kremlin. The churches and palaces were meanwhile abandoned to the depredations of the invaders and the criminal classes, the jails having been thrown open by the order of the Governor. On October 19th the French began their fatal retreat from the city. On May 18, 1896, Moscow was the scene of a fearful disaster, brought about by the distribution of gifts at a popular festival arranged in honor of the coronation of Nicholas II. Over 2000 people were crushed to death and many more wounded. Consult: Fabricius, *Le Kremlin de Moscou* (Moscow, 1883); Zabel, *Moskau* (Leipzig, 1902); Sabjelin, *History of Moscow* (in Russian, Moscow, 1902).

MOSCOW. A town and the county-seat of Latah County, Idaho, 94 miles south-southeast of Spokane, Wash., on the Northern Pacific and the Union Pacific railroads (Map: Idaho, A 2). It is the seat of the University of Idaho (q.v.) with the State Agricultural College. Mining, farming, fruit-growing, stock-raising, and lumbering are the leading industries, and there are some manufactures. Population, in 1900, 2484.

MOSCOW, University of. The oldest and largest institution of higher learning in Russia, organized in 1755. At its inception it consisted of three faculties—law, medicine, and philosophy—with a total staff of ten professors, mostly brought from Western Europe. The curriculum was very limited in its scope until 1807, when it was reorganized by Alexander I. At the burning of Moscow in 1812 the university buildings were destroyed. The most valuable collections, however, had been previously removed. Instruction, suspended for a while, was resumed in 1813, and new buildings were erected in 1816-19. In 1835 the number of chairs was increased to thirty-five and a uniform four years' course established for all departments. In 1841 the Medico-Surgical Academy was united with the University. The liberal University Act of 1863 gave the professors and students a certain amount of self-government which was abolished during the reactionary régime of Alexander III. in 1884. In 1902 Moscow University consisted of the following faculties: (1) Medicine, (2) law, (3) physical and natural sciences, (4) historico-philological faculties. It offers four-year courses leading to the degree of Candidate. In the medical school, however, the course covers five years, the regular degree being 'physician;' the degrees of Master, Doctor of the various sciences, and M.D. are conferred for special investigation. The university library contains 271,926 volumes and 23,239 pamphlets. The departmental libraries, laboratories, observatory, museums, etc., number altogether 33. The medical department has 14 special clinics and hospitals. The teaching staff consists of 27 emeritus, 44 ordinary, and 20 extraordinary professors, 175 privat-docents, and 11 instructors. The number of students in 1902 was 4691, of whom 363 took the historico-philological, 321 the mathematical, 683 the natural science, 1673 the law, and 1100 the medical course. The expenditures of the university amount to about $830,000. As the majority of the students come from the poorer classes, the number of scholarships is very large, the number in 1902 reaching as high as 645. The university is under direct supervision of the Minister of Public Instruction, who appoints the rector. There is a university council, but its powers are very limited.

MOSEILIMA, mô-sī'lē-mȧ (Ar. *Musailimah*, from the proper name *Muslimah*, from *salima*, to be safe). One of the most important of the rival prophets who came forward in Arabia when Mohammed had stirred the religious thought of the people. He belonged to the tribe of the Beni Henifah, of Yamama in Nejd. The traditions about his life and age are extremely contradictory and legendary. It appears, however, tolerably certain that he had risen to a certain eminence in his tribe, probably as a religious teacher only at first, before Mohammed assumed his prophetical office. He seems to have proposed to divide the religious leadership with Mohammed, a suggestion which the latter contemptuously refused. He never undertook to supplant Mohammed. After the death of the Prophet, Moseilima set up the standard of open opposition and was defeated and killed in a desperate battle by Khalid, who had been sent against him by Abu Bekr. His 'heresy' was stamped out, and only a few scattered supporters contrived to escape to El-Hasa and Basra, where they may have laid the foundation of the later Karmathian creed. See MOHAMMEDAN SECTS.

MOSELEY, mōz'lĭ, HENRY (1801-72). An English mathematician, born at Newcastle-under-Lyme. He graduated at Saint John's College, Cambridge, and in 1831 became professor of natural philosophy and astronomy in King's College, London. In 1853 he was appointed canon of Bristol Cathedral, and two years afterwards was made chaplain to the Queen. He published a number of scientific books, *Mechanical Principles of Engineering and Architecture* (1843) being the most important. Moseley discovered formulæ for the dynamical stability of warships, which have come into common use.

MOSELLE, mō-zĕl', German MOSEL, mō'zel. One of the principal affluents of the Rhine. It rises on the west slope of the Vosges Mountains in the northeastern corner of France, flows northwestward to the French boundary, then northward past Metz and Thionville, after which it turns to the northeast, and with many windings through the Prussian Rhine Province, enters the Rhine at Coblenz (Map: Germany, B 3). Throughout the greater part of its length the Moselle runs through a narrow valley occupied by fertile fields and meadows, and inclosed by steep hills and mountains, in many places becoming rocky cliffs. In the lower valley the hills are vineclad, producing the celebrated Moselle wines, noted for their delicate aromatic flavor. Numerous ruins and historic landmarks also make the valley notable. The total length of the river is 314 miles; it is navigable 214 miles for small vessels. Two lines of steamers ply regularly between Coblenz and Treves.

MOSEN, mō'zen, JULIUS (1803-67). A German author, born at Marieney in the Vogtland, Saxony. He attended the University of Jena, where Goethe awarded him the first prize for his competitive anniversary poem on Karl August's fiftieth birthday; completed his studies at Leipzig in 1826-28, and from 1828 to 1831 was in the office of an advocate at Markneukirchen. He went to Oldenburg in 1844 under appointment from Grand Duke Paul Frederick August as dramaturgist of the Hoftheater with title of Councilor. His activity in that post was interrupted by illness, and from 1850 he was pensioned. His first public success was achieved by the epic *Lied vom Ritter Wahn* (1831), based on the Italian legend of *Il cavaliere Senso*, and his reputation was much increased by *Ahasver* (1838), a second poem in that kind, whose large, historical action is somewhat impeded by its philosophy. The *Gedichte* of 1836 (2d ed. 1843) include the well-known ballads, long since established as *Volkslieder*, "Andreas Hofer," "Der Trompeter an der Katzbach," and "Die letzten Zehn vom vierten Regiment," descriptive of an episode in the Polish contest for independence. Of his works of fiction, the best, perhaps, are the *Bilder im Moose* (2 vols., 1846), short stories, finished in workmanship. His dramas were overweighted with the rhetorical exposition of his ideas on politics and history. *Otto III.* (appeared with three others as *Theater*, 1842) was the most important. As dramaturgist, he did much to further German drama, especially Shakespearean presentations. The best collective edition of his works is that of 1880 (Leipzig, 6 vols.). Consult the anonymous biography, *Julius Mosen* (Oldenburg, 1878).

MOSENTHAL, mō'zen-täl, JOSEPH (1834-96). A German-American musician, born at Cassel. He studied under his father and Spohr, and in 1853 came to America, where he played the organ in Calvary Church, New York City, from 1860 to 1887. He was conductor of the Mendelssohn Glee Club in New York City from 1867 to 1896, played a first violin in the Philharmonic Orchestra for forty years, a second violin in the Mason and Thomas Quartet for twelve, and composed much Church music, such as the psalm "The Earth is the Lord's," and part songs for male voices, *Thanatopsis*, *Blest Pair of Sirens*, and *Music of the Sea*.

MOSENTHAL, SALOMON HERMANN VON (1821-77). A German dramatist. He was born at Cassel, studied at Marburg, and in 1850 became an official in the Ministry of Public Instruction at Vienna, and was soon afterwards appointed Ministerial archivist. His investiture with the Order of the Iron Crown in 1871 conferred knighthood upon him. He is chiefly known by the dramas *Deborah* (1850; numerous later edd. known in English as *Leah the Forsaken*), and *Der Sonnenwendhof* (1856), which have been represented with success, and translated into several languages. He also wrote the libretti for a number of well-known operas, notably Nicolai's *Die lustigen Weiber von Windsor* (1849) and Goldmark's *Die Königin von Saba* (1875). His collected works were published in six volumes in 1877-78.

MÖSER, mẽ'zẽr, ALBERT (1835-1900). A German lyric poet. He was born at Göttingen, and after studying there became a teacher in Dresden. His odes, sonnets, and songs attained great popularity, especially a ballad, 'Die Rose von Mars la Tour,' and are marked by much melody, by a dreamy reflective manner, and occasionally by great skill in the reproduction of classical metres. His *Gedichte* were published in 1865.

MOSER, mō'zẽr, GEORGE MICHAEL (1704-83). An English gold-worker and enameler, born at Schaffhausen in Switzerland. At an early age he went to London, where he was a friend of Sir Joshua Reynolds, of Goldsmith, and of Dr. Johnson; was drawing teacher to George III., and was one of the founders and the first keeper of the Royal Academy. Moser was especially famous as an enameler of jewelry.

MOSER, GUSTAV VON (1825-1903). A popular German dramatist, born at Spandau, May 11, 1825. He was trained for the army, entered it in 1843, and served till 1856, when he married the daughter of a wealthy landed proprietor. After an unfortunate venture in comedy, *Der weibliche Hussar*, he devoted himself to agriculture till a happy meeting with the Berlin stage-director

Wallner brought him back to the stage in 1861 for a career of almost unbroken popular success. Of more than forty comedies the most noteworthy are: *Das Stiftungsfest* (1873); *Ultimo* (1873); *Der Veilchenfresser* (1876); *Der Bibliothekar* (1878); *Krieg im Frieden* (1880). He also wrote a number of plays in collaboration with others. A uniform edition of Moser's works was begun in 1873, and extends to more than twenty volumes.

MOSER, Johann Jakob (1701-85). A German publicist, born in Stuttgart. He studied at the University of Tübingen, where in 1720 he became professor of law. In consequence of some difficulties with the censor, he resigned this position in 1732, and in 1736 answered a call to the University of Frankfort-on-the-Oder. Here he incurred the displeasure of Frederick William I., and in 1739 was again compelled to resign. In 1747 he became Privy Councilor and chief of the chancery in the service of the Landgrave of Hesse-Homburg, but two years later he went to Hanau and in 1751 returned to his native city, where he entered the service of the Duke of Württemberg. In 1759, being held responsible for certain manifestoes directed against the Duke, he was imprisoned in the fortress of Hohentwiel, where he remained for five years. After his release his offices were restored to him. Among his works are: *Deutsches Staatsrecht* (1766-75, 21 vols., besides two supplementary vols., and an index); *Neues deutsches Staatsrecht* (1766-75, 21 vols. and additions, 1781-82, 3 vols.); *Deutsches Staatsarchiv* (13 vols., 1751-57); and his *Lebensgeschichte* (3d ed., 4 vols., 1777-83). Consult Wächter, *J. J. Moser* (Stuttgart, 1885).

MÖSER, mẽ'zẽr, Justus (1720-94). A German historian and publicist, born at Osnabrück. He studied law at Jena and Göttingen, and in 1747 was chosen *advocatus patriæ*. He was sent to England in 1763 on financial business of the Allies. During the minority of the Duke Frederick of York, who became afterwards Bishop of Osnabrück, Möser was the principal adviser of the Regent. He founded in 1766 the weekly *Die Osnabrückischen Intelligenzblätter*, from which he reprinted in 1774 *Patriotische Phantasien*, a series of brilliant and valuable essays. His *Osnabrückische Geschichte* (1768; 3d ed. 1819) is an anticipation of the best results of the modern German historical methods. His collected works, edited by Abeken (Berlin, 1842-44), include a biography by Nicolai and Möser's poetry. Consult: Kreyssig, *Justus Möser* (Berlin, 1857); and Rupprecht, *J. Mösers soziale und volkswirtschaftliche Anschauungen* (Stuttgart, 1892).

MOSES, mō'zĕs. The most prominent figure in the earlier portion of the Old Testament narrative. According to the modern view which regards the Pentateuch as a combination of different sources, those portions relating the career of Moses (in the main, the books of Exodus and Numbers) combine three distinct documents or strata of tradition. It is still possible in most cases to separate the historical compilation known as JE (see Elohist and Yahwist) into its two component parts. In addition to these is the so-called Priestly narrative (see Hexateuch), which is considerably later than either J or E. A brief summary of the career of Moses as given by each of these sources will make clear wherein they differ, and also indicate their value as historical material.

In the narrative of the Yahwist, Moses first appears as a fugitive in Midian. A story is told of his helping the daughters of a priest of Midian to water their sheep, the tale reminding of a similar incident in Jacob's life (Gen. xxix. 1-10); and just as Jacob married Rachel, so Moses marries Zipporah, a daughter of the priest. After the death of the king from whom he had fled, and of those who had sought his life, Moses returns to Egypt. On the way Yahweh appears to him in a burning bush and gives him the command to deliver his people, the Hebrews, from the oppression in Egypt, and bring them to Canaan. Moses hesitates, but is reassured by three signs given him. He delivers his message to the elders of Israel, and Pharaoh is requested to let the Israelites go into the wilderness to perform a sacrifice. Upon the refusal of Pharaoh, seven plagues (see Plagues of Egypt) are sent in succession. Pharaoh proposes a compromise, which Moses refuses, and at last, when the first-born in every Egyptian family is stricken with death, the Egyptians in a panic hurry the Israelites out of Egypt. Pharaoh recovers from his terror and starts in pursuit of the fugitives, who are guided by a cloud at day and by a pillar of fire at night; but the King and his army are drowned in the sea after the Israelites have crossed in safety. The people are led into the wilderness and endure hardships until they reach Mount Sinai, where Yahweh appears and calls Moses to Him on the Mount. He remains there forty days and forty nights, and receives from Yahweh two tables of stone. Moses' father-in-law, Hohab, the son of Reuel, the Midianite, visits him and decides to accompany the Israelites. They continue their wanderings amid many hardships till they reach Kadesh. Caleb and others are sent into Canaan as far as Hebron and bring back reports about the fertility of the land and the powerful character of the inhabitants. Israel marches along the borders of Edom to Moab, conquering Heshbon and other Amorite cities. Balaam is sent for by Balak, the King of Moab, to curse Israel, but fails to do so; final laws and exhortations are delivered by Moses to his people. He is then called to the top of Pisgah, where, after being shown all of Canaan, he dies, being buried by Yahweh Himself in a valley of Moab opposite Beth-peor. Aaron in this narrative is completely ignored.

In the Elohistic narrative, the birth of Moses in Egypt is related with the story of his miraculous deliverance from the decree of Pharaoh. His sister (Miriam) was by him when he was found in an ark of bulrushes by Pharaoh's daughter. He is educated as an Egyptian noble, but learning that he is an Israelite, goes out to see how his people fare, and observing an Egyptian ill-treating an Israelite, he slays the former, and when the deed becomes known, flees to Midian. While tending the flocks of his father-in-law, Jethro, on Horeb, 'the mountain of God' [Elohim], God reveals Himself and announces His new name, Yahweh. Moses is ordered by Yahweh, who has heard the cry of the oppressed people, to go to Pharaoh and demand the release of the Israelites. On his way to Egypt, he is joined by Aaron. Together they appear before Pharaoh. Five plagues are brought upon Egypt, and when the last—the death of the first-born—is sent, Pharaoh gives Moses and Aaron permission to depart with the Israelites. The latter, loaded with presents from the Egyptians, and carrying with them the bones of Joseph, start on their journey. Pharaoh follows in pursuit with 600 chariots, but Moses lifts up his rod. An angel places himself between Israel and the pursuers and the latter perish. The people, fed by bread from heaven, reach Horeb, where Yahweh appears amid thunder and lightning, and delivers to the people the Ten Commandments. (See DECALOGUE.) Moses and Joshua ascend the Mount and during their absence Aaron makes a golden calf for the people. Upon the return of Moses and Joshua, they see the people dancing around the calf, and in anger Moses breaks the two tables. Moses returns to Yahweh, intercedes on behalf of his people, and receives laws which he communicates to the people. Jethro visits Moses and suggests the appointment of subordinates to assist in the government of the people. Miriam and Aaron revolt against Moses and are punished; Amalek attacks Israel and is completely routed; Dathan and Abiram rebel against Moses and are swallowed up by the earth. The people reach Kadesh, where Miriam dies. Moses urges Israel to invade Canaan, and 12 men are sent out to survey it, who bring back discouraging reports so that the people ask Moses for a leader to take them back to Egypt. Because of the complaints of the people at their hardships, fiery serpents are sent as a plague; Moses makes a brazen serpent by looking at which the sufferers are healed. Yahweh announces to Moses that he is about to die, and Joshua is appointed as his successor. Moses delivers final laws and exhortations and dies in the land of Moab. His burial place is unknown.

The Priestly narrative brings Aaron into constant association with Moses, but ignores Miriam. God speaks to Moses and Aaron in Egypt; the former is at the time eighty years old—the latter eighty-three. Six plagues are wrought in a miraculous way by Moses and Aaron in the presence of Pharaoh and his magicians, who at first are able to perform the same miracles. The Israelites leave Egypt to observe the Passover festival. They are pursued by Pharaoh, and Moses stretches out his hand over the sea, the waters of which are divided and afford a passage for Israel. After the Israelites reach the farther shore, Moses again stretches out his hand, the waters return and the Egyptians are drowned. After long wanderings, the people come to Sinai, where Yahweh appears. Moses ascends into the cloud that hovers over the mountain and receives instruction from Yahweh regarding the tabernacle and its furniture, and the duties of the priests and their vestments. He also obtains two tablets of stone. Moses and Aaron proceed to organize the nation and its worship. A census is taken, and the people leave the wilderness. Korah and 250 princes rebel against Moses and Aaron and a sign is given by Yahweh—the blossoming of Aaron's rod—proving the choice of Aaron and his family for the priesthood. Joshua, Caleb, and ten others are sent to survey Canaan. The ten bring back discouraging reports against which Joshua and Caleb protest. Yahweh appears and announces that Joshua and Caleb alone of the grown men shall enter Canaan; the ten are stricken with death. A second census is taken by Moses and Eleazar. Joshua is appointed the successor of Moses, who, after delivering final laws, ascends Mount Nebo, and dies at the age of one hundred and twenty years in the full possession of all his faculties.

The Book of Deuteronomy, taken up with the final addresses and ordinances given by Moses, adds nothing to the above traditions of his career.

A general survey of these narratives reveals certain features in the career of Moses that must have become permanently fixed in the minds of the people, before the attempt was made to adjust the figure to the pragmatic theory which guides the Old Testament writers in their survey of the past. These are: (1) his presence in Egypt; (2) his association with Midian and the cult at Horeb or Sinai (q.v.); (3) his leadership of certain clans. The popular reminiscences of a sojourn of the Hebrews in Egypt point to the presence at one time in that land of some of the clans that afterwards formed part of the Hebrew confederation. (See JEWS.) These clans subsequently left Egypt and returned to the wilderness, whence they originally issued. Joining other clans at Horeb (or Sinai), they adopted a cult which existed there. The mountain was a sacred one and the deity who dwelt on the top was known as Yahweh. The relationship of Moses to these incidents depends upon the question whether he is to be regarded as an individual or as the representative of a clan. It must be confessed that at times Moses is spoken of as though he were merely the eponymous ancestor of a clan, and yet, taking all things into consideration, the balance of evidence is in favor of the assumption that there was an individual by the name of Moses, of whom some faint reminiscences survived, and who gradually became the favorite personage to whom all traditions, legends, and myths associated with the exodus from Egypt and the birth of the nation—traditions, legends, and myths coming to the Hebrews from various sources and at various times—were attached. The result of this process lies before us in the majestic figure of Moses as portrayed in the union of the three 'strata,' already outlined.

BIBLIOGRAPHY. Consult the histories of Renan, Stade, Guthe, Kittel, Wellhausen, Winckler, Piepenbring, etc.; also the commentaries on Exodus and Numbers enumerated in the articles upon these books; Kuenen, *Religion of Israel*, vol. i. (Eng. trans. Edinburgh, 1874-75); Budde, *Religion of Israel to the Exile* (New York, 1899); Driver in *Authority and Archæology*, pp. 54-79 (London, 1899). For the mass of additional legends that gathered around Moses, see Beer, "Das Leben Moses nach Auffassung der jüdischen Sage," in *Jahrbuch für die Geschichte der Juden und des Judenthums*, vol. iii. (Leipzig, 1863); Weil, *Biblische Legenden der Muselmänner* (Frankfort, 1845; Eng. trans. under the title *The Bible, the Koran, and the Talmud*, London, 1846).

MOSES. A colossal statue in the Church of San Pietro in Vincoli, Rome, one of the most famous works of Michelangelo. The gigantic figure is seated in the attitude of one about to spring to his feet. The left hand is pressed to the body to restrain his indignation at the worship of the golden calf, at which he appears to gaze with flashing eyes and frowning face, while the right hand grasps the tables of the law. The head shows two short horns, based on a mistaken interpretation of Ezekiel xxxiv. 21. The "Moses" was one of thirty proposed statues for the tomb of Pope Julius II. in Saint Peter's, which was not completed. See Plate under Michelangelo.

MOSES, Assumption of, and Revelation of. See Apocrypha, section on *Old Testament;* also Assumption of Moses.

MOSES, Bernard (1846—). An American professor of history and political economy, born at Burlington, Conn. He graduated at the University of Michigan in 1870, studied at Heidelberg, and became professor of history in Albion College, N. Y., in 1875. In 1876 he was appointed to the University of California. His first book, *Politics* (1884), was written in collaboration with W. W. Crane; afterwards he produced: *The Federal Government of Switzerland* (1889); *Democracy and Social Growth in America* (1892); and *The Establishment of Spanish Rule in America* (1898). He was one of the Philippine Commissioners appointed by President McKinley.

MOSES OF CHORENE, kô-rĕ′nė. An Armenian author, belonging to the fifth century. The only extant works now generally admitted to be his are a *Rhetoric*, and a *History of Armenia*, which appeared in a German version by Lauer at Regensburg in 1869, and entitles him to the foremost place among Armenian historians. A work on geography once ascribed to him is now assigned to the seventh century. Consult Von Gutschmid, *Ueber die Glaubwürdigkeit der armenischen Geschichte des Moses von Khoren* (Leipzig, 1876).

MOSGU, mŏs′kōō, or **MASA**, mä′sȧ. Pagan negroes in the Chad Basin, Sudan, south of the lake, divided into many tribes or branches, and numbering about a million. Less than a third of them have come under the sway of Mohammedanism.

MOSHEIM, mōs′hīm, Johann Lorenz von (1694-1755). A distinguished German Church historian and theologian. He was born at Lübeck, October 9, 1694, and studied at Kiel. In 1723 he became ordinary professor of theology at Helmstedt and in 1747 at Göttingen, where he died as chancellor of the university, September 9, 1755. His theological works are numerous, among them a work on Bible morality, *Sittenlehre der heiligen Schrift* (1735-53; 4th ed. 1753-61, continued by J. P. Miller, 1770-78), and discourses, *Heilige Reden* (1732; 4th ed. 1765). But his contributions to theological literature in the department of ecclesiastical history are most important, by reason of their great learning, fullness, and accuracy. The following have been translated from the original Latin: *Commentaries on the Affairs of Christians Before the Time of Constantine the Great* (London, 1813-15); *Institutes of Ecclesiastical History* (Murdock's trans., ed. by W. Stubbs, 1863; new ed., Boston, 1892); his valuable *Versuch einer unparteiischen Ketzergeschichte* (1746-48) is untranslated.

MOSKVA, mŏs-kvä′. A river of European Russia, a left affluent of the Oka, which is itself an affluent of the Volga. It rises in the Government of Smolensk, flows eastward through the city of Moscow, and joins the Oka near Kolomna, in the Government of Moscow, after a course of 285 miles (Map: Russia, E 3). It is navigable between Moscow and the Oka, a distance of 112 miles, and is an important commercial route. On its banks, September 7, 1812, occurred the famous battle of the Moskva or Borodino between the Russians and Napoleon.

MOSLEM, mŏz′lĕm, or **MUSLIM**, mŭz′lĭm. A common designation in the West for a Mohammedan. It comes from the Arabic *muslim*, a derivative of *salima*, 'to be safe,' which is often used by Mohammed in the sense of a 'true believer,' generally in contrast to *kāfir*, an unbeliever, infidel. The name Mussulman, often used in the same sense, is derived from the Persian plural of *muslim* (*muslimān*). See Mohammedanism.

MOSLER, mōz′lẽr, Henry (1841—). An American genre painter, born in New York City. He studied in Cincinnati under J. H. Beard. During the Civil War he was on the staff of *Harper's Weekly*, and afterwards went to Paris. There he studied under Hébert. Still later he received some instruction at the Munich Academy under Piloty, and in Düsseldorf. He became especially well known in Paris, where he lived many years and exhibited much. He was elected a National Academician in 1895, and in the following year won the Clark Prize. He also won a gold medal at the Salon of 1888, a silver medal at the Paris Exposition of 1889, and a medal and diploma of honor at the Atlanta Exposition in 1895. In 1892 he was awarded the cross of the Legion of Honor. His more notable works include: "Le retour" (1879), which was bought by the French Government for the Luxembourg; "The Purchase of the Wedding Gown" (1880); "The Last Sacrament" (1885); and "The Coming Storm" (1885). His "Wedding Morning" was bought by the Sydney Museum, Australia.

MOSQUE (Fr. *mosquée*, from Sp. *mezquita*, from Ar. *masjid*, temple, from *sajada*, to prostrate one's self, to pray). A Mohammedan house of prayer and worship. Examples of these buildings are found wherever the Mohammedan faith has prevailed, from Spain to India and Turkestan. There is no fixed form of structure for them; in poor communities a bare room provided with a *miḥrāb* to mark the *kiblah* (q.v.) often serves the purpose. In general the earliest type of mosque was an open court, surrounded on all sides by an arcaded portico, like the atrium or cloister of a church or the peristyle court of an Egyptian temple, but sometimes differing from them in having not a single row, but two or more rows of columns or piers. The side of the court toward Mecca is usually deeper than the other three, with more rows of supports; it contains the *mihrāb* and to the right of it the *mimbar* (pulpit), and, in front, generally a platform and reading desk. In the open court (*ṣaḥn*) is the fountain for ablutions, often of large size and covered with a dome.

The mosques of India and Central Asia are generally constructed after this plan. The Mohammedans, however, have always been influenced by the native forms of architecture in the different countries which they have entered. The Spanish mosques, for example, closely resembled churches, having many parallel aisles supported on a forest like the old Cordova mosque, or fewer aisles, like the mosque at Toledo, now San

Cristo de la Luz. The dome was not used to any extent till the fourteenth century, when two new types made it their central form: the mausoleum mosque originating in Cairo, and the Turkish mosque derived from the Byzantine plan of Saint Sophia (q.v.) at Constantinople. The masterpiece of the first type is the Hasan mosque at Cairo (1356), followed by those of Barkuk, Khawand al-Baraka, and others. Of the second type, besides the several superb examples at Constantinople (Sulaiman, Ahmad, and others) there is the earlier one at Isnik, and the model spread even to Egypt, as in the Sinan mosque at Bulak. Still another way of employing the dome appeared in certain of the mosques of India, as the Doshamma mosque at Delhi. Among the most famous and sacred of the early mosques were the *Masjid al-Ḥarâm* at Mecca (q.v.), the *Masjid al-Nabî* at Medina (q.v.), the *Masjid al-Âḳsâ*, the Mosque of Omar at Jerusalem, and the great Mosque of Walid at Damascus. All of these have been rebuilt so that their early form is no longer recognizable. The old mosque at Kairwan (q.v.) is a well preserved early example (eighth century), as is also the Mosque of Tulun at Cairo; the Mosque of Amru at Cairo is of even earlier foundation, and still retains portions of old work. The Mosque of Omar represents the concentric mausoleum type. It is now two or three centuries since mosques of any architectural importance have been erected. The poorer mosques have bare whitewashed walls with no decoration of any kind. The larger and more pretentious are often elaborately and artistically decorated with carvings, arabesques, and passages from the Koran in the most involved style of ornamental calligraphy. Hundreds of oil lamps and sometimes ostrich eggs, elephant's tusks, and the like hang from the ceiling. The floor is usually covered with matting. A striking feature of mosque architecture is the minaret (q.v.).

The five prayers are said in the mosque daily. (See MOHAMMEDANISM.) The worshiper on entering removes his shoes, carries them in his left hand, sole to sole, and puts his right foot first over the threshold. He performs the necessary ablutions and takes his place in the congregation facing the *miḥrâb*. The attendance is more general on Friday, when some special prayers are said and a sermon (*khuṭbah*) is often added. A mosque which has this service is called *masjid al-jâmi'* ('mosque of the general assembling') or simply *jâmi'*. Women are not forbidden to enter the mosque, but their presence is not considered seemly during the time of prayer; sometimes a special place, secluded by a screen, is provided for them. There are few mosques to which unbelievers do not now have access. The utmost decorum and solemnity are observed during services, and the mosques are deeply reverenced by the faithful. At the same time they are intended for daily use, and when services are not going on are general gathering and lounging places; persons may be seen there sewing, spinning, or engaged in some similar handicraft; and they serve as resting places for travelers and wanderers. It has been the custom from the beginning for teachers and professors to give lectures and hold classes in the larger mosques, which thus serve as college buildings. The teacher takes his place at a pier or column at stated hours, his favorite pupil holds his books or notes, and the audience sits around on mats. Several such courses are carried on simultaneously in different parts of the covered arcades. Until medressehs were built in the eleventh century, the mosques were probably the only regular seat of advanced teaching. In recent times the advanced education in the mosques has been largely confined to the preparation of candidates for the position of imam, but there are still notable exceptions. The Azhar Mosque in Cairo has long been the main centre of advanced instruction in Mohammedan countries, the only survivor of many finer mediæval institutions, and its courses are attended by between 5000 and 10,000 students. Minor buildings, such as school-rooms, academies, libraries, hospitals, dormitories, public kitchens, and almshouses, are often connected with the mosques.

The revenues of the mosques are derived not only from the contributions of the faithful, but also from investments in landed property (*wuḳûf*), often from gifts made centuries ago; this property is in the hands of trustees. The income serves to keep the building in repair and to pay necessary expenses. The mosque officials and attendants include the *'imâm*, who leads the prayers, the learned men who teach (*mawlawî*, *'ulamâ*), the *khâṭib* or preacher (in a *jâmi'*), the muezzins (q.v.), who call to prayers, doorkeepers, lamp-lighters, etc. Their number depends entirely upon the revenues; sometimes a single imam combines in his person the functions of all the others. The imam has a salary from the revenues, but the teachers are dependent entirely upon the gifts of their pupils. See MOHAMMEDANISM. Consult the Bibliography of MOHAMMEDAN ART.

MOSQUERA, môs-kā'rȧ, TOMÁS CIPRIANO DE (1798-1878). A Colombian politician and soldier, born at Popayan. At thirty-one he was general and Ambassador Extraordinary to Peru, and in 1833 was made Senator. From 1845 to 1849 he was President of New Granada, and greatly increased the material prosperity of the country. He headed the revolt against Ospina in 1859, and in 1861 became President of the country reorganized as the United States of Colombia; but was deposed in 1867 for arrogating to himself the power of adjourning Congress. He returned from banishment in 1869, and became Governor of Cauca and a Congressman.

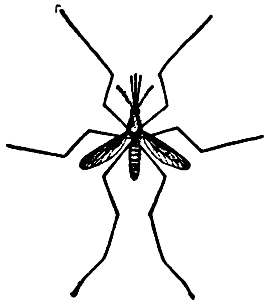
MOSQUE SWALLOW. One of a group of related Asiatic and North African swallows within the genus Hirundo, whose prevailing colors are blue, with chestnut on the rump and side of the head, and buff or brownish streaked breasts. They are familiar town swallows wherever they occur, and take their English name from the habit of placing their nests commonly on the walls and minarets of mosques. These nests and their eggs are much like those of the American eaves swallow. The commonest Oriental species are *Hirundo daurica* and *Hirundo Nepalensis*, and a conspicuous African one of large size is *Hirundo Senegalensis*. Consult Sharpe and Wyatt, *Monograph of the Hirundinidæ* (London, 1885-94), and authorities upon East Indian birds cited under BIRD.

MOSQUITÍA, mōs'kė-tē'ȧ. A strip of territory on the east coast of Central America. See MOSQUITO COAST.

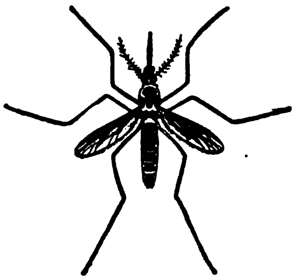
MOSQUITO (Sp., Port. *mosquito*, diminutive of *mosca*, fly, from Lat. *musca*, fly). A biting fly of the family Culicidæ. These flies belong to the group of nemocerous Diptera, and their nearest allies are the crane-flies, the midges of the families Dixidæ, Stenoxenidæ, and Chironomidæ, the fungus-gnats, gall-gnats, and moth-flies, from all of which true mosquitoes are distinguished by the fact that the veins of the wing and the body itself bear flattened scales, readily perceived under a low power of the microscope. The family is a large one, and includes 22 genera and about 300 species. The number of described species has doubled within the last few years, since especial attention has begun to be paid to this group, and activity in research is now so great that it is probable that it may again be doubled before the mosquito fauna of the globe is fairly well known.

Geographic Distribution. The mosquitoes form a cosmopolitan group, and extend practically to all known portions of the globe. Certain species are excessively abundant in the Arctic regions, while the greatest number of species is to be found in the tropical and subtropical life-zones. Certain of the genera are very widely distributed, the typical genus, Culex, being found practically everywhere. Anopheles is represented in all regions except the Boreal and the Arctic; Stegomyia occurs in Southern Europe, North, South, and Central America, West Indies, Africa, India, Malay Archipelago, Eastern Asia, and Australasia. A similar distribution is found with others of the less conspicuous genera. Certain species are also of almost world-wide distribution, and this is doubtless largely due to the ease and frequency with which mosquitoes are transported by seagoing vessels and by railway trains, and to the extraordinary facility with which they accommodate themselves to a novel environment. It is a well-substantiated fact, for example, that there were no mosquitoes in the Hawaiian Islands until they were brought there by sailing vessels. Certain species have a remarkable range through different life-zones, and the group as a whole has only a slight faunistic value. *Culex cantans*, for example, occurs in Canada and the United States, throughout Europe, and in Southern India; *Culex pipiens* occurs throughout Europe from Scandinavia to Malta, all over North and Central America and the West Indies, and is also found in Oriental regions.

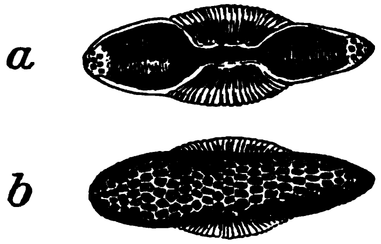
ATLANTIC COAST MOSQUITO (*Culex solicitans*).


MOSQUITO OF MALARIA (*Anopheles maculipennis*).

Classification. The family has been divided by Theobald into six subfamilies, Anopheles, Megarhinus, Culex, Ædomyia, Trichoprosoön, and Corethra being the typical genera of these subfamilies. The last named, however, has a short proboscis not formed for piercing, and does not belong to the biting mosquitoes proper. The characters which have been relied upon mainly in the differentiation of the genera have been the comparative length of the palpi in the different sexes, the character of the terminal joints of the palpi, the relative proportions of certain of the cells of the wings, the characters of the scales of the legs and head, the bristles upon the metanotum, and certain other points connected with the relations of the veins of the wings. The species for the most part have been separated upon colorational characters, although certain characteristics of the wing-venation are specific rather than generic, and the study of the body scales reveals specific characters. There are also some interesting characters connected with the teeth of the foot-claws which are both specific and generic.

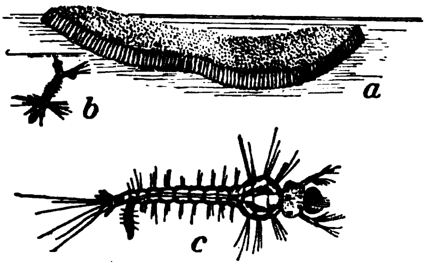

MOSQUITO OF YELLOW FEVER (*Stegomyia fasciata*).

Life History. Mosquitoes in their early stages are all aquatic. The larvæ need a certain amount of standing water for their development. The eggs are laid by the adult insects, in the majority of cases upon the surface of standing water. They may be laid upon end, attached side by side in raft-shaped masses, as in *Culex pipiens* and as in the genus Uranotænia, or they may be laid singly on their sides, as in Anopheles, *Stegomyia fasciata*, Psorophora, and several species of Culex. They may also be laid upon moist earth in swampy places, as with *Culex solicitans*, or upon the leaves of pitcher-plants, as with *Wyeomyia Smithii*, hatching in these cases when water eventually reaches them. The eggs of some species, as those last named and *Stegomyia fasciata*, will bear desiccation; but the vitality of others, as those of Anopheles, is destroyed when they are removed from the water for any length of time. The egg stage is temporary with perhaps the majority of species, but with others it is much longer, and may be the hibernating stage with certain forms. The larva is an active and voracious little creature, and is commonly known as a 'wiggler' or 'wrig-



EGG OF ANOPHELES.
a, upper surface; *b*, under surface. These eggs float in disconnected masses. (Greatly magnified.)

gler.' Its life as a rule is short, and with the great majority of the species it is a true air-breather, coming to the surface of the water at frequent intervals and extruding its respiratory tube in order to suck air into its tracheæ. With at least one species (*Wyeomyia Smithii*), and perhaps with others, the anal locomotory flaps have an abundantly branched tracheal supply, and at least during part of the larval life these flaps function as air-gills, rendering it possible for the larva to remain below the surface of the water for a prolonged period of time. The food of mosquito larvæ is most variable. They swallow all sorts of minute organisms which float upon the surface or are held in suspension in the water. The larvæ of Anopheles feed for the greater part of their life at the surface, and consequently devour mainly the spores of algæ which float there. Later in life in shallow water they descend to the bottom and feed upon heavier objects. The larvæ of Culex feed below the surface upon small organisms, animal and vegetable, and mineral as well, which are held in suspension. The larvæ of Psorophora seem largely carnivorous, and, on account of their large size, are able to overpower and to devour other mosquito larvæ and other aquatic insects. They are even cannibals, and will feed upon small individuals of their own kind. All mosquito larvæ are very active, wriggling quickly through the water by abrupt and rapid bendings of the body, aided in some cases by long lateral hairs, and especially by a well-developed group of flaps at the anal end of the body. Food is brought into the mouth by the active movement of long oral cilia. In many forms the jaws are undeveloped, but in some, as in Psorophora, they are well formed and adapted for piercing and tearing.



EGGS AND LARVÆ.

a, a 'raft' of eggs of the common mosquito (culex); *b*, a single larva ('wiggler') taking breath at the surface; *c*, a larva (enlarged).

The pupa is also active, but does not feed, and possesses no mouth parts. As a rule it floats at the surface of the water, breathing through two respiratory tubes which issue from the thorax—a curious change from the respiratory tube of the larva, which is single and issues from the anal end of the abdomen. Although generally floating at the surface, the pupa when disturbed rapidly vanishes below the surface by energetic movements of the abdomen and of the anal flaps, and is thus enabled to a certain extent to avoid the attacks of fish and other enemies. The pupal stage is usually of short duration, and the adult issues through the cracking of the skin of the thorax. With many mosquitoes there are several generations annually. With *Culex pipiens* and *Anopheles maculipennis*, for example, there may be from eight to twelve such generations in a long summer. With other species it seems reasonably certain that the life-duration of the individual is much greater, and that in some cases there may be but a single generation each year. Most mosquitoes hibernate as adults, stowing themselves away in protected places at the beginning of cold weather. Other species undoubtedly hibernate in the egg stage, and still others unquestionably hibernate as larvæ, readily standing extremes of temperature, and even emerging in good condition with the warm weather of spring from blocks of ice in which they have been solidly frozen.

Agency of Mosquitoes in Carriage of Disease. Since 1898 mosquitoes have become of vital importance to the human race, following the discovery that they are secondary agents in the carriage of several diseases of human beings, notably malaria and yellow fever. See Insects, Propagation of Disease by.

Riddance of Mosquitoes. The most effective way of relieving a neighborhood of mosquitoes consists in abolishing the breeding places. All accumulations of stagnant water—and these are of the most varied and frequently inaccessible character—must be removed wherever it is possible. Swampy lands should be drained; hollows in old trees and stumps should be filled up; old cans and bottles should be removed; cesspools should be hermetically sealed; rain-water barrels should be covered with fine wire gauze; the roof-troughs of houses should be frequently cleaned out. No possible supply of standing water should be overlooked, and these will in many cases require a most careful and ingenious search. Where mosquitoes are breeding in troughs or large cement basins which are used for watering stock, fish, such as sunfish, goldfish, or top minnows (qq.v.), should be introduced. Where other ponds exist which it is not possible to drain, the water margins should be kept clean and sharp, and superabundant vegetation should be removed. Moreover, if the fish supply of such ponds cannot be made satisfactory, a certain amount of kerosene placed upon the surface of the water will quickly destroy mosquito larvæ. This kerosening of swamp lands, where drainage is impossible or very expensive, is often a temporary remedy of great value. In malarial regions persons may be protected from the bite of the dangerous and annoying mosquitoes by the careful screening of houses and by wearing mosquito veils and gloves at night when obliged to be out of doors. Anopheles, as a rule, bites only at night. By this method the Italian Government has greatly reduced malaria in the black belt of Italy. By protecting healthy persons and malarial patients as well, and by the free use of quinine with the patients, the general health of the population of that region has greatly improved. The Germans in East Africa believe that they can wipe out malaria by simply destroying the disease with medicine. Malaria once abolished in human beings, there will be none for the mosquitoes to carry. In the United States extensive work has been done in the destruction of breeding places and thus reducing the numbers of mosquitoes. Under such conditions malaria will die out. In Cuba, aside from protecting the early yellow-fever patients and the constant use of mosquito bars in hospitals, yellow fever has been exterminated by house-to-house work against the breeding places of Stegomyia, this work being carried on first by the medical officers of the United States Army, and later by the health authorities of the Cuban Government. Mosquitoes, as a rule, may be stupefied by burning pyrethrum powder (Persian insect powder). They may also be deterred from biting by anointing the skin with oil of citronella.

Consult: Howard, *Mosquitoes* (New York, 1901); Ross, *Mosquito Brigades* (London, 1902); Theobald, *A Monograph of the Culicidæ of the World* (ib., 1901); Celli, *Malaria* (ib., 1900); Giles, *Gnats or Mosquitoes* (2d ed., ib., 1902); North Shore Improvement Association, *Report on Mosquitoes* (New York, 1902); Berkeley, *Laboratory Work with Mosquitoes* (ib., 1902).

MOSQUITO, mŏs-kē'tō (corruption of the native name *Misskito*). A considerable people apparently made up of several tribes, which occupies that portion of the eastern coast of Nicaragua known from them as Mosquitia or the Mosquito Coast (q.v.). They are an intelligent people, short in stature, and usually very dark in color. This latter trait is said to be due in part to admixture with negro blood from slavers wrecked upon their coast. They number about 6000 souls. Consult Squier, *The States of Central America* (2d ed., New York, 1858); and (anonymous) *Waikna*.

MOSQUITO BEE. Any one of several of the very small, stingless tropical honey-bees of the genus Melipona, which form communities, consisting at times of countless numbers. They are among the smallest of the bees, and although they do not sting, all the essential elements of the sting are present, the pointed or penetrating part of the apparatus being stunted. One species (*Trigona* or *Melipona mosquito*) sends off swarms after the manner of the common hive bee. The nests abound in honey, and have many enemies, since the bees cannot defend themselves by stinging. The nests, however, are rich in devices for protection and for the exclusion of intruders. Some species of them build their nests in completely with clay. See BEE.

MOSQUITO BLIGHT. A disease of the tea plant in India and Ceylon, caused by the punctures of several of the species of the genus Helopeltis of the plant-bug family Capsidæ. The young bugs as well as the adults feed upon the leaves and young twigs of the plant, causing them to wilt.

MOSQUITO COAST, or MOSQUITÍA. The strip of territory inhabited by the Mosquito Indians on the eastern coast of Central America, stretching along the Caribbean Sea from about latitude 10° 30′ N. to latitude 13° and extending about 40 miles inland (Map: Central America, F 4). It is notable chiefly for the fact that it was for a time the subject of diplomatic controversy between the United States and Great Britain. From about 1665 to 1850 it constituted a protectorate under the nominal control of Great Britain, during which time various attempts were made to plant colonies there, but only with partial success. Both the Central American republics and the United States denied the claim of Great Britain to a protectorate over the Mosquito Coast, the latter particularly on account of the contiguity of the territory to the proposed inter-oceanic canal which the United States wished to construct or cause to be constructed. The seizure in 1848 of Greytown (San Juan del Norte), an important commercial port at the mouth of the San Juan River, in Nicaragua, by the Mosquito Indians with the aid of England, caused great excitement in the United States, and for a time war seemed possible. To avert this danger, however, and to obtain a basis for a uniform policy of abstention from interference in the region by both England and the United States with a view to securing the neutrality of the proposed canal, the Clayton-Bulwer Treaty of 1850 was concluded between the two countries, by which it was agreed that neither party would occupy, fortify, colonize, or exercise dominion over the Mosquito Coast, or any part of Central America. By a treaty of November 28, 1859, with Honduras, Great Britain ceded to that republic its claim to the protectorate hitherto exercised over the Mosquito Indians and agreed to recognize as belonging to and under the sovereignty of Honduras all territory occupied by the said Indians. This arrangement was very unsatisfactory to the Indians and led to a revolt among them. The difficulty was finally adjusted by the Treaty of Managua between Great Britain and Nicaragua of January 28, 1860, by which it was stipulated that Great Britain would recognize the sovereignty of Nicaragua over the Mosquito territory lying within its bounds; that a certain district should be assigned to the Indians; and that the British protectorate should cease within three months after the exchange of ratification. A dispute having arisen between Nicaragua and the Mosquito nation in regard to the interpretation of the treaty, the Emperor of Austria was requested to decide upon the true meaning of the clauses in dispute, which he did in 1880, holding that the sovereignty of Nicaragua over the Indians was limited by the right of self-government conceded to them by the treaty. From that time onward the natives enjoyed almost complete self-government. By an agreement entered into between Nicaragua and the Mosquito Indians in 1894 they were formally and voluntarily incorporated into the Republic of Nicaragua, their country becoming the Department of Velaya. The population of the territory in that year was about 15,000. Consult Travis, *Clayton-Bulwer Treaty* (Ann Arbor, 1893).

MOSQUITO-HAWK. The name of several animals which dart about after small flying insects, as (1) a nightjar or 'nighthawk'; (2) a dragon-fly (q.v.).

MOSQUITO LAGOON. A salt-water lagoon on the eastern coast of Florida, United States (Map: Florida, H 3). It is a continuation of Halifax River, and extends 30 miles south of Mosquito Inlet to Haulover Canal, which connects it with Indian River. It has an average width of one mile; it is shallow, and navigation even by small boats is impeded by coral beds, sandbanks, and mangrove swamps. Oysters and fish abound in its waters. A strip of land from a half mile to five miles wide separates the lagoon from the ocean.

MOSS, mŏs. A town of Southeastern Norway, situated on the east shore of the Christiania Fjord. 33 miles south of Christiania, on the railroad between the capital and Frederikstad. It has a good harbor visited by steamers, and trades in wood and preserves. Population, in 1900, 8941. In 1814 the treaty was signed at Moss by which Norway consented to a union with Sweden.

MOSS (MDutch, Dutch, OHG. *mos*, Ger. *Moos*, moss; connected with Lat. *muscus*, OChurch Slav. *mŭchŭ*, Lith. *mŭsai*, Welsh *mwswg*, moss). A plant belonging to the group Musci (q.v.) of the bryophytes (q.v.).

MOSS AGATE. See MOCHA STONE.

MOSSÂMEDES, mŏs-sä'mȧ-dĕs. The chief town of the District of Mossâmedes, Portuguese West Africa, situated on the Atlantic coast 150 miles north of the mouth of the Kunene (Map: Africa, F 6). It is a well-built and regularly laid out town, with a fine Government building, church, hospital, and a fort. The harbor is excellent, and equipped with an iron pier, and the trade is considerable. The chief exports are rubber, cattle, and dried fish. Population, 4500.

MOSS-ANIMALS. See POLYZOA.

MOSSBUNKER (from Dutch *marsbanker*, probably from *mars*, peddler's pack, or possibly from *mas*, crowd + *bank*, bank; so called in allusion to the appearance of the fish in shoals). A name (heard about New York and New Jersey) for the menhaden (q.v.). It is said by Goode (*Fishery Industries, Sec. I.*, Washington, 1884) that the word is a relic of the early Dutch, who took it from their name for the horse mackerel of Europe, which was 'marshbanker.' It has survived in some localities in New Jersey in its original form, but is more usually cut down and changed to 'bunker' about New York and Long Island Sound.

MOSSES FROM AN OLD MANSE. A collection of tales by Nathaniel Hawthorne (1846). Many of his famous sketches are contained in it.

MOSSLEY, mŏs'lĭ. A municipal borough in Lancashire, England, on the Tame, three miles southeast of Oldham (Map: England, D 3). Its importance dates from 1840, when there were established cotton and woolen factories, mill works, and foundries. The town hall is a handsome structure. The municipality owns its markets and its gas works, and maintains recreation grounds. Population, in 1901, 13,450.

MOSSO, mōs'sō, ANGELO (1846—). An Italian physiologist. He was born at Turin, studied medicine there, at Florence, Leipzig, and Paris, and in 1879 was appointed professor of physiology at Turin. He invented various instruments to measure the pulse, and experimented and wrote upon the variation in the volume of the pulse during sleep, mental activity, or emotion. In 1900-01 he visited the United States and embodied the results of his observations in *Democrazia nella religione e nella scienza* (1901). Among his other works are: *Die Diagnostik des Pulses* (1879); *Sulla paura* (1884, trans. into German and French); *Die Temperatur des Gehirns* (1894); and *Der Mensch auf den Hochalpen* (1898).

MOSS PINK. A flowering plant. See PHLOX.

MOSS SIDE. A manufacturing town in Lancashire, England, 1½ miles southwest of Manchester (Map: England, D 3). It is provided with gas, electric lighting, and water by the Manchester corporation. The town owns its tramways and slaughter-houses, maintains a free library, and provides for technical education. Population, in 1891, 23,800; in 1901, 26,700.

MOST, JOHANN JOSEPH (1846—). A German-American anarchist, born at Augsburg in Bavaria. He learned the trade of bookbinding, and in 1863-68 traveled as an apprentice through Germany, Austria, Italy, and Switzerland. On his return to Germany he was first a socialist writer at Mainz and afterwards editor of the *Freie Presse* in Berlin. He was several times arrested and imprisoned because of the violence of his writings. From 1874 to 1878 he was a representative of Chemnitz in the Imperial Reichstag, but in the latter year, having been expelled from the socialist organization, he went to London, where in 1879 he founded the anarchist organ *Die Freiheit*. In 1881 he was there arrested for printing editorials approving the assassination of Czar Alexander II. and sentenced to eighteen months' imprisonment. Upon his release he emigrated to New York, where he resumed the publication of his paper. In 1886, and again in 1887, he was imprisoned for inciting to violence. During the following years he continued to publish his paper, lectured, and wrote frequently in the interests of anarchy. After President McKinley's assassination, in 1901, he was arrested for publishing a seditious editorial in *Die Freiheit*, and was sentenced to one year's imprisonment. He was sent to the New York penitentiary in June, 1902. Among Most's publications are: *Der Kleinbürger und die Socialdemokratie* (1876); *Die Lösung der socialen Frage* (1876); *Mosts Proletarier-Liederbuch* (1875); *Why I Am a Communist* (1890); and *Down with the Anarchists!* (1901), a pamphlet published in order to prove that the aims of anarchy are pacific.

MOSTAGANEM, mŏs'tȧ-gȧ-nĕm'. A fortified seaport of Western Algeria, in the Department of Oran, situated on a steep cliff on the Mediterranean coast 45 miles east of Oran (Map: Africa, E 1). It has flour mills and tanneries, and an active trade in wool, skins, and horses. It is connected by a branch road with the railroad from Oran to Algiers. Population, in 1901, 17,485; of commune, 18,090. Mostaganem was a large and important trade centre in the sixteenth century, but later fell into decay. It has again prospered since its capture by the French in 1833.

MOSTAR, mōs'tär. The largest town and former capital of Herzegovina (q.v.), situated on the Narenta about 50 miles southwest of Serajevo, with which it is connected by rail (Map: Austria-Hungary, E 5). It has a number of modern buildings, but is essentially Oriental in appearance, with its numerous mosques, bazaars, and Turkish shops. There are a fine Greek cathedral, a higher gymnasium, and a number of trade schools. Tobacco and arms are the chief products. Mostar is the seat of a Roman Catholic and a Greek bishop, as well as of a mufti, and has a strong garrison. Population, in 1895, 17,020, including over 7000 Mohammedans.

MOS'TELLA'RIA (Lat., ghost). An entertaining comedy of a haunted house, by Plautus, which appears to have been adapted from the *Phasma* of Philemon. The plot is ingenious and the characters are well drawn.

MOSUL, mô-sōōl′. The capital of the Vilayet of Mosul, Asiatic Turkey, on the Tigris, opposite the ruins of ancient Nineveh (q.v.), and 220 miles by river northwest of Bagdad (Map: Turkey in Asia, K 4). It is surrounded by walls now almost in ruins. Of the ancient buildings only the Great Mosque remains. Mosul is the seat of a Roman Catholic mission, Dominican schools, and French and Russian consuls. Its trade, formerly much greater, is now confined to cotton, hides, wax, nuts, gum, and wool, all carried chiefly by caravans. The principal causes of its diminished importance were the rise of Abushehr (q.v.) as an emporium of trade, and the diversion of traffic by the Suez Canal. Population, about 55,000, chiefly Arabs, but comprising also Kurds, Turks, Armenians, Christians, and Jews. Mosul was an old Arabic town, taken by the Moslems in 636. It was besieged by Saladin in 1182, and was successively under Mongol, Persian, and Turkish sway. In the twelfth century it was very important, and for a time supplied Europe with its manufactures, especially muslins, which probably got their name from this town.

MOSZKOWSKI, mŏsh-kôf′skê, MORITZ (1854 —). A Polish composer and pianist, born at Breslau. He studied at the Dresden Conservatory and in Berlin. At nineteen years of age he made his début as a piano virtuoso, and after successful tours throughout the principal European countries settled in Berlin, in which city he subsequently made his headquarters, although after 1897 he became almost entirely identified with the musical life of Paris. The best known of his works is *Spanish Dances*, which nowhere met with greater success than in America, and which may be said to have introduced him to the world at large; he also wrote many pieces for pianoforte, chamber music, concert studies, and waltzes. Among the larger works are: *Boabdil der Maurenkönig* (1892); incidental music to Grabbe's *Don Juan und Faust* (1896); a symphonic poem, *Jeanne d'Arc;* overtures, and concert suites.

MOTAZILITES, mô-tä′zĭ-līts. See MUTAZILITES; MOHAMMEDAN SECTS.

MOTET′ (from It. *motetto*, diminutive of *motto*, word, from ML. *muttum*, word, grunt, from Lat. *muttire*, *mutire*, to mutter). A sacred vocal composition without instrumental accompaniment, in polyphonic style. As a rule the text of motets is Latin; but there are also motets with German, Italian, and English words. Although the *a capella* style is the rule, it was not always followed. Especially during the first half of the seventeenth century, which witnessed the beginnings of instrumental music, it was not unusual to add a *basso continuo*, or even a number of violin parts. In some instances we find even motets for a solo voice with instrumental accompaniment. The motet must not be confounded with the *anthem* (q.v.), in which latter form *homophony* (q.v.) is always employed. The form of the motet is very old and has undergone many changes with the various styles of music. The oldest motets were constructed on a *cantus firmus* (q.v.). From the *Ars cantus mensurabilis* of Franko of Cologne we learn that a motet had *two different* texts in the alto and tenor parts. J. S. Bach, in his motets, substitutes the Protestant chorale for the *cantus firmus*.

MOTH (AS. *moþe* Ger. *Motte*, moth; perhaps connected with Goth. *maþa*, OHG. *mado*, Ger. *Made*, AS. *maþþu*, *maþa*, Eng. *mad*, *made*, maggot, grub). An insect of an indefinable section of the Lepidoptera (q.v.), separated from butterflies by superficial features and habits. No scientific distinction exists between these two, and the terms Rhopalocera for the former and Heterocera for the moths have been abandoned in taxonomy. Moths as a rule are nocturnal, while butterflies, as a rule, fly by day. Moths rest in most cases with the wing horizontally disposed, while butterflies hold them erect, displaying the under surface. The antennæ of moths are likely to be feathery in shape, while those of butterflies are thread-like, swollen toward the end into a 'club-head.' The nearest to a structural division is made by the fact that all so-called moths have a jugum, or 'hook and eye,' upon the fore wing by which these wings are held together in flight, while such a structure is absent from the butterflies. (See BUTTERFLIES AND MOTHS.) All but four families of Lepidoptera, and by far the greater number of species and individuals, are moths. They are, however, less conspicuous than their relatives, on account of their generally smaller size and inconspicuous hues, but mainly because of their nocturnal habits. They are of more importance, too, in their relations with mankind than the ornamental butterflies, which do comparatively little either of harm or good beyond the delight their beauty affords. The moths, on the contrary, supply the useful product silk, on the one hand, and on the other furnish a great variety of species, which, especially in the larval stage, do enormous damage to growing crops and fruit, as well as to stored grain and food-stuffs, and to a long list of materials, in both their raw and manufactured states. The accompanying colored plate represents moths of various families, and exhibits the form and style of coloration assumed. The species figured are described elsewhere. See BUTTERFLIES AND MOTHS.

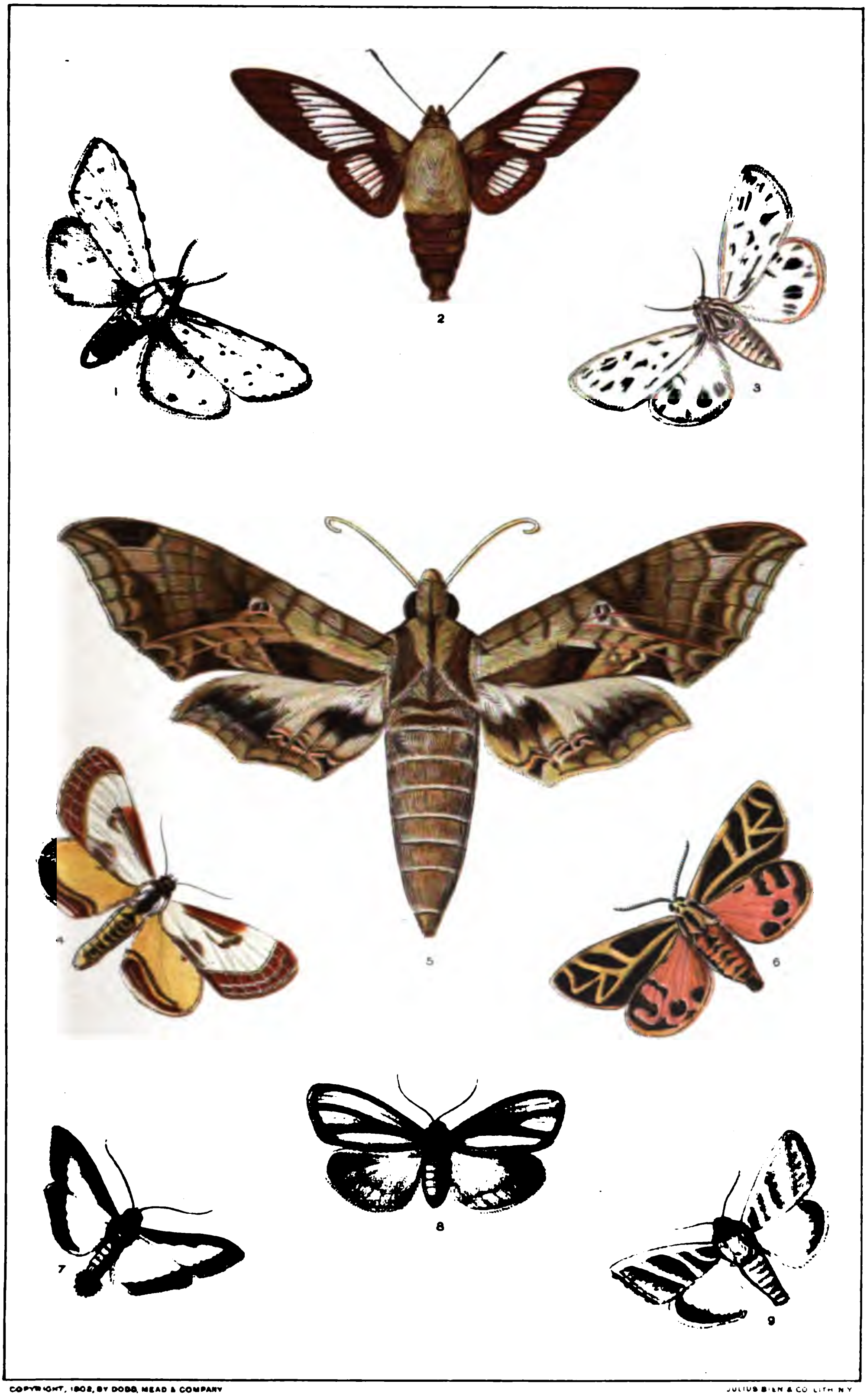
MOTH, BROWN-TAILED. A name given in England and New England to the European moth, *Euproctis chrysorrhœa*. The moth is white in color with a brown tip to the abdomen. Its larva feeds on a great variety of trees, and is gradually spreading in New England. The best remedy is to burn the larvæ cases during the winter.

MOTHER ANN. A name given to Ann Lee (q.v.), the founder of the Shakers.

MOTHER BUNCH. A nickname given by Tucca to Mistress Miniver, the ale-wife, in Dekker's *Satiromastix* (1602). The name was applied later to makers of jokes, as in *Pasquil's Jests, Mixed with Mother Bunch's Merriments* (1604); and in *Mother Bunch's Closet Newly Broke Open* (1760).

MOTHER CAREY'S CHICKEN (possibly corrupted from Lat. *mater cara*, dear mother, in allusion to the Virgin Mary). A name familiarly given by sailors to the stormy petrel and other small black and white species of petrel. The name 'Mother Carey's goose,' or hen, is in like manner given to the great black petrel or 'bonebreaker' (*Ossifraga gigantea*) of the Pacific Ocean, which is a ravenous feeder on dead whales

MOTHS-AMERICAN



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1 SALT-MARSH CATERPILLAR MOTH — LEUCARCTIA ACRÆA
2 HUMMING-BIRD MOTH - HEMARIS THYSBE
3 ARGE MOTH - ARCTIA ARGE
4 PEARL WOOD-NYMPH - EUDRYAS UNIO
5 PANDORUS SPHINX - PHILAMPELUS PANDORUS
6 TIGER MOTH - ARCTIA NAIS
7 MELON CATERPILLAR MOTH - MARGARONIA HYALINATA
8 STRIPED FOOTMAN - HYPOPREPIA MINIATA
9 TOBACCO-BUD MOTH - HELIOTHIS RHEXIÆ

ALL NATURAL SIZE

and other animal garbage, and also preys upon other sea-birds. See PETREL.

MOTHER GOOSE. The supposed author of the familiar nursery rhymes known as *Mother Goose's Melodies.* A baseless claim that the name originated in Boston was made on behalf of Elizabeth Goose, whose rhymes were printed by her son-in-law, Thomas Fleet, as *Songs for the Nursery; or, Mother Goose's Melodies* (Boston, 1719). The title appears to have come from France, where Queen Goosefoot, or Bertha au Grand Pied, the mother of Charlemagne, was regarded as the special patron of children, and her festival, January 2d, is celebrated. The most definite source is Charles Perrault's *Contes de ma mère l'Oye* (1697), containing ten stories, seven of which are from the *Pentamerone.* It was translated by Robert Samber in 1729. *Mother Goose's Melodies* were printed in London by John Newbery in 1760. Though the title is probably of French origin, the songs are English, some belonging to the time of Shakespeare and earlier.

MOTHER GOOSE TALES. See NURSERY LORE.

MOTHER HUBBARD'S TALE, or PROSOPOPOIA. A metrical composition by Edmund Spenser (1591), written in his youth. It is a satire on Court follies, under the guise of a story of a fox and an ape masquerading as a soldier and his servant. It purports to have been told to the poet by Mother Hubbard.

MOTHER-OF-PEARL. The shells of the large marine bivalve mollusks *Avicula* (*Meleagrina*) *margaritifera, Avicula macroptera,* and *Avicula fuenta,* which also produce the precious pearls. (See PEARL.) These shells are collected in the tropical seas, chiefly on the coast of Ceylon, Manila, Cuba, Panama, the Gulf of California, and the South Sea Islands. In 1865 extensive fishing grounds were found on the northwest coast of Australia. The shells from Panama are small and thick and are known in commerce as bullock shells. Those from Manila and Australia are finest in quality; they are disk-shaped and often as much as a foot in diameter. There are two varieties, the white, or silver-lipped, and the black-lipped. The mother-of-pearl or nacre of commerce is really the inner portion or lining of the shell, which the oyster secretes in successive layers of filmy thinness and marvelous smoothness of surface. Some fine mother-of-pearl is also produced in inland waters, chiefly in the rivers of China, Germany, and Russia. Recently the shells of a kindred Mississippi River mollusk have been used in the manufacture of pearl buttons. See BUTTON; PEARL OYSTER.

MOTHER OF PRESIDENTS. A name frequently given to the State of Virginia, which has furnished more Presidents to the Union than any other State. The following seven were born there: George Washington, Thomas Jefferson, James Madison, James Monroe, William H. Harrison, Zachary Taylor, and John Tyler. See STATES, POPULAR NAMES OF.

MOTHER OF STATES. A name given to Virginia as the oldest of the thirteen American colonies, and because its original territory was formed into a number of States—West Virginia, Kentucky, Ohio, Illinois, and Indiana.

MOTHER SHIPTON'S PROPHECIES. A series of foretellings of events purporting to have originally been told by a woman named Agatha or Ursula Shipton, of Yorkshire, between 1486 and 1561. They appeared in chap-books or pamphlets, the earliest known of which was printed in 1641, and were continued until recent times. Charles Hindley wrote some prophecies purporting to have dated from 1448. It has been suggested that Mother Shipton was Master William Lilly, an astrologer, 1602-1681.

MOTHERWELL, mŭTH'ẽr-wĕl. A police burgh and manufacturing town in Lanarkshire, Scotland, 12 miles southeast of Glasgow (Map: Scotland, E 4). Its growth and importance are due to its iron and steel works and its neighboring collieries. It has fine municipal buildings, owns its water-works, and maintains a public park, etc. Population, in 1841, 726; in 1901, 30,423.

MOTHERWELL, WILLIAM (1797-1835). A Scotch poet, born and educated in Glasgow. His first appearance in print was as editor of a volume of local poems (1819). His *Minstrelsy Ancient and Modern* (1827) won him the acquaintance of Scott. With Hogg, too, Motherwell was on friendly terms, and in 1835 the two prepared an edition of Burns's poems. Motherwell died of apoplexy in the same year, overcome by the strain of testifying before a Parliamentary committee on Orangeism. In his *Poems, Narrative and Lyrical* (1832), he utilizes Scotch and Norse mythology and occasionally shows some lyric power, as in the well-known "Jeanie Morrison," which tradition says was planned when he was only fourteen.

MOTH-FLY. Any one of the true flies of the family Psychodidæ—very small, weak flies which look like little moths and are frequently found upon windows and upon the under surfaces of leaves. They have broad wings, rather thick antennæ, and are densely clothed with hairs, even the surface of the wings being hairy. These are the only true flies, except true mosquitoes, which have hairs or scales on the wings. In the arrangement of the wing-veins these flies differ from all other Diptera, and probably represent the most generalized type in this order of insects. They differ greatly in larval habits: some live in rapidly running water, others on fallen leaves in small pools, others are found in rotten potatoes, while some live in dry cow-dung. The larvæ have both tracheal gills and open spiracles, so that theoretically they can breathe both air and the oxygen of the water. The family has a wide distribution, but only about 20 species are known in the United States.

MOTH-HUNTER. A bird, the nightjar (q.v.).

MOTILÓN, mō'tē-lōn' (Sp., Cut-haired). A fierce tribe of Cariban stock (q.v.), inhabiting the mountains known as the Painted Andes, about Ocaña, in Northeastern Colombia. They were conquered in the early Spanish period and colonized in the lowlands under supervision of missionaries, but on the outbreak of a smallpox epidemic they were compelled to cut their hair to cool the fever, and were otherwise subjected to such sanitary regimen that they rebelled and fled to the mountains. They were fugitives for half a year, but returned on the subsidence of the epidemic. On a recurrence of the epidemic some years later the Indians again fled to the mountains, where they have since remained. For nearly two centuries they have been distinguished for their aggressive and untamable hostility to the whites, so that very little is definitely known of them. See Yameo.

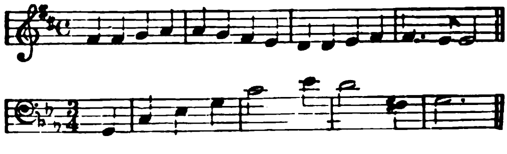
MOTION. See Mechanics.

MOTION (Lat. *motio*, from *movere*, to move, Skt. *miv*, to push). In law, an application to a court to obtain a direction, or order, as it is termed, in relation to some question or matter incidental or collateral to the main issues of the action. Generally, motions raise questions of both law and fact, and it often becomes a serious question as to whether a matter can be decided by the court on motion or whether there is such a controversy as will entitle the party against whom the relief is sought to a trial. A motion differs from a trial, which is the method of determining the substantive rights of the parties to an action on the main issues raised by the pleadings, whereas a motion is usually made to expedite the progress of the cause, or for summary relief preliminary to the trial of an action, and cannot bring up the entire merits of the action, and is based upon affidavits and other documents.

Where there is a question to be decided by the court on which the parties may reasonably differ, the motion can only be made after due notice to the opposite party. Generally any person interested in the subject-matter of an action is entitled to make a motion to protect his interests therein, whether he is a party to it or not. See articles Affidavit; Decree; Judgment; Trial.

MOTION (in Music). The progression of the various voices or parts in a composition. Two voices proceed in *contrary motion* when one ascends, the other descends; in *parallel motion* when both ascend or descend; in *oblique motion* when one remains on the same tone while the other proceeds either ascending or descending. In compositions for three or more voices all three kinds of motion may appear simultaneously. Progression of voices in *parallel* motion requires the greatest care because it is here that faulty progressions (fifths, octaves) appear. For this reason the beginner would do well to lead the soprano and bass in *contrary* motion whenever possible. For examples of the different kinds of motion, see Ex. 13, under Harmony.

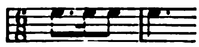
In respect to the tones of a single part a distinction is made between *conjunct* and *disjunct* motion. In the former case the notes proceed either by steps or semisteps; in the latter by intervals greater than a whole step. The following two examples from Beethoven illustrate this:



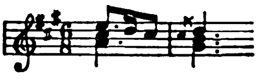
MOTIONS. A name given to a kind of puppet-shows, especially illustrating Scriptural stories. Motions throve in England in the fifteenth century.

MOTIVE (ML. *motivus*, moving, from *movere*, to move). In psychology, a general term for the conscious conditions of action (q.v.). As these conditions include always processes of two kinds, sensory and affective, the motive falls into two parts: the inducement, the sensory or 'intellectual' process, the 'reason' for action; and the incentive, the affective process which prompts to it. Thus a thief is induced to steal by the sight of the unguarded loaf; the incentive to his theft is the unpleasant feeling of hunger. The typical motive to action is the impulse (q.v.). See Action.

MOTIVE. In music, the original germ from which all musical form is evolved. A motive generally fills one measure, and two motives constitute the *section*. (See Form.) The simplest form of motive is the *rhythmic* motive considered apart from the melodic and harmonic progressions, in conjunction with which it generally occurs. Thus the *rhythmic* motives underlying the principal subject of Beethoven's Symphony in A major is:



and the *complete* (rhythmic, melodic, harmonic combined) motive is:



However, there are also purely rhythmical motives which are set against other complete motives. A famous example is furnished in Beethoven's C minor Symphony, where the rhythmic motive of the principal subject is sounded on the basses against the secondary subject of the violins. In a wider sense the term *motive* is used almost synonymously with *theme*. In the use of this term musical terminology is very careless, for *motive* more frequently is applied when *theme* or *subject* should be used. Hence, in theoretical works the word *measure-motive* is adopted to denote the simplest form as explained above. The *leading motives* in Wagner's works should properly be called *leading themes*. See Leitmotiv.

MOTLEY, John Lothrop (1814-77). An eminent American historian, born in Dorchester, Mass., April 15, 1814. He entered Harvard College at the age of thirteen, and was graduated in the class of 1831. The two years following he spent in Germany at the universities of Göttingen and Berlin, and here he formed an intimate personal friendship with Bismarck, which continued till his death. On his return he studied law. He was married, in 1837, to Miss Mary Benjamin, of Boston. Motley's first venture in literature was a story entitled *Morton's Hope* (1839), a very unsuccessful historical-romantic novel. In 1841 he was made secretary of the American Legation at Saint Petersburg, but, owing to the severity of the climate and his regret at being separated from his family, he soon resigned. His first work revealing his real power was a review of a memoir of Peter the Great, which he wrote for the *North American Review* in 1845. Two years later he published in the same periodical a scholarly article on Balzac, and in 1849, for the same organ, a review of Talvi's *Geschichte der*

Colonisation von Neu England, a paper showing accurate knowledge of the history of New England and of the Puritan movement, and displaying philosophical insight. The same year saw the appearance of his *Merry-Mount,* an historical novel dealing with an episode in the early life of the Massachusetts Colony.

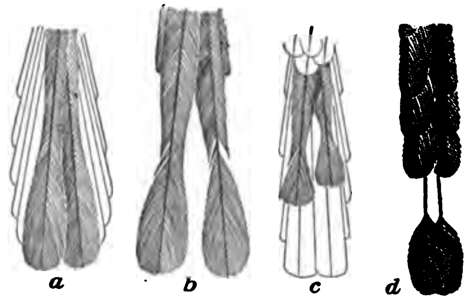
With this novel, and with an unsuccessful term in the Massachusetts Legislature, ended what may be called Motley's experimental period. He saw the true path for his genius to follow, and he was seized with the desire to write, to cite his own words, 'one particular history,' that of the Dutch. Having obtained the approbation of the historian W. H. Prescott, on whose territory he feared he might be trespassing, he began to gather material in America, and in 1851 he set sail for Holland to continue his researches. In 1856 appeared the *History of the Rise of the Dutch Republic,* a work in three volumes, published at his own expense. The same year Motley returned to Boston, where he remained about a year; then he went to England in 1858. Here he received the degree of D.C.L. from Oxford, and in 1860 he published the first two volumes of his *History of the United Netherlands.* In England he did his country good service by sending (1861) to the London *Times* two letters on the causes of the American Civil War, which helped to dissipate the British misunderstanding of American affairs. In 1861 he was appointed Minister to Austria, and in Vienna he served the United States faithfully and with tact, until misunderstanding and calumny caused him to resign in 1867. In 1868 appeared the last two volumes of the *History of the United Netherlands,* a book which sustained the high reputation of his earlier work and its own earlier volumes.

President Grant, on his election, appointed Motley Minister to England, but he recalled him in November of the following year (1870), for what appear to have been unsatisfactory reasons. Motley then retired to private life, and began work on the last of his histories. This was *The Life and Death of John of Barneveld, Advocate of Holland; with a View of the Primary Causes and Movements of the Thirty Years' War* (1874), which, in two volumes, virtually completed his plan of the history of Holland and the Dutch. It was his last work. He had suffered an incapacitating paralytic stroke in 1873, and the death of his wife in 1874 was a heavy blow. He himself lingered three years longer, and died in Dorchester, England, May 29, 1877.

Motley takes rank with the most distinguished of American historians. His work presents a finished and often brilliantly colored picture of the times and the country with which it deals. It was written only after a thorough examination and analysis of all available documents, and is philosophical as well as pictorial in its treatment. It is full of an inspiring love of freedom, has the advantage of dealing with an heroic movement, displays marked skill at characterization, and often flashes with wit. His *Correspondence* is scarcely less brilliant, and affords many glimpses of interesting personages, both American and European.

The histories are published in good English and American editions. There is a memoir by his intimate friend, Oliver Wendell Holmes (Boston, 1878); *The Correspondence of John Lothrop Motley* was edited (New York, 1889) by G. W. Curtis.

MOTMOT (onomatopoetic, in imitation of the bird's note). A bird of the family Momotidæ, related to the coraciiform bee-eaters, todies, and kingfishers. The motmots are peculiar to tropical America, and only one of the 15 species occurs as far north as the United States. They are birds of very brilliant plumage and about the size of a blue jay, but more slender in form; are solitary in habits, and live on insects, reptiles, and fruits. Their most peculiar feature is the long tail, in which the middle pair of feathers are longer than the rest, and have a peculiar shape which has caused them to be called 'racket-feathers.' The cause of the peculiarity has been greatly discussed, but there is much evidence to show that it is brought about by the birds themselves biting away the vanes from the denuded part. One species (*Momotus cæruliceps*) reaches the Mexican boundary of the United States. Consult: Belt, *Naturalist in Nicaragua* (London, 1888); Murie, *Ibis* (London, 1892). See Plate of KINGFISHERS, MOTMOTS, ETC.



TAILS OF MOTMOTS.

a, Lesson's motmot, central rectrices perfect; *b*, the same, rectrices denuded; *c*, Mexican motmot, central rectrices affected while yet growing; *d*, blue-headed motmot showing 'rackets' resulting from complete denudation of a part of the feather.

MOTOORI NORINAYA, mô'tô-ŏ'rĭ nô'rĭ-nä'yȧ (1730-1801). A Japanese scholar, the greatest authority, until the era of modern research, upon the customs, history, poetry, and religion of ancient Japan. He wrote many books, his most important being a commentary on the *Kojiki* (Records of Ancient Matters, the oldest extant Japanese book). The commentary is in forty-four volumes. It was begun in 1764 and finished in 1796. Upon the publication of the first part students came to Motoori from all parts of Japan. In 1801 he lectured in Kioto to crowds, princes and nobles being among his auditors. His influence increased after his death, and his writings are thought to have aided in bringing about recent changes in the Empire. He is regarded as a master of literary style.

MOTOR CARRIAGES AND VEHICLES. See AUTOMOBILE.

MOTOR-GENERATOR. See DYNAMO-ELECTRIC MACHINERY.

MOTOR ORGAN (Lat. *motor,* one who moves, from *movere,* to move). A structure which when stimulated moves the parts attached. Motor organs are found at the base of leaves and leaflets in various plants, particularly members of the bean family (Leguminosæ). They are formed by the modification of the structure of the main leafstalk and of the stalks of the leaflets (Fig. 1). When the latter are short the motor organ may constitute the whole stalk. The motor organ is a cushion (pulvinus) of thin-walled tissue (parenchyma) whose centre is occupied by a strand of fibro-vascular and mechanical tissue (Fig. 2). This is in sharp contrast with the structure of the stalk elsewhere. There the outer parenchyma forms the usual cortex, the vascular and mechanical strands are distinct and often numerous, and the centre is occupied by a pith (parenchyma) of considerable volume. The central position of the strands in the motor organ obviously permits freer bending. The cells of the parenchyma are normally turgid, and by mutual pressure the organ is kept rigid, supporting the leaf or the leaflet. The action of an appropriate stimulus on the plant results in the exudation of water from the cells on one side of the pulvinus. This water passes into the intercellular spaces of the organ and the cells of course lose their turgor. Owing to the now unopposed pressure of the still turgid cells on one side of the organ, it bends more or less, the flaccid side becoming concave, and the leaf-blade is carried through a considerable arc. In the sensitive plants (Mimosa) of the tropics, contact is the usual stimulus. The whole reaction takes place very rapidly, the time from shock to response being only a fraction of a second. In other plants variations in the intensity of light cause similar but slow curvatures in the motor organs. Exactly how the exudation of water from the cells of the motor organ is brought about is not known. It is probable that the stimulus in some way alters the physical structure of the protoplasm within the affected cells so that the contained solution is allowed to filter out. See MOVEMENT.

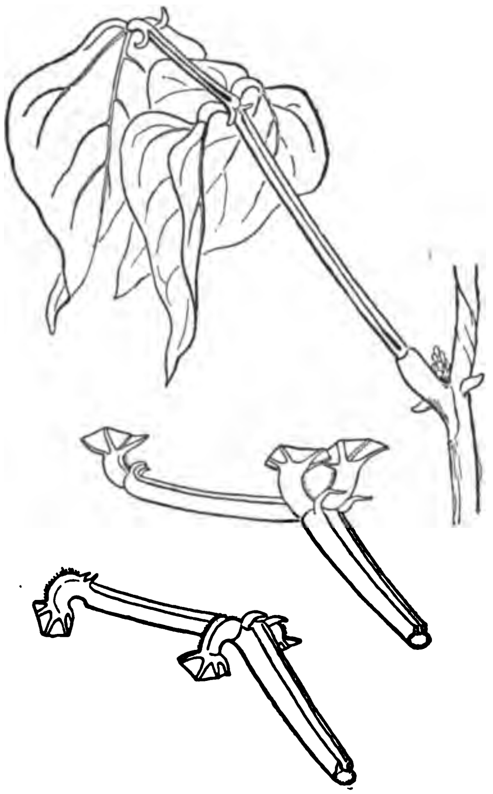


FIG. 1. MOTOR ORGANS OF LEAF OF BEAN.

The primary organ at the base of main petiole; secondary ones at the base of each leaflet; the lower figures show the curvature of these organs after stimulation (blades cut away to show more clearly).

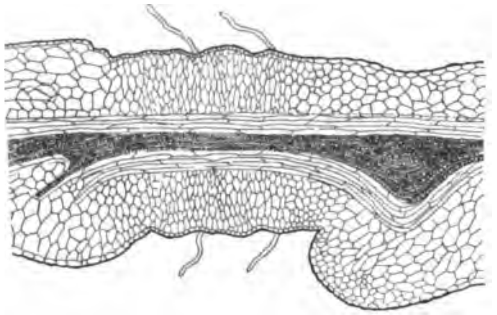


FIG. 2. LONGITUDINAL SECTION THROUGH MOTOR ORGAN OF SENSITIVE PLANT (*Mimosa pudica*).

MOTRIL, mô-trēl′. A city and port of entry in Southern Spain, in the Province of Granada, situated on the Mediterranean coast, 32 miles south by east of Granada (Map: Spain, D 4). There are ruins of old Moorish fortifications, but the greater part is well built with modern houses. Motril is chiefly an industrial town, has iron foundries, and manufactures sugar, spirits, chocolate, flour, soap, paper, cotton textiles, and pottery. The harbor is an exposed roadstead. Population, in 1900, 18,508.

MOTT, JAMES (1788-1868). An American abolitionist, born at Cowneck, Long Island. Soon after completing his education he became a teacher in a Friends' boarding-school in Dutchess County, N. Y., where he met Lucretia Coffin (see MOTT, LUCRETIA), whom he afterwards married. In 1810 he removed to Philadelphia and became a merchant. He early manifested his sympathy with the anti-slavery movement and was one of the first supporters of William Lloyd Garrison. He was one of the organizers of the Philadelphia National Anti-Slavery Society in 1833, and in 1840 he was a delegate to the World's Anti-Slavery Convention in London. There he took a prominent part in the agitation to admit women delegates, and eight years later presided over the first national convention held in support of the woman's rights movement. In 1848 he joined in calling the Anti-Sabbath Convention, and after the war was actively interested in the establishment of Swarthmore College by the Philadelphia Yearly Meeting, of which he was a member.

MOTT, LUCRETIA (COFFIN) (1793-1880). An American abolitionist and woman's rights advocate, born on Nantucket Island. She was educated in the Friends' School at Nine Partners, near Poughkeepsie, N. Y., where she met James Mott (q.v.), whom in 1818 she married. She became prominent as a preacher in the Society of Friends and was chosen a minister. As a result of a visit to Virginia in 1818 she became an ardent advocate of emancipation. At the 'Separation' of 1827 which divided the Society of Friends into two hostile factions, she and her husband adhered to the liberal or Hicksite party. In 1833 she attended as an invited guest the first convention of the American Anti-Slavery Society, of which her husband was a member. Soon afterwards she helped to organize the Female Anti-Slavery Society, of which she continued one of the leaders until 1839, when it was merged in the men's organization. As the feeling against abolitionists grew in intensity, many of the more timid Quakers began to deprecate any discussion of slavery by one of their ministers, and even in her own meeting she was regarded with suspicion and dislike. In 1840, at the World's Anti-Slavery Convention in London, to which both James and Lucretia Mott had been chosen delegates, the question of the equal participation of women in the proceedings of the convention came up, and after some discussion all women were excluded. It was then that Lucretia Mott and Elizabeth Cady Stanton first discussed the woman's rights movement, which they launched eight years later at a convention in Seneca Falls, N. Y. But these two movements, abolition and woman's rights, while they received the greater share of her attention, were not the only ones in which Mrs. Mott was interested, for all that promised to uplift humanity or to break the fetters of ignorance and tradition received her warmest support. Almost to the end of her life she made frequent journeys to visit distant meetings or to attend conventions called to consider the elevation of woman, the promotion of temperance, and the establishment of universal peace. Consult Hallowell, *The Life and Letters of James and Lucretia Mott* (Boston, 1884).

MOTT, Valentine (1785-1865). An American surgeon, born at Glen Cove, N. Y. He studied medicine at Columbia College, and graduated in 1806, taking post-graduate courses in London and Edinburgh. In 1809 he was appointed to fill the chair of surgery at Columbia College, in which position he was continued after the medical department of that institution was united with the College of Physicians and Surgeons in 1813. In 1826 he was one of the founders of the Rutgers Medical College, which was disbanded four years later. He then returned to the College of Physicians and Surgeons, and in 1830 became professor of surgery at the New York University Medical College. Mott was celebrated as a skillful operator in all branches of surgery, and was the inventor of several valuable surgical instruments. He introduced an operation for immobility of the lower jaw, and in 1821 performed the first operation for osteosarcoma of that member. He performed the operation of lithotomy 165 times and amputated more than 1000 limbs. He visited Europe in 1835 and traveled in the East, publishing an account of his journey in 1842. He published also a translation of Velpeau's *Operative Surgery* and a volume of clinical lectures (1860). Many foreign distinctions were conferred on him, and he was a member of many learned societies. He died in New York.

MOTTARONE, môt'tȧ-rō̍'nȧ, Mount. A mountain in Italy on the west shore of Lake Maggiore (q.v.). It is 4892 feet high and is often called the 'Rigi of North Italy.' The view is magnificently extended. At one's feet lie Maggiore and six other lakes; across Maggiore, 60 miles to the southeast, may be seen the Cathedral of Milan; to the north rise the Alps.

MOTTEUX, mô'tẽ', Peter Anthony (1660-1718). A French-English playwright and translator, born at Rouen, in Normandy. He went to London on the revocation of the Edict of Nantes in 1685, and afterwards opened a warehouse in Leadenhall Street, where he sold 'tea, china, and Indian wares' (described in the *Spectator* No. 552). In 1693 appeared Boileau's, *Ode sur la prise de Namur, avec une parodie de la même ode par le Sieur P. Motteux.* Motteux mastered English in eight years; and in 1694 appeared one of the two works which made him famous. With Sir Thomas Urquhart and others he published in three volumes a translation of Rabelais (books i.-iii.), the remainder of which followed in 1768 (books iv.-v.). For the stage he wrote comedies, masques, and operas. But his fame rests wholly on his Rabelais and on his admirable version of *Don Quixote.* Motteux died on February 18, 1718, his birthday anniversary, in a brothel near Saint Clement's Church. Though several persons were held for his murder, it is more likely that he died of disease.

MOTT HAVEN. Formerly a village in Westchester County, N. Y., lying north of the Harlem River, and now included in New York City.

MOTTL, mŏt'l, Felix (1856—). An Austrian composer and musical conductor, born in Vienna. He studied at the Conservatory there under the best teachers, and won a number of prizes. In 1881 he became Court chapelmaster at Karlsruhe, and conducted the philharmonic concerts till 1892. In 1886 he conducted at Bayreuth and in 1893 he was appointed general musical director at Karlsruhe. His most noteworthy undertaking was the initial production at Karlsruhe of Berlioz's great two-part opera, *Les Troyens.* His own operas, *Agnes Bernauer* (1880) and *Fürst und Sänger* (1893), were also successfully presented. His songs and minor compositions are relatively unimportant.

MOTTO (It., a saying). In heraldry, a word or short sentence which forms an accompaniment to a coat-of-arms, crest, or household badge. Mottoes were originally the battle-cries of the knights who used them. They were attached to the badge when the family had one, or to the crest where there was no badge. See the article Heraldry.

MOTUCA (mȯ-tōō'kȧ) **FLY.** A gad-fly (q.v.) which abounds in parts of Brazil, and makes in biting a large and deep cut which may bleed considerably. As this fly (*Hadrus lepidotus*) sometimes settles in numbers on human beings, it is deservedly feared.

MOUBATA BUG. See Mite.

MOUCHERON, mōōsh'rôɴ', Frederik de (1634-86). A Dutch landscape painter, born at Edam. He studied under Jan Asselyn at Amsterdam, and then went to Paris. Afterwards he lived at Antwerp, and in 1659 settled at Amsterdam. His landscapes are mainly views in Italy—which he never visited—with figures by Lingelbach, Van der Velde, and Helmbreker. His son and pupil, Isaak (1670-1744), was born at Amsterdam. He was an excellent engraver. The works of both these artists are to be found in many of the European galleries.

MOUCHEZ, mōō'shȧ', Amédée (1821-92). A French astronomer, born at Madrid. He studied in the French Naval Academy and served in the navy until 1878, when he succeeded Leverrier as head of the National Observatory. He had already shown himself an able and industrious scientist in the coast surveys of Brazil and Algeria, and as organizer of the expedition to the island of Saint Paul to observe the transit of Venus in 1874. In his new post he greatly improved the equipment of the observatory, brought out a score of volumes of the *Annales* and a part of the catalogues listing all stars observed since 1838, and, above all, planned the international photographic chart of the heavens. He wrote: *Côtes du Brésil* (1869-76); *Rio de la Plata* (1873); and *La photographie astronomique et la carte du ciel* (1877).

MOUFLON, mōōf'lŏn (Fr.). A wild sheep (*Ovis musimon*), now, and perhaps always, restricted to the islands of Corsica and Sardinia, where it is confined to the highest parts of the mountains. The rams stand about 27 inches high at the shoulders, carry immense horns, and have an abundant mane about the neck, shoulders, and breast. This mane is ashy gray, but the body is rusty red, lighter on the sides and stern, and with a dark line along the spine. The belly, sides of the tail, feet, and nose are white. The females are more dun-colored, so that they are almost invisible among the rocks. During the winter flocks of several hundred formerly gathered and ranged the mountains until spring, when they separated into family parties of three or four ewes and lambs, led by an old ram; but now large flocks are uncommon. The rutting season is in midwinter; the lambs—one or two at a birth—are produced in April or May. The animals have now become very wary, and offer most excellent sport to hunters. Consult books of European natural history and sport, especially Aflalo, *Sport in Europe* (London, 1901).

The term is sometimes extended to the aoudad (q.v.), and more especially to a slightly smaller sheep (*Ovis ophion*), with lighter horns, which is confined to the mountains of Cyprus, and called the Cyprian mouflon.

MOUKDEN, mŏŏk-dĕn'. The capital of Manchuria. See Mukden.

MOULDING. See Molding.

MOULIN ROUGE, mōō'lăɴ' rōōzh (Fr., Red Mill). A well-known dance hall on the right bank of the Seine in Paris, which since the disappearance of the Jardin Mabille has been one of the chief places of popular amusement.

MOULINS, mōō'lăɴ'. The capital of the Department of Allier, France, 50 miles by rail northeast of Montluçon; on the Allier, here spanned by a bridge one-fourth of a mile long, with thirteen arches (Map: France, K 5). It is a well-built town, with pleasant, beautifully shaded, promenades and many places of interest. The chief among these last are the Hôtel de Ville, with a magnificent library and valuable manuscripts; the Cathedral and its interesting art treasures; the Archæological Museum, the Church of the Sacred Heart, and the Lycée. The industries comprise the manufacture of glassware, cotton and woolen fabrics, and silk; there is an important trade in coal, wood, grain, and wine. Moulins was for a time the capital of Bourbonnais and the residence of the dukes of Bourbon; of the ducal castle, a fourteenth-century tower, now used as a prison, remains. Population, in 1901, 22,340.

MOULMEIN, moul-mīn'. A city in Lower Burma. See Maulmain.

MOULTING. See Molting.

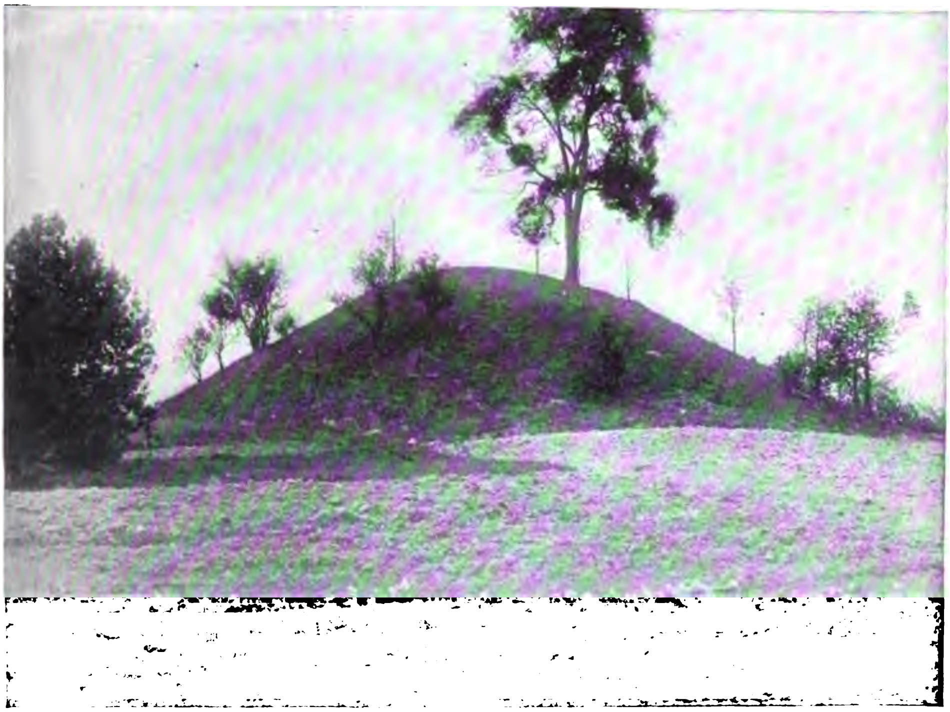
MOULTON, mōl'ton, Ellen Louise (Chandler) (1835—). An American poet, born in Pomfret, Conn., April 10, 1835. She was educated at Troy, N. Y., and before her twentieth year had edited *The Waverley Garland, a Present for All Seasons* (1853), and had written *This, That, and the Other* (1854). In 1855 she married William Moulton, a Boston publisher and journalist. Her published work is voluminous. The following titles may be named: *Juno Clifford, A Tale* (1856); *My Third Book, A Collection of Tales* (1859); *Bedtime Stories* (1873); *More Bedtime Stories* (1874); *Poems* (1878); *New Bedtime Stories* (1880); *Random Rambles* (1881); *Ourselves and Our Neighbors* (1887); *Miss Eyre from Boston, and Others* (1889); *In the Garden of Dreams: Lyrics and Sonnets* (1889); *Stories Told by Twilight* (1890); and *At the Wind's Will* (1899). She was the literary executrix of the English poet Philip Bourke Marston, and collected his poems in 1892. In 1894 she published a volume of selected poems of Arthur O'Shaughnessy. Mrs. Moulton ranks well as a sonneteer and shows skill.

MOULTON, Richard Green (1849—). An English educator and literary critic, born at Preston, England, and educated at Christ's College, Cambridge. He was university extension lecturer to Cambridge (1874-90), to the American Society for the Extension of University Teaching (1890-91), and to the London Society (1891-92), and in 1892 became professor of literature in English at the University of Chicago. His works include: *Shakespeare as a Dramatic Artist* (1885); *The Ancient Classical Drama* (1890); *Four Years of Novel Reading* (1895); *The Literary Study of the Bible* (1896); and *Introduction to the Literature of the Bible* (1901); the last two supplementary to *The Modern Reader's Bible* (1895-98), published under his editorial care.

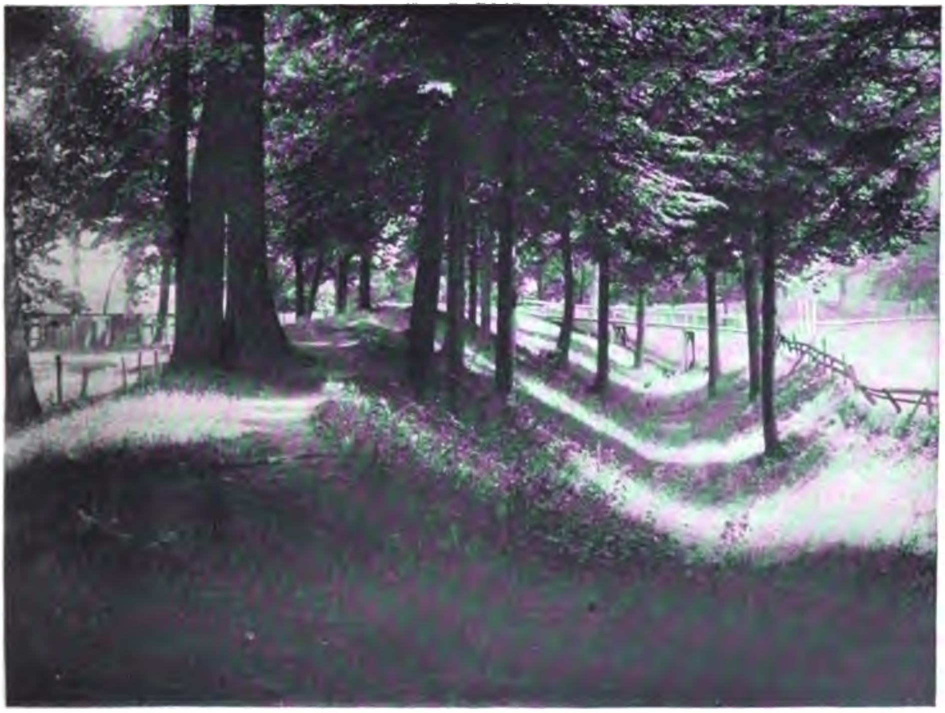
MOULTRIE, mōl'trĭ, Fort. See Fort Moultrie.

MOULTRIE, William (1731-1805). An American soldier, prominent in the Revolutionary War. He was born in South Carolina, received an ordinary education, and in the Cherokee troubles of 1761 was a military captain. Though closely connected with many of the Loyalists, he early took sides with the Patriot Party. In 1775 he was the representative of Saint Helena Parish in the South Carolina Provincial Congress, and later in the same year was chosen colonel of a South Carolina regiment. For some time thereafter he was busily engaged in providing for the defense of Charleston, and to this end placed a battery at Haddrell's Point and (March, 1776) began the erection of a rude fort of palmetto logs on Sullivan's Island. This fort commanded the entrance to the harbor, and on June 28th was fiercely but unsuccessfully attacked by Admiral Sir Peter Parker, who was finally forced to withdraw. Moultrie had undertaken the defense against the advice and wish of his

MOUND-BUILDERS



MOUND, ADAMS COUNTY, OHIO



CIRCULAR EARTHWORK, OHIO

superior officer, General Charles Lee. For his success he received the thanks of Congress, and in his honor the fort was named Fort Moultrie. In September of the same year he was made a brigadier-general and was put in command of the Department of Georgia and South Carolina. He defeated the British under General Gardner at Beaufort in February, 1779, and, by obstructing the advance of Prevost in May, enabled Charleston to prepare for its defense, finally entering the city and holding chief command until the arrival of General Lincoln. On the surrender of Charleston in May, 1780, he became a prisoner, but in February, 1782, he, with several others, was exchanged for Burgoyne. He was made a major-general in October of that year, and subsequently was twice (in 1785 and in 1794) elected Governor of South Carolina. He retired to private life after his second term and died at Charleston, September 27, 1805. His *Memoirs of the Revolution as far as it related to the States of North and South Carolina* (2 vols., 1802) was written in part while he was a prisoner, and was finished in later years.

MOUND-BIRD. The mound-birds are a group of gallinaceous birds, with feet like those of pigeons in not having the hallux raised above the other toes, and related to the American curassows (q.v.). They form a family, the Megapodidæ, which, as is indicated by the name, are characterized by the possession of unusually large feet. Although the family contains two subfamilies, the mound-birds proper or, as they are called in Australia, 'jungle-fowl,' and the brush turkeys (q.v.), yet all these birds agree in the remarkable habit which has given them their widely known popular name. This habit is the building of a huge mound for a nest, within which the eggs are left to be hatched by heat caused by the decay of vegetable matter within the heap. These mounds vary greatly in size and shape as well as in manner of construction, and in the number and arrangement of the eggs which they contain. The simplest are where the birds excavate a hole in the sand in which the eggs are laid, and are then covered with a mixture of sand and vegetable matter. Such is the habit of the 'lowan,' or 'mallee-bird' (*Megacephalon maleo*), of Celebes. In most cases, however, the birds scratch up grass, leaves, turf, etc., and with their large feet throw this material together in a heap. The female digs down into such a heap from the top and lays an egg, which is so placed that it is nearer the outside than the top of the mound. Just how the young escape from the mound when the egg hatches is still uncertain, but it is probably by digging through to the side. The young are well developed, feathered, and able to fly as soon as they leave the mound. The number of eggs laid by each female is still a matter of doubt; from four to twenty are found in each mound, and there is no doubt that several females often lay in the same heap. The eggs are white when first laid, but soon become stained by the vegetable matter in which they lie. They are remarkably large for the size of the bird and are ellipsoidal rather than oval; they measure from 3 to 4.3 inches in length, according to the species. The birds resort to the same mound season after season, but add fresh material at every egg-laying time. Consequently the mounds increase with age and may be in use for many years. They are usually more or less truncatedly conical or crater-like in form, but may have one of the horizontal diameters much longer than the others. The largest one on record was reported to be about 50 feet in diameter and some 14 feet high.

The mound-birds themselves are plainly colored and vary in size from a small fowl to a small turkey. They are shy and retiring and are not often seen. They frequent scrub and undergrowth along the seacoast or on the banks of streams emptying into the sea. The mounds are built in open spaces in the thick scrub or on unfrequented parts of the shore. The birds fly little and heavily, and are not easily flushed, but sometimes seek shelter in trees. They are said to be noisy at night and to have hoarse call-notes which they use during the day. All the Megapodidæ are inhabitants of the Australasian region and are not found north of Celebes; the majority of the species are Australian. The one best known on that continent is the 'scrub-hen,' or 'mound-turkey,' of Queensland (*Megapodius tumulus*). Another smaller one is the leipoa (*Leipoa acellata*). The 'brush-turkeys' of New Guinea and neighboring islands belong to the genus Tallegalus.

Consult Gould and other authorities on the ornithology of Australia (see BIRD). See, also, Campbell, "Mound-Building Birds" (with photographic illustrations of 'mounds'), in *Bird Lore*, vol. v. (New York, 1903).

MOUND-BUILDERS. Specifically, a hypothetical race or people at one time supposed to have antedated the Indian tribes as inhabitants of the Ohio and Mississippi valleys; but the 'Mound-Builders' of the Mississippi Valley are now regarded merely as the ancestors and representatives of the tribes found in the same region by Spanish, French, and English pioneers. The custom of erecting mounds has been widespread; most primitive peoples are known to have erected mounds either habitually or in some stage of their development. Most of the mounds of the typical regions in Central North America are mortuary or sacrificial. The chief contents are skeletons, with ceremonial and other objects buried with the bodies, while the structures are wholly of earth; in a few cases house-like structures form the nucleus of the mound. In the Southwestern United States, in Central America, and elsewhere in the Western Hemisphere, as in the Old World, the mounds are sometimes crumbled ruins of structures of adobe, or sun-dried brick.

MOUND CITY. The county-seat of Pulaski County, Ill., eight miles north of Cairo; on the Ohio River, and on the Cleveland, Cincinnati, Chicago and Saint Louis Railroad and a branch of the Illinois Central (Map: Illinois, C 6). It has a trade in lumber, ship-building interests, and manufactures of lumber, staves, furniture, pumps, etc. In the national cemetery here are 5310 graves, 2732 of unknown dead. Population, in 1900, 2705.

MOUNDS'VILLE. A city, named in honor of its most striking attraction, and the county-seat of Marshall County, W. Va., 11 miles south of Wheeling; on the Ohio River, and on the Baltimore and Ohio and the Ohio River railroads (Map: West Virginia, D 2). It is the seat of the State penitentiary, and has a fine court house, and a famous relic of the mound-builders, a massive structure of conical form, in which two burial vaults containing skeletons and copper ornaments were discovered by excavations of 1838. The city is in an agricultural and coal-mining region, has important commercial interests as a result of its shipping facilities, and extensively manufactures glass, lumber products, enameled ware, bricks, cigars, grain cradles, flour and feed, foundry products, leather, etc. The government is vested in a mayor, elected every two years, and a unicameral council. Population, in 1890, 2688; in 1900, 5362.

MOUNET-SULLY, mōō'nā'sụ'lē' (1841—). A French tragedian, whose real name is Jean Sully Mounet. He was born at Bergerac, February 27, 1841, and at twenty-one entered the Conservatoire. After beginning his career at the Odéon, he served in the Franco-Prussian War, and in 1872 he made his début at the Théâtre Français, where in about two years he became a member of the company. Admirably gifted by nature, he is famous for the power and passion of some of his impersonations. His successes include many of the rôles in the classic repertoire. Among them are his Achille in *Iphigénie* and his Hippolyte in *Phèdre,* and also characters in more modern works like those of Victor Hugo. Perhaps his most notable achievement, however, was his performance of *Œdipus the King* in the fêtes at the old Roman Theatre of Orange, a performance repeated in Paris at the Théâtre Français (1888). His Hamlet also counts among his most serious efforts. Consult Matthews, *The Theatres of Paris* (New York, 1880).

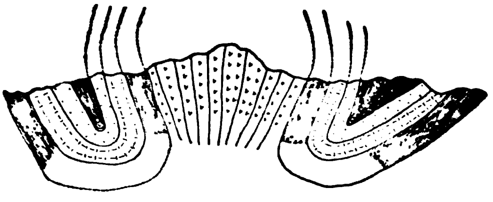
MOUNIER, mōō'nyā', JEAN JOSEPH (1758-1806). A French politician and author, born in Grenoble (Isère). He became judge at Grenoble in 1783, secretary of the estates of Dauphiné in 1788, and in 1789 was elected Deputy in the States-General. There he unsuccessfully advocated the system of two legislative chambers, a subject which he also expounded in his *Considérations sur les gouvernements* (1789). He was elected president of the National Assembly in 1789, but soon afterwards resigned because of the decision to remove the Assembly to Paris. He withdrew to Switzerland and thence to Weimar, published his *De l'influence attribuée aux philosophes, aux francs-maçons et aux illuminés sur la révolution de la France* (1801), and in 1801 returned to France, where Bonaparte appointed him prefect of Ille-et-Vilaine (1802) and councilor of State (1805). His further publications include *Recherches sur les causes qui ont empêché les Français de devenir libres* (1794). Consult De Lanzac de Laborie, *Un royaliste libéral en 1789* (Paris, 1887).

MOUNT FOR GUNS. See COAST ARTILLERY; GUNS, NAVAL; ORDNANCE.

MOUNT, WILLIAM SIDNEY (1807-68). An American genre and portrait painter. He was born at Setauket, Long Island, November 26, 1807, and studied at the National Academy, New York, of which he was made a member in 1832. His first works to gain repute were the "Daughter of Jairus," exhibited in 1828, a full length portrait of Bishop Onderdonk, and a number of clever children portraits. It was not until the exhibition of "Husking Corn" that his special talent for genre painting was recognized. Mount was the forerunner of a whole school of genre artists; he had a keen eye for humor, and was one of the first Americans to portray the negro character successfully. Among his best paintings are: "Bargaining for a Horse;" "The Fortune-Teller," and a portrait of James Rivington, in the New York Historical Society; "Raffling for a Goose" (1837), Metropolitan Museum, New York; "A Long Story" (1837), Corcoran Gallery, Washington; "Turn of the Leaf," Lenox Library, New York. Mount died at his home in Long Island, November 19, 1868.

MOUNTAIN (OF. *montaigne, muntaigne,* Fr. *montagne,* from ML. *montanea, montana,* mountain, from Lat. *montanus,* mountainous, from *mons,* mount). A term somewhat loosely used for a high prominence on the earth's surface with steep slopes. The distinction between mountain and hill is merely one of size. A plateau is distinguished from a mountain by its broader top and sometimes by its gentler slopes. Where a mountain forms a linear elevation it is called a range, ridge, chain, or sierra. Where the ridges are grouped in parallel lines, or *en échelon,* the groups are called mountain chains, systems, or cordilleras. These terms are sometimes given more precise meanings. *Mountain ridge* is sometimes confined to a series of parallel ranges, all of which were formed within a single geosyncline, or on its borders. *Mountain system* is applied to a number of parallel or consecutive ranges formed in separate geosynclines of approximately similar dates of upheaval. *Mountain chain* is applied to two or more systems of the same general region of elevation, but of different dates of origin. *Cordillera* is applied to several mountain chains in the same part of the continent. Most of the names applied to parts of mountains explain themselves. Crest, peak, knob, pinnacle, needle, valley are familiar to all. A gorge or cañon or clove is distinguished from a valley by its steep slopes and narrow bottom; a park is a broad valley; a col or saddle is an exceptionally low point in a crest; a cirque is a steeply walled, outward facing amphitheatre near the crest of the range.

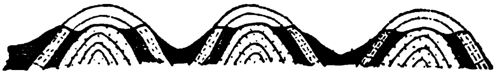
TYPES AND ORIGIN OF MOUNTAINS. Mountains are formed (1) by uplift, (2) by circumdenudation or land sculpture, and (3) by eruptive agencies; and mountains formed in these three ways have characteristic and distinguishing forms.



FAN STRUCTURE, ALPS.

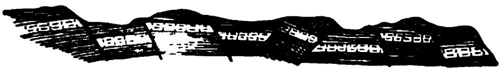
(1) By far the larger number of mountains due to uplift are in the form of folds or wrinkles in the earth's crust. These folds take on a great variety of form and arrangement. Usually a number are parallel, but not coextensive in their longer directions, lapping by one another *en échelon.* They may be upright or overturned at various angles. They may be compressed

along the limbs and spread out at the crest in such a way that the strata on both sides of the axial plane of the fold dip toward this plane, a type of folding called the *fan fold*, sometimes the *Alpine structure*, because of its excellent development in the Alps. On the major folds with this variety of attitude may be imposed smaller folds, just as smaller waves are superimposed on the greater waves of a body of water. Again, the folds are themselves folded in directions transverse to their longer directions. Examples of mountain systems representing folds of the earth's crust are the Alps, the Jura, the Appalachian system, the Coast Ranges, and most of the Rocky Mountains.



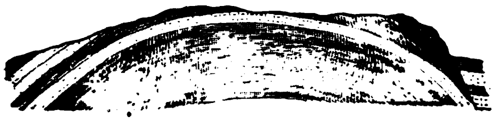
SYMMETRICAL FOLD, JURA MOUNTAINS.

Another type of uplift is shown in the Basin Ranges of Nevada, Idaho, Arizona, and New Mexico, and is known as the *Basin Range structure*. Here the uplift is not accompanied by any horizontal compression. The rocks apparently have been uplifted vertically in great blocks owing their outlines to joints or faults, while others remain stationary or go down. Not infrequently a series of such blocks is tilted in a monoclinal manner, corresponding edges of different blocks going up and the opposite edges going down, the elevated edges thus making mountains, and the depressed edges valleys.



FAULTED STRUCTURE, BASIN RANGE.

Still another type of uplift is shown in the Uinta Mountains of Utah, where a great mass of rock has been apparently lifted vertically above the adjacent rocks with only a gentle arching.



BROAD MONOCLINE, UINTA MOUNTAINS.

Two theories have been proposed to explain mountains of the fold type, the so-called gravitation theory, and the contraction theory. It has been observed that mountains formed by folding or faulting are for the most part composed of great thicknesses of sediments which were deposited in the same general geosyncline, i.e. in the same great depression of the earth, or perhaps which were deposited in areas which became geosynclines due to subsidence of the area under the weight of the sediments. It is supposed that the load of sediments may cause the isogeotherms to rise, that is, causing the rocks at a certain level to have a higher temperature than they otherwise would have. This, perhaps combined with the injection of igneous rocks, which are sometimes observed to occur in such areas, causes the rocks to expand, resulting in folds or mountains. To this there are a number of objections. The expansion possible by this cause is not sufficient to explain the amount of folding observed, and furthermore it does not explain the occurrence of the folds in parallel ridges. The contraction theory is briefly this: The cooling of the earth is proceeding more rapidly in the interior than at the cool exterior. This causes more rapid contraction of the interior than of the exterior, and the crust, in its tendency to make itself smaller in order to fit the smaller nucleus, becomes wrinkled and corrugated. The wrinkles become located along points of weakness. These are likely to be under the geosynclines where great sedimentation has occurred, where, as above seen, the temperature is supposed to be higher.

(2) When an area is elevated above the sea the natural forces of erosion, wind, water, changes of temperature, etc., begin their attack upon the land, and slowly cut it down, the waters collecting in rills, brooks, and rivers, cutting small and large valleys with a variety of forms and distribution due to the varying hardness and the structure of the materials cut through. If carried far enough this process will ultimately bring the elevated area to sea level. At certain stages in the process certain areas, because of their hardness or structure, may stand high above the surrounding areas which have been worn away, and may be called mountains. In so far as mountains have already been formed by folding and elevation, subsequent erosion only modifies their shapes, but where uplift has not left the land in mountain form subsequent denudation may bring it to this point. Mountains formed or modified in this way have a variety of shapes. When the strata are horizontal a hard layer at the top may resist erosion sufficiently long to make the mountain a flat or table top mountain. Hard volcanic material about a volcano may resist erosion more than the surrounding material, and the area thus stand as a lava-topped mountain. If the strata are much folded erosion cuts down along lines of least resistance, usually following the softer strata, leaving the edges of the harder ones as ridges. This state of affairs appears in the Appalachian system, a system owing its present features to folding and elevation combined with differential denudation along softer layers.

(3) Mountains formed by eruption of igneous rocks are of common occurrence. Volcanic mountains formed by lavas occurring either singly or grouped in lines are well known. Vesuvius, Rainier, Hood, Saint Helen's, and Shasta are examples of these. The volcanic materials may be so grouped as to form an upland of considerable extent, as the Cascade range. Eruptions of igneous rocks which never reach the surface also form mountains by bulging up the strata above them. Going upward toward the surface they find it easier at a certain point to spread out in a globular form (called laccolite), arching the strata above them, than to break through the overlying strata and come to the surface. The mountain thus formed is a dome with a nucleus of igneous material. The Henry and Huerfano mountains of the Western United States are of this type.

MOUNTAINS AND CLIMATE. Mountains fulfill important uses in the economy of nature, especially in connection with the water system of the world. They are at once the great collectors and distributors of water. In the passage of moisture-charged winds across them, the moisture is precipitated as rain or snow. When mountain ranges intersect the course of constant winds and abstract the moisture, they produce a moist country on the windward side, and a comparatively dry and arid one on the leeward. This is exemplified in the Andes, the precipitous western surface of which has a different aspect from the sloping eastern plain; and so also the greater supply of moisture on the southern sides of the Himalayas brings the snow-line 5000 feet lower than on the northern side. Above a certain height the moisture falls as snow, and a range of snow-clad summits would form a more effectual separation between the plains on either side than would the widest ocean, were it not that transverse valleys are of frequent occurrence, which open up a pass, or way of transit, at a level below the snow-line. But even these would not prevent the range being an impassable barrier if the temperate regions contained as lofty mountains as the tropics. Mountains also show considerable vertical variation in their life and climate zones. It is well known that, other things being equal, the air is one degree cooler for every 300 feet of ascent, and also that the rate of precipitation increases upward. At a certain elevation rain gives way to snow. Corresponding to these varying conditions of temperature and moisture is the distribution of the vegetation, which is commonly in well-defined zones, each zone distinguished by its species from the zones above and below. Near the top of many mountains the vegetation ends altogether, and the top of the mountain is barren.

AGE OF MOUNTAINS. The age of most folded mountain systems has been determined by the structure of the sediments of known age which compose them, and their relation to other sediments of known age. For instance, the Appalachian system of the Eastern United States, composed mainly of Paleozoic rocks, is much contorted, while rocks of Mesozoic age rest against this mountain system in relatively undisturbed layers. It is clear that the main uplift of the mountain system followed the deposition of the Paleozoic rocks, and preceded that of the Mesozoic rocks. The age of volcanic mountains is determined by the relations of the volcanic materials of surrounding sedimentary rocks of known age. The mountain systems of the world were formed at various times. Some of them have represented areas of weakness where several mountain-making movements have occurred, as in the Pyrenees, Alps, Jura, and Himalayas. Others have been cut down by denudation to their very roots, and do not now appear as mountains. The greatest and loftiest mountains of elevation have for the most part received their greatest uplift in comparatively recent geological times.

Consult: Elie de Beaumont, *Notice sur les systèmes de montagnes* (Paris, 1852); Geikie, *Mountain Architecture* (London, 1877); Reclus, *The History of a Mountain* (New York, 1881); Suess, *Das Antlitz der Erde* (Leipzig, 1885-88); Reade, *The Origin of Mountain Ranges* (London, 1887); Geikie, *Earth Sculpture* (New York, 1898); Davis, *Physical Geography* (Boston, 1898); Von Lendenfeld, *Die Hochgebirge der Erde* (Freiburg, 1899); Lapparent, *Leçons de géographie physique* (2d ed., Paris, 1898).

MOUNTAIN, THE. The name of a political faction in the French Revolution. See MONTAGNARDS.

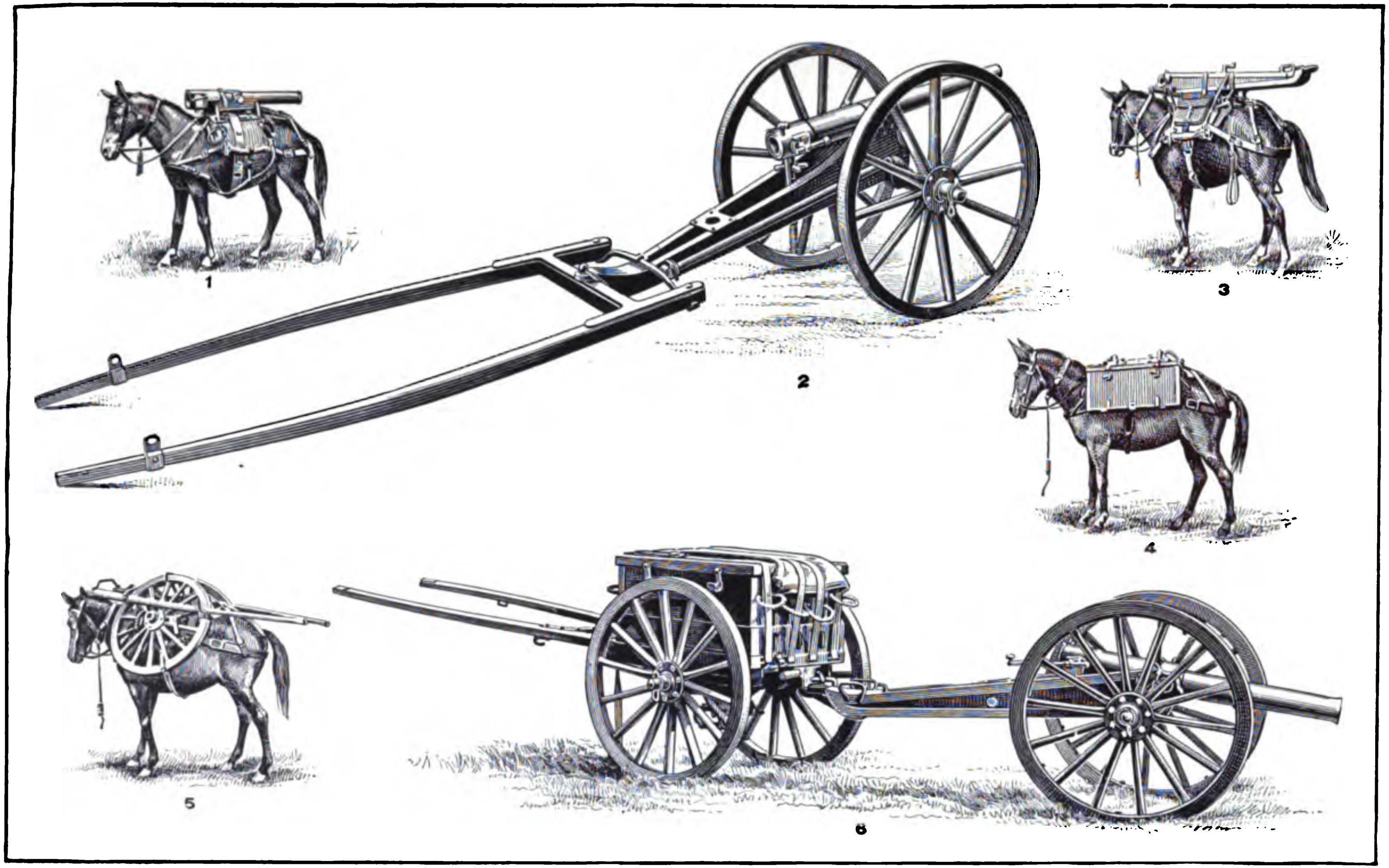
MOUNTAIN ARTILLERY. Cannon for use in countries where the usual wheeled vehicles cannot go. Sometimes a jointed gun of considerable weight, as in the case of the English, sometimes a single piece gun—designed to be capable of being taken wherever troops may be ordered without retarding their movements. Fixed ammunition with metallic cartridge cases is used entirely.

In the United States the mountain guns are of two forms: The Hotchkiss 2-pounder, 1.65 in. calibre, and the Hotchkiss 12-pounder, 3 in. calibre. The carriage is of steel. The cartridge consists of three main portions: the cartridge case, the charge, and the projectile. Two types of projectile are used, canister and shell. The canister for the 2-pounder consists of a cylindrical tin case holding 30 hardened-lead one-ounce bullets with the interstices filled with a matrix of sulphur. The shell is of cast iron, with point percussion fuze. (See FUZE.) The 2-pounder gun weighs 121 pounds and is capable of penetrating 1.3 inches of steel at the muzzle. The 12-pounder gun weighs 218 pounds and is capable of penetrating 1.4 inches of steel at the muzzle. The English mountain gun, which is of great importance in the Indian and colonial service, is a jointed weapon of three pieces, each section weighing 960 pounds, the entire gun and carriage weighing 5160 pounds.

MOUNTAIN ASH, ROWAN TREE, or QUICKEN TREE (*Pyrus Aucuparia; Sorbus Aucuparia* of many botanists). A very ornamental European tree of the natural order Rosaceæ. It does not attain a great size; has in general a very straight erect stem; and is distinguished from the other species of Pyrus by pinnated glabrous leaves of serrated leaflets, terminated by a single leaflet; corymbs of small flowers; and small globose fruit. The wood is valued for its compactness. The inner bark and sapwood have a very peculiar smell. In the superstitions of European peasants a twig of rowan tree was supposed to have great efficacy in scaring away evil spirits. The

MOUNTAIN ASH.

MOUNTAIN ARTILLERY



1 TWELVE-POUNDER MOUNTAIN GUN ON MULE
2. TWO-POUNDER HOTCHKISS MOUNTAIN GUN
3, 4, and 5. MOUNTAIN GUN CARRIAGE AND AMMUNITION CHESTS PACKED ON MULES
6. TWELVE-POUNDER HOTCHKISS MOUNTAIN GUN

generally red, sometimes yellow, fruit (rowan berries), which is acid and somewhat bitter, is sometimes used for preserves. The very nearly allied American species (*Pyrus Americana*), which has bright red fruit, is a shrub or small tree distributed from Newfoundland to Manitoba and southward in elevated regions, and often planted as an ornamental. The wood is soft, light, and little used. Somewhat similar to it is the elder-leaved mountain ash (*Pyrus sambucifolia*), a hardy species ranging north to Greenland and Alaska, but seldom found south of the Great Lake region. It differs from *Pyrus Americana* in its leaves, larger flowers, and fruits.

MOUNTAIN ASH. A coal-mining town in Glamorganshire, Wales, five miles south of Merthyr-Tydfil (Map: Wales, C 5). It has large collieries, foundries, and iron manufactures, owns its water and gas works, and maintains slaughter-houses. Population, in 1891, 17,826; in 1901, 31,100.

MOUNTAIN BEAVER. The sewellel (q.v.).

MOUNTAIN CAT. (1) In California, the cacomistle. (2) Any of several wild cats regarded as peculiar to local mountain regions; a catamount.

MOUNTAIN CHAIN. See MOUNTAIN.

MOUNTAIN CLIMBING. The awakening of man's interest in mountains is chiefly due to Rousseau, though earlier writers, while approaching them as scientists, were also susceptible to their charm. This two-fold interest led Saussure to incite J. Balmat to find a way to the summit of Mont Blanc in 1786 and to accompany him thither in 1787. From that ascent alpinism is generally dated. In London in 1857 was formed the first Alpine Club to foster "the community of feeling amongst those who in the life of the High Alps have shared the same enjoyments, the same labours, and the same dangers." This idea, in a modified form, was taken up throughout Continental Europe and advocated with such enthusiasm that more than 100,000 persons of both sexes are now enrolled in the various alpine societies. The largest of these are the German and Austrian (founded in 1862), about 55,000 members; Swiss (1863), 7000; Italian (1863), 54,000; and French (1874), 6000. In America three strong societies came into being: the Appalachian Mountain Club (q.v.) in Boston (1876), 1300 members; the Sierra Club (1892) in San Francisco, 800; and the 'Mazamas' (1894) in Portland, Ore. In these derivative societies eligibility is based upon a love of nature and of the mountain in particular rather than on alpinism proper, though most of them contain a contingent of expert climbers. The American Alpine Club (1902), with its home in Philadelphia, aims to revert to the original type, but adds to its field polar exploration and the study of glaciers.

Thus cultivated, Alpine climbing has attained almost to a science. Its principles are set forth in extended manuals, such as Dent's *Mountaineering*, Badminton Library (London, 1892). It has called into existence the class of professional guides—Swiss, Tyrolese, and Italian—whose skill far exceeds that of the best amateurs. Their aid, always expedient in tours above snow line, is indispensable in attacks upon giant peaks in distant lands, such as have frequently been made within recent times.

The most dangerous accidents in mountain climbing, those which consist in falls from a great height, rarely occur when guides are taken and the party is properly roped together in a chain of mutual support. Occasionally some foothold seemingly secure gives way beneath the climber's weight; but more frequently the

NAME	Locality	Height	Year	Party
Mont Aiguille	Dauphiné	7,000	1492	Dompjulian de Beaupré
Pic du Midi	Pyrenees	9,547	15—	De Candale
Titlis *	Swiss Alps	10,627	1739	Anonymous
Mont Blanc †	" "	15,781	1786	Balmat and Paccard
Jungfrau	" "	13,672	1811	J. R. and H. Meyer
Finsteraarhorn	" "	14,026	1812	H. Meyer, *et al.*
Monte Rosa ‡	" "	15,217	1855	Smyth, *et al.*
Schreckhorn	" "	13,385	1861	Leslie Stephen
Weisshorn	" "	14,803	1861	J. Tyndall
Dent Blanche	" "	14,318	1862	E. S. Kennedy, C. Wigram
Matterhorn	" "	14,780	1865	E. Whymper, *et al.*
Gross Glockner	Tyrolese Alps	12,457	1799	
Ortler †	" "	12,800	1804	Josele (a hunter)
Kasbek	Caucasus	16,546	1868	D. W. Freshfield, *et al.*
Elbruz †	"	18,470	1868	" " "
Ushba	"	15,700	1888	J. G. Cockin
Dikhtaw	"	17,000	1888	A. F. Mummery
Kabru §	Himalayas	24,015	1883	W. W. Graham
Pioneer Peak	"	22,600	1892	W. M. Conway
Koser Gunge	"	21,010	1898	Dr. W. H. and Mrs. Workman
Mount Cook †	New Zealand	13,349	1895	M. Zurbriggen (guide)
Chimborazo	Andes	20,498	1879	E. Whymper
Aconcagua	"	22,860	1897	S. Vines, Zurbriggen
Illimani	"	21,030	1898	W. M. Conway
Mount Washington †	White Mountains	6,293	1642	Darby Field
Pike's Peak	Rocky Mountains	14,147	1820	E. James, *et al.*
Hood	Cascades	11,934	1854	Stevens and Van Trump
Rainier	"	14,526	1870	Barlow, *et al.*
Saint Elias §	"	18,024	1897	Duke of the Abruzzi, *et al.*
Bonney	Selkirks	10,645	1888	W. S. Green, H. Swanzy
Sir Donald	"	10,652	1890	E. Huber, C. Sulzer
Dawson †	"	11,100	1899	C. E. Fay, H. C. Parker
Temple	Canadian Rockies	11,637	1894	S. E. Allen, W. D. Wilcox, *et al.*
Victoria	" "	11,150	1897	J. W. Collie, *et al.*
Assiniboine	" "	11,860	1901	J. Outram
Columbia §	" "	....	1902	"

* The first snow peak. † The highest in range. ‡ The highest summit. § The highest thus far climbed.
(In most instances the guides are not mentioned in this list.)

fall takes place because the climber is overtired, or has started too quickly, without the necessary training and hardening, in consequence of which at a critical moment some muscle fails to answer. Overexertion of either body or mind is always to be avoided; for alertness of both is essential. The rope is the sheet anchor of mountaineering, whether it be on the snow or on the equally dangerous grassy slopes. On really difficult mountains no more than three persons should be on the same rope. With the rope the ice-axe is used, and indeed is a very necessary adjunct to the climber. It consists of a steel axe with a cutting edge crosswise to the handle, like an adze and a pick. The handle is of such length that it makes a convenient staff, and is shod with a steel point. The cutting edge of the axe is employed for making steps in an ice wall, the pick for holding and aiding the climber in pulling himself up, while the axe when used as a staff or alpenstock enables the climber to hold securely, or it can be employed as a brake when descending. Accidents which come from the fall of large masses of rock, snow, or earth may be largely obviated by a careful observation of the position of the sun with regard to snowfields below upon which the path is to be taken. If the snow begins to slide, carrying the climber with it, the utmost nimbleness of resource, wit, and strength applied to the alpenstock as a brake is the only remedy that can be formulated beforehand. In ascending an ordinary *couloir* the axe must be constantly used for cutting footholds step by step.

The list on the preceding page presents some of the principal first ascents since the earliest authentic records.

Consult: J. Forbes, *Travels Through the Alps* (Edinburgh, 1843); A. W. Moore, *The Alps in 1864*, from MS. copy (Edinburgh, 1902); J. Ball and E. S. Kennedy, *Peaks, Passes, and Glaciers* (London, 1859-62); G. Studer, *Ueber Eis und Schnee* (Bern, 1869-71); J. Tyndall, *Mountaineering in 1861* (London, 1862); id., *Hours of Exercise in the Alps* (ib., 1871); L. Stephen, *The Playground of Europe* (ib., 1871); E. Whymper, *Scrambles Among the Alps* (ib., 1871); id., *Travels in the Great Andes of the Equator* (ib., 1892); C. T. Dent, *Above the Snow-line* (ib., 1885); Clarence King, *Mountaineering in the Sierra Nevada* (Boston, 1886); W. M. Conway, *Climbing in the Karakoram-Himalayas* (London, 1894); id., *The Alps from End to End* (ib., 1895); id., *The Bolivian Andes* (New York, 1901); A. F. Mummery, *My Climbs in the Alps and Caucasus* (ib., 1895); E. A. Fitzgerald, *Climbs in the New Zealand Alps* (ib., 1896); id., *The Highest Andes* (ib., 1899); F. M. B. Workman, *In the Ice World of the Himalaya* (New York, 1898); C. E. Mathews, *The Annals of Mont Blanc and the Matterhorn* (London, 1898); F. De Filippi, *The Ascent of Mount Saint Elias* (London, 1900); W. D. Wilcox, *Camping in the Canadian Rockies* (New York, 1900); J. N. Collie, *Climbing in the Himalayas and Other Mountains* (Edinburgh, 1902). For recent American mountaineering, consult *Appalachia*, vols. i.-ix. (Boston, 1876-1902), and *Sierra Club Bulletin*, vols. i.-iii. (San Francisco, 1893-1903).

MOUNTAIN GAZELLE. See Gazelle.

MOUNTAIN GOAT. See Rocky Mountain White Goat.

MOUNTAIN HERRING. The Rocky Mountain whitefish (*Coregonus Williamsoni*), found in clear streams from the northern Rocky Mountain ranges to the Pacific coast. It is good food, and is esteemed by anglers, as it readily takes a fly. See Whitefish; and Plate of Whitefish, Smelts, etc.

MOUNTAIN LIMESTONE. The basal strata of the Carboniferous series in the south of England and Wales. It is highly fossiliferous and carries a few ores. Its chief use is for building stone. The term was applied to the calcareous rocks of the American Subcarboniferous, but soon fell into disuse.

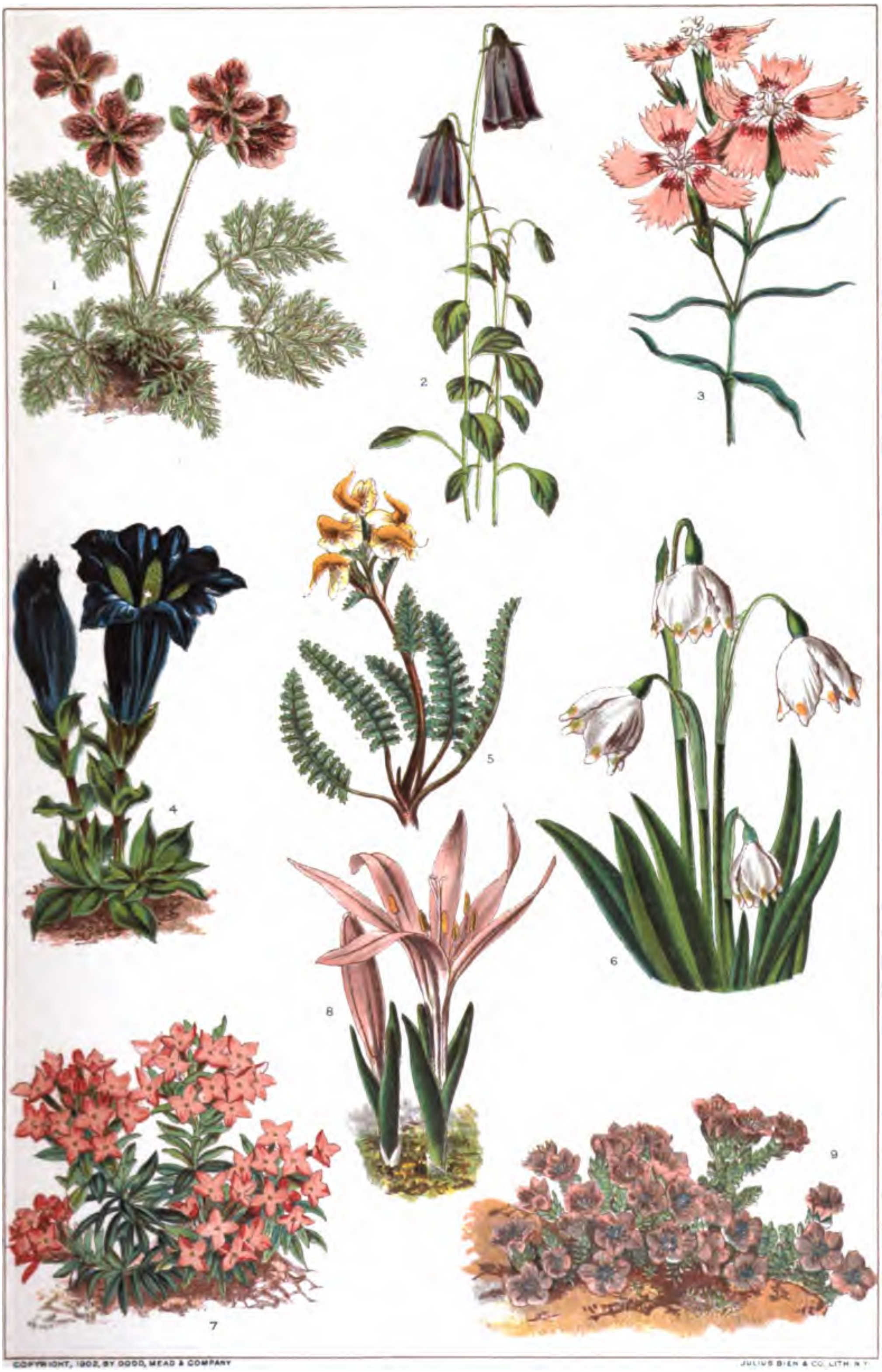
MOUNTAIN LION. The name in the western part of the United States for the panther, cougar, or puma (*Felis concolor*). Early writers upon America reported that the lion was a resident of North America from the skins they saw among the Indians, which they supposed to be those of lionesses. See Puma.

MOUNTAIN MEADOWS MASSACRE. In American history, the massacre, near Mountain Meadows in Utah, in September, 1857, of a party of emigrants from Arkansas and Missouri passing through Utah on their way to Southern California. They numbered all told about 140 men, women, and children. On their way they were everywhere refused food until they reached the neighborhood of Mountain Meadows, a valley in Iron County, about 350 miles south of Salt Lake City. Here they stopped to rest their horses, and on September 7, 1857, were fired upon by Indians, and, it is alleged, by Mormons disguised. They withstood siege until September 11th, when, on promise of protection by John D. Lee (q.v.), Mormon bishop and Indian agent, they left the shelter of their wagons. All adults and children over seven years of age were killed, and seventeen younger children were distributed among Mormon families, but were afterwards restored to relatives by the United States Government. Lee was executed for this crime in 1877, and though the effort to inculpate other high officers of the Church failed, there can be little doubt that the project was known and approved by them, especially since Brigham Young (q.v.) had a short time before announced that "no person shall be allowed to pass or repass into or through or from this territory without a permit from the proper officer." H. H. Bancroft in his *History of Utah* (San Francisco, 1883) places blame on Lee entirely. Consult: Linn, *Story of the Mormons* (New York, 1902); and *Confessions of John D. Lee* (Saint Louis, 1891).

MOUNTAIN MOCKING-BIRD. See Mocking-Bird.

MOUNTAIN PLANTS. The chief features of mountain plants have been discussed under the head of Alpine Plant. At the bases of most mountains the vegetation closely resembles that of the surrounding lowlands, but with elevation changes appear which correspond to the changes observed as the globe is traversed toward high latitudes. For example, in the mountains of Mexico the typical vegetation of the lowlands gives place with ascent to various zones of trees, including forms which are deciduous like those of the United States, then conifers like those of the Northern United States and Canada, and finally into mosses and lichens characteristic of the alpine regions. Mountains contain a large

MOUNTAIN PLANTS



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1 ERODIUM PETRÆUM.
2 CAMPANULA PULLA.
3 DIANTHUS HIRTUS
4 GENTIANA ACAULIS.
5 PEDICULARIS ELONGATA.
6 LEUCOJUM VERNUM.
7 DAPHNE CNEORUM.
8 BULBOCODIUM RUTHENICUM)
9 SAXIFRAGA OPPOSITIFOLIA.

proportion of endemic plants. This is doubtless due to their relative isolation. Mountain endemism is particularly characteristic of the alpine forms, probably because the conditions for their migration are less favorable than for those farther down. Some plants characteristic of mountain habitats are shown in the accompanying plate. See ENDEMISM.

MOUNTAIN PLOVER. A ring-plover (*Ægialitis montana*), very common throughout the Rocky Mountain region and neighboring plains, where its sandy gray plumage renders it almost invisible when it alights. It remains in the open lands, and rarely ascends above the level (8000 to 9000 feet) of the interior 'parks.' It breeds throughout its summer habitat.

MOUNTAIN QUAIL. A local name of two Californian 'partridges': (1) the 'plumed' partridge (*Oreortyx pictus*); and (2) Gambel's partridge (*Lophortyx Gambeli*). See QUAIL.

MOUNTAIN SHEEP. The Rocky Mountain Sheep. See BIGHORN.

MOUNTAIN SPINACH. See ORACHE.

MOUNTAIN SYSTEM. A term rather loosely used, but which properly refers to a number of parallel or consecutive mountain ranges formed during the same geological period, but in separate areas of crusted folding. Thus the Appalachian system comprises the Appalachian, Acadian, and Ozark ranges, each of which follows a common direction although lying within a different geosynclinal fold.

MOUNTAIN TEA. See GAULTHERIA.

MOUNT AUBURN. A well-known cemetery in Cambridge, Mass., containing the graves of many celebrated men, including Longfellow, Lowell, Charles Sumner, and Phillips Brooks. The beautiful grounds cover 125 acres.

MOUNT AYR. A town and the county-seat of Ringgold County, Ia., 75 miles south by west of Des Moines; on the Chicago, Burlington, and Quincy Railroad (Map: Iowa, C 4). It has a fine court-house and public school buildings, and is important chiefly as a trade centre for a fertile agricultural and stock-raising section. Population, in 1890, 1265; in 1900, 1729.

MOUNT CAR′MEL. A mountain range of Palestine. See CARMEL.

MOUNT CARMEL. A city and the county-seat of Wabash County, Ill., 25 miles southwest of Vincennes, Ind.; on the Wabash River, and on the Southern and the Cleveland, Cincinnati, Chicago and Saint Louis railroads (Map: Illinois, E 5). It has a fine court-house and city hall. Water power is obtained from the river; and besides railroad shops of the Big Four, there are manufactories of machinery supplies, pulleys, shafting, paper, strawboard, lumber, spokes, staves, woodenware, furniture, and flour. Settled in 1818, Mount Carmel was chartered as a city in 1865. Population, in 1890, 3376; in 1900, 4311.

MOUNT CARMEL. A borough in Northumberland County, Pa., 28 miles east-southeast of Sunbury; on the Lehigh Valley, the Northern Central, and the Philadelphia and Reading railroads (Map: Pennsylvania, E 3). There are several anthracite mines here and in the vicinity, and an important coal trade is carried on. The borough has also manufactures of lumber, hats and caps, miners' lamps, shirts, cigars, etc. Population, in 1890, 8254; in 1900, 13,179.

MOUNT CAR′ROLL. A city and the county-seat of Carroll County, Ill., ten miles east of the Mississippi River; on the Chicago, Milwaukee and Saint Paul Railroad (Map: Illinois, B 1). It has a public high school library and the Frances Shimer Academy. There are valuable mineral deposits, especially iron ore, in the vicinity, which is interested mainly in agriculture and stock-raising. Population, in 1890, 1836; in 1900, 1965.

MOUNT CLEM′ENS. A city and the county-seat of Macomb County, Mich., 20 miles northeast of Detroit; on the Clinton River, at the head of navigation, and on the Grand Trunk Railroad (Map: Michigan, L 6). It is a popular summer and health resort, beautifully situated, and noted for its mineral springs, which possess curative properties for many diseases. The city has an active Chamber of Commerce, a public library, and well-equipped hotels and bath-houses. Its industrial interests are represented by a large beet-sugar factory, cooperage works, a casket manufactory, and an establishment producing carriages, wagons, sleighs, and agricultural implements. Settled in 1802, Mount Clemens was incorporated first in 1878. The government is administered, under the conventional charter of Michigan cities of the fourth class, by a mayor, annually elected, and a unicameral council. The city owns and operates the water-works. Population, in 1890, 4748; in 1900, 6576.

MOUNT DESERT, dė-zẽrt′ *or* dĕz′ẽrt. The largest of the numerous islands on the coast of Maine. It belongs to Hancock County, and is separated from the mainland on the northwest by a channel from one-half to two miles wide, and on the northeast by Frenchman's Bay (Map: Maine, G 7). It is 15 miles long and 8 miles broad, with an area of about 100 square miles. Its outline is very irregular, a long, narrow bay or fiord almost separating the island into two halves. The surface is rugged and mountainous, rising to a height of over 1500 feet, and presenting a line of bold cliffs along the northeast coast. The island is surrounded by a number of rocky islets, and there are several beautiful lakes in the interior, giving a varied character to the scenery, which has made Mount Desert a favorite summer resort. The island has three convenient harbors, Bar Harbor, Northeast, and Southwest, and numerous villages, varying in popularity as summer resorts, the most noted being Bar Harbor. First discovered by Champlain, who gave the island its name, Mount Desert was settled in 1608 by French Jesuits, their colony of Saint Sauveur on Somes Sound, however, being destroyed eight years later by an expedition from Virginia. A permanent settlement here (Somesville, which is thus the oldest on the island) was effected by the English in 1761. The town of Mount Desert was incorporated in 1789. Since that date the towns of Eden, Cranberry Isles (three miles from Southwest Harbor), and Tremont have been formed from the original district and incorporated, respectively, in 1796, 1830, and 1848. Population, Cranberry Isles, in 1900, 374; Eden, in 1890, 1946; in 1900, 4379; Mount Desert, in 1900, 1600; Tremont, in 1900, 2010.

MOUNTED GRENADIERS. See MOUNTED INFANTRY.

MOUNTED INFANTRY. A general term applied to foot soldiers mounted on horses, mules, camels, or on wagons for transportation only. Such were the ancient infantry carried swiftly to the battlefield in war chariots. In the sixteenth century Louis of Nassau made 500 of his cavalrymen take up behind their saddles an equal number of infantry, and Alexander of Parma, wishing to surprise the Duke of Alençon, mounted several companies of infantry on pack horses. This was followed by mounting several divisions of the infantry of that time, to which was given the name of 'dragoons,' probably from the matchlock carried, which was ornamented at the muzzle with the head of a dragon. Eventually this name 'dragoon' was given to certain cavalry which fought either mounted or dismounted. Louis XIV. established a corps of 'Mounted Grenadiers.' James II. created a similar corps in the British Army, called 'Horse Grenadiers,' who were armed with muskets and grenades; in action they dismounted, linked horses, fired, and then threw their grenades by ranks. In 1780, during the American Revolution, a body of 1500 mounted riflemen from Kentucky and North Carolina, each man armed with his own rifle and mounted on his own horse, attacked the British at King's Mountain, and after a spirited dismounted contest defeated the enemy, who lost Major Ferguson killed, 300 others killed and wounded, and 800 men and a quantity of arms and ammunition captured. Napoleon in Egypt mounted a body of selected infantry on camels, as did forty years later the British in India, in which their camel-infantry covered forty miles daily for six days. Again, in the Sudan campaign camels were used with success. In Tongking and Algeria the French often mount their infantry, sometimes allotting one mule to two soldiers, by which plan they have accomplished 140 miles in three days. The best authorities agree that mounted infantry should be used for the sole purpose of moving quickly to the place where they are required for duty as infantrymen, not hesitating, if necessary, to sacrifice the means of transportation.

During the war in South Africa (1899-1902) the Boer army was almost entirely composed of mounted infantry or riflemen. These were men accustomed to the saddle and the use of firearms from boyhood, versed in the arts of the hunter, in the science of woodcraft, and familiar with the topography of the field of operations. Having, by cautious and noiseless approach, reached unperceived a spot near the enemy, the Boer dismounted, hoppled his horse, leaving him a short distance in rear, crept forward, and from a secure position opened fire upon the unsuspecting foe. If forced to retire, he did so quietly and quickly to take up a new position. From impregnable natural fortifications small bodies of these mobile troops often repulsed vastly superior British forces supported by artillery. In operating against the British cavalry the Boers advanced toward it on horseback up to within 500 meters, then dismounted and opened fire. In battle the Boers left the reins thrown over their horses' necks and dragging on the ground; the horses did not move until their riders returned; these animals were of a great variety of size and breed, from the stolid Basuto pony to the blooded stallion.

The British under Lord Roberts had a force of about 3000 mounted infantry, originally organized into two brigades of five regiments each, of which 2000 men were regulars and the remainder colonials. Owing to the want of instruction in mounted field duties, this force (with the exception of the colonial contingent) was not very useful.

During the American military operations in the Philippines small detachments of regular infantry mounted on active native ponies were found useful in expeditions where rapid marches were necessary during the rainy season or as a temporary substitute for cavalry.

In those European countries where large cavalry establishments are maintained and traditional methods are deeply rooted, there will be provision for three classes of mounted troops; one on large, heavy horses trained in 'shock tactics' and for ceremonial purposes; another on lighter horses for scouting and pursuit of an enemy; a third, of infantrymen armed with long-range rifles on small, active horses for escort, convoy, and picket duty. In the United States all of these duties are performed by a single class. To give greater mobility to infantry without impairing its fire action, it may be mounted temporarily on anything that will transport it rapidly to the place where it is needed in advance of its comrades on foot; this kind of mounted infantry must be employed in masses, never individually.

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MOUNTED POLICE. See MILITARY POLICE for description of various military and semi-military organizations of this nature.

MOUNT FOREST. A town of Wellington County, Ontario, Canada, on a branch of the Saugeen River, 73 miles northeast of London (Map: Ontario, C 4). It has manufacturing industries, and is at the junction of the Grand Trunk and Canadian Pacific railways. Population, in 1891, 2214; in 1901, 2019.

MOUNT'FORT, WILLIAM (1660?-92). An English actor and playwright. As early as 1678 he was playing in London. After 1682 he was a member of the company at the Theatre Royal, and was the creator of many parts in the drama of the time, besides writing and adapting several plays, such as *The Injur'd Lovers, or the Ambitious Father* (publ. 1688); *Successful Strangers* (1690); *King Edward the Third* (1691); and *Greenwich Park* (1691). According to the common account of his death, he was assassinated, December 9, 1692, by Capt. Richard Hill, a jealous admirer of Mrs. Bracegirdle. Consult: Cook, *Hours With the Players* (London, 1881); Galt, *Lives of the Players* (London, 1831); Cibber, *Apology*, ed. Lowe (London, 1889).

MOUNT GIL'EAD. A village and the county-seat of Morrow County, Ohio, 47 miles north by east of Columbus; on the Whetstone River, and on the Toledo and Ohio Central, and the Cleveland, Cincinnati, Chicago and Saint Louis railroads (Map: Ohio, E 4). It has a public school library. There are some manufactures and a trade with the surrounding agricultural country. Population, in 1890, 1329; in 1900, 1528.

MOUNT HOL'LY. A town and the county-seat of Burlington County, N. J., 19 miles east by north of Philadelphia; on Rancocas Creek and on the Pennsylvania Railroad (Map: New Jersey, C 4). It has the Burlington County Hospital, Children's Home, and the Burlington County Lyceum of History and Natural Science, founded in 1876, which possesses a library of 6500 volumes. The industries are represented by several extensive shoe factories, and by foundries, canneries, a hammock factory, etc. Population, in 1890, 5376; in 1900, 5168.

MOUNT HOLYOKE COLLEGE. An undenominational woman's college in South Hadley, Mass., founded by Mary Lyon as a seminary in 1837 and chartered as a college in 1888. In addition to the regular undergraduate courses, provision is made for graduate work, and special courses are open to teachers. The four years' course consists of two years of prescribed work and two years elective, and leads to the degree of B.A. The college offers a large number of scholarships and two graduate fellowships. During the collegiate year 1902-03 the college had 83 instructors and officers, and an enrollment of 671. The campus includes 150 acres, attractively laid out, and contains seven dormitories; Mary Lyon Hall occupying the site of the original building destroyed by fire in 1896, and including the chapel and offices of administration; a well-equipped gymnasium; an observatory; Lydia Shattuck Hall for chemistry and physics; Lyman Williston Hall for natural sciences; Dwight Memorial Art Building, opened in 1902; and the library, with a permanent fund of $10,000, containing 23,000 volumes and 3800 pamphlets. Its productive funds amounted to $613,000, and its gross income to $168,000. The buildings and grounds were valued at $862,000, and the whole college property at $1,450,000.

MOUNT MOR'GAN. A municipality of Raglan County, Queensland, Australia, 23 miles southwest of Rockhampton, and 404 miles north of Brisbane by rail (Map: Queensland, G 7). It is noted for the abundance and richness of the gold deposits found on the mountain-summit and inclosed in a rock mass largely composed of iron ore and siliceous sinter. The yield of gold in 1900 was 187,352 ounces, valued at $3,758,550. Population, in 1901, 6280.

MOUNT OF OLIVES. See OLIVES, MOUNT OF.

MOUNT OF OLIVES. An oratorio by Beethoven, originally *Christus am Oelberg* (1803), produced in 1814. In deference to the sentiment against representing Christ as a character in a performance, David was substituted in his place, and the name of the oratorio was changed in 1842 to *Engedi*.

MOUNT PLEASANT. A city and the county-seat of Henry County, Iowa, 28 miles west by north of Burlington; on the Chicago, Burlington, and Quincy Railroad (Map: Iowa, F 4). It is the seat of the State Hospital for the Insane, the Iowa Wesleyan University (Methodist Episcopal), opened in 1844, and the German College (Methodist Episcopal), opened in 1873. It has also several secondary institutions, a conservatory of music, and a public library. Mount Pleasant is the centre of a productive farming country, and is an important shipping point for live stock, especially horses. There are grain elevators and manufactories of flour, lumber, carriages, and wagons, agricultural implements, brick and tile, etc. Limestone is extensively quarried in the vicinity. The water-works and electric light plant are owned by the municipality. Population, in 1890, 3997; in 1900, 4109.

MOUNT PLEASANT. A city and the county-seat of Isabella County, Mich., 53 miles west by north of Saginaw; on the Chippewa River, and on the Ann Arbor and the Pere Marquette railroads (Map: Michigan, J 5). It is the seat of the Central State Normal School and of a United States Government Indian school, and has a handsome court-house. A fertile agricultural region surrounds the city, and there are manufactures of lumber and various lumber products, flour, woolen goods, plows, foundry products, gasoline engines, brick and tile, wagons, etc. The water-works are owned and operated by the municipality. Population, in 1890, 2701; in 1900, 3662.

MOUNT PLEASANT. A borough in Westmoreland County, Pa., 11 miles south of Greensburg, the county-seat; on the Baltimore and Ohio and the Pennsylvania railroads (Map: Pennsylvania, B 3). It is the seat of the Western Pennsylvania Classical and Scientific Institute (Baptist). The borough is the centre of an extensive coke-making industry, and manufactures also flour, lumber, iron, foundry products, glass, etc. Population, in 1890, 3652; in 1900, 4745.

MOUNT SAINT MARY'S COLLEGE. A Roman Catholic college at Emmitsburg, Md., founded in 1808. Its material interests are under the control of a board of directors, of whom the Archbishop of Baltimore is president. In addition to the regular college work, it has a preparatory and a scientific and business course, with a total registration in 1902 of 220 students and 15 instructors. It confers the degree of B.A. The library contains 27,000 volumes. The buildings and grounds are valued at about $200,000. The income was about $50,000.

MOUNT-STE'PHEN, GEORGE STEPHEN, Baron (1829—). A Canadian capitalist, born at Dufftown, Banffshire, Scotland. He came to Canada in 1850 and entered the dry goods business in Montreal. He succeeded there as a cloth manufacturer, and became wealthy, but was conspicuous chiefly for his share in carrying through to completion the long-delayed Canadian Pacific Railway, of which he became president in 1881. For his services in this connection he was knighted by Queen Victoria (1886), and the following year he and Sir Donald Smith gave $500,000 each for the building of the Victoria Hospital in commemoration of her Majesty's jubilee. In 1888 he went to reside in England, and in 1891 he was created first Baron Mount-Stephen, a title taken from a peak in the Rocky Mountains named for him during the construction of the Canadian Pacific Railroad.

MOUNT STER'LING. A town and the county-seat of Brown County, Ill., 38 miles east of Quincy; on the Wabash Railroad (Map: Illinois, B 4). It has manufactures of flour, wagons, brick, drain tile, etc., and in the vicinity, which is interested chiefly in agriculture, are coal and clay deposits. The water-works are owned by the municipality. Population, in 1890, 1655; in 1900, 1960.

MOUNT STERLING. A city and the county-seat of Montgomery County, Ky., 33 miles east of Lexington; on the Chesapeake and Ohio Railroad (Map: Kentucky, H 2). It has a public library and several private educational institutions. The city controls important commercial interests, and among its industrial establishments are planing mills, flouring mills, machine shops, and a distillery. Population, in 1890, 3629; in 1900, 3561.

MOUNT VERNON. The home and burial-place of George Washington, in Fairfax County, Virginia; on the right bank of the Potomac, 15 miles south of Washington, D. C. The Washington mansion, beautifully situated on an eminence, commanding a view of the river, is of wood, two stories high, ninety-six feet long, and thirty feet deep. It was built in 1743 by Washington's elder brother, Lawrence, who called it Mount Vernon, after Admiral Vernon, under whom he had served in the British Navy. A high piazza runs along the front of the house, which has six rooms of moderate size on the ground floor, containing many objects of historical interest. The tomb to which Washington's remains were removed from the old family vault in 1831 stands a few hundred yards from the house, near a wooded ravine. Mount Vernon, which had been much enlarged by Washington, was by him bequeathed to Bushrod Washington, upon whose death it came into the hands of John A. Washington, his nephew, who sold it in 1858 to the Ladies' Mount Vernon Association, which holds it in trust as a place of national interest. Consult: Lossing, *The Home of Washington and Its Associations, Historical, Biographical, and Pictorial* (new ed., New York, 1865); and Wineberger, *Home of Washington at Mount Vernon and Its Associations* (Washington, 1866).

MOUNT VERNON. A city and the county-seat of Jefferson County, Ill., 76 miles east by south of Saint Louis, Mo.; on the Chicago and Eastern Illinois, the Southern, the Louisville and Nashville, and the Wabash, Chester and Western railroads (Map: Illinois, D 5). It has an attractive Supreme Court building, and is engaged principally in agriculture, coal mining, and in the manufacture of cars, machine-shop products, axe handles, lumber, flour, etc. There are also a large grain elevator, marble works, and a tie-preserving establishment. Mount Vernon was laid out in 1819 and was incorporated first in 1872. The government is administered under the original charter of incorporation, which provides for a mayor, elected every two years, and a unicameral council. Population, in 1890, 3233; in 1900, 5216.

MOUNT VERNON. A city and the county-seat of Posey County, Ind., 18 miles west by south of Evansville; on the Ohio River, and on the Louisville and Nashville and the Evansville and Terre Haute railroads (Map: Indiana, B 5). It has a fine court-house and the Alexandrian Public Library. There are manufactories of flour, hominy, lumber, foundry, and machine-shop products, engines, carriages, etc. Mount Vernon is a commercial centre of considerable importance for a fertile region in which coal is abundant. Population, in 1890, 4705; in 1900, 5132.

MOUNT VERNON. A town in Linn County, Iowa, 16 miles east by south of Cedar Rapids; on the Chicago and Northwestern Railroad (Map: Iowa, F 3). Cornell College (Methodist Episcopal), opened in 1857, is situated here. The town is surrounded by a rich farming region, and has considerable trade. Population, in 1890, 1259; in 1900, 1629.

MOUNT VERNON. A city in Westchester County, N. Y., on Eastchester Creek, an arm of Long Island Sound, and the Bronx River, and on the New York Central and Hudson River and the New York, New Haven and Hartford railroads (Map: New York, G 5). It is chiefly a residential suburb of New York City, which it adjoins on the north. It has some handsome streets paved with macadam and asphalt, and in the more elevated sections of the city, which command fine views of the Sound, there are costly mansions. Mount Vernon maintains a public library, founded in 1896, for which a $50,000 building, the gift of Andrew Carnegie, was begun in 1903. Among the prominent edifices are the Lucas Building, which contains the city offices, the Mount Vernon Hospital, the new postoffice, and many churches and school buildings. Mount Vernon was founded in 1852 and incorporated as a village in the following year, and in 1892 was chartered as a city. The government, under the original charter, is vested in a mayor, elected every two years, and a municipal council. Most of the administrative officials are appointed by the mayor and confirmed by the council. The comptroller, receiver of taxes, assessors, and board of education, however, are chosen by popular vote. Population, in 1890, 10,830; in 1900, 21,228.

MOUNT VERNON. A city and the county-seat of Knox County, Ohio, 25 miles north by west of Newark; on the Kokosing River, and on the Baltimore and Ohio and the Cleveland, Akron and Columbus railroads (Map: Ohio, F 5). It has a fine court-house, a public library and Hiawatha Park with a picturesque lake. There are locomotive works, bridge works, Corliss engine works, a large foundry, flour and saw mills, bent-wood works, and manufactories of furniture, hoops, staves, sashes, and doors. The city is the centre of a fertile agricultural region with which it carries on a considerable trade, and near by is found natural gas in abundance. The water-works are owned by the municipality. Population, in 1890, 6017; in 1900, 6633.

MOUNT WASHINGTON. See WASHINGTON, MOUNT.

MOURNING BRIDE, THE. A play by William Congreve (1697). Alphonso, Prince of Valentia, and Almeria, daughter of the King of Granada, are shipwrecked when about to be married, and each believes that the other has been drowned. Alphonso, taken prisoner, under an

MOUNT VERNON

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MOUNT VERNON

assumed name, finds Almeria at the Court of Granada, and the wedding is eventually accomplished. The play is the source of the famous lines beginning, "Music hath charms to soothe the savage breast."

MOURNING-CLOAK. A handsome butterfly (*Euvanessa*, or *Vanessa*, *antiopa*), known in England as the Camberwell beauty. It appears in the United States very early in the spring, and may not infrequently be seen flying about on warm days in winter. It hibernates in the adult stage even in cold climates. According to Scudder, it ranges from the Arctic Circle to the thirtieth parallel of latitude. It is purplish brown, with wings bordered by yellow, brown, and blue. The larvæ are covered with black spines, and feed gregariously on willow, elm, poplar, and hackberry, often stripping the larger branches of leaves. The species is two-brooded and the second generation of moths appears in midsummer.

THE MOURNING-CLOAK.

MOURNING DOVE. The Carolina dove. See DOVE.

MOURZOUK, mōōr-zōōk′. A town of Africa. See MURZUK.

MOUSCRON, mōōs′krōn. A town of Belgium in the Province of West Flanders, situated near the French frontier, 32 miles southwest of Ghent. It is a customs station, and manufactures furniture and cotton and woolen goods. Population, in 1890, 13,764; in 1900, 19,366.

MOUSE (AS., OHG. *mūs*, Ger. *Maus*, Lat. *mus*, Gk. *μῦς*, *mys*, OChurch Slav. *myshĭ*, Skt. *mūṣa*, mouse, from *muṣ*, to steal). The word mouse was originally applied to a small rodent mammal, *Mus musculus*, now called the house mouse, which was formerly confined to the Old World, but is now cosmopolitan in its distribution. Gradually the use of the word has extended to other small rodents, and especially in compounds to mammals not rodents, and even to birds. This troublesome little rodent is a small gray creature, with a body about three inches long and a tail half that length, the ears rather large and very delicate, and small feet. The color shows considerable variation, in some cases having a strong brown cast, while in others it becomes very pale and even fades to white. In its habits the mouse is largely nocturnal, though often seen during the day. It makes its home in sheltered nooks and crannies, where a nest of rags, paper, feathers, etc., is nicely made. Mice are very prolific, six to ten young being born at a time, and there are many broods during the year. Much has been written about the singing powers of the mouse, and the fact that it does sing is supported by the evidence of perfectly trustworthy witnesses. Mice are unquestionably fond of music, but it is not fully determined whether their ability to make it is normal or is an individual peculiarity. Some writers have gone so far as to assert that it is due only to a diseased throat.

The name mouse is applied to any representative of the genus Mus not big enough to call a rat. This genus is one of the largest of mammalian genera, including upward of 130 species, which vary considerably in size, somewhat in color, and not a little in the softness of the pelage. The upper molar teeth are always wide, with three series of tubercles, and therefore called trituberculate; in this respect Mus differs from all of the native American 'rats' and 'mice.' Another characteristic of the genus is the long, slender, rounded tail, with whorls of scales, and few hairs; in some mice this is almost prehensile. Besides the common mouse, the following may be mentioned as well-known European species of Mus: The wood mouse (*Mus sylvaticus*), which is a trifle larger than its cosmopolitan cousin, and on account of its longer tail is sometimes called the 'long-tailed field-mouse;' it is abundant in Great Britain, and is noted for the large stores of grain which it hoards. The harvest mouse (*Mus minutus*) is the smallest of British quadrupeds, the length exclusive of tail being only about 2½ inches; it occurs chiefly in the southern parts of England, and is notable for its curious globular nests, composed of grass leaves and panicles woven together and suspended between stalks of grain or tall grass; a somewhat smaller species (*Mus pumilus*) occurs in the south of Europe. Asia and Africa have many species, as the curious black-striped Barbary mouse, which looks like a miniature American ground-squirrel.

In America the name mouse is applied to a large number of small mammals, especially in such compounds as wood-mouse, field-mouse, etc. Some of these are very different from the true mice, but nearly all belong to the family Muridæ, though not to the Murinæ with the Old World mice. Many of them are voles, of the subfamily Arvicolinæ, while others are vesper-mice or 'white-footed' mice of the subfamily Cricetinæ, to which the hamsters also belong. A typical American example of this latter group is the well-known and widely distributed white-footed mouse or 'deer-mouse' (*Peromyscus leucopus*), which is found, in some one of many local races, nearly throughout North America. It is about seven inches long, of which nearly one-half is the tail. The upper surface is fawn-color of some shade, while the under parts and the feet are snowy white. The ears are rather large, and the general form and appearance delicate and graceful. It is found in all sorts of situations and even lives in houses sometimes, like the common mouse. In the Central and Southern States, another species even handsomer than this occurs, known as the golden mouse (*Peromyscus aureolus*). It is golden cinnamon above and yellowish-white beneath. The largest and in some respects the most remarkable of this group is the rice-field mouse (*Oryzomys palustris*), which is ten or eleven inches long, dark grizzly rat-color, and has very harsh pelage. It is said to be more like the true mice than any other American species. The curious little harvest-mouse (*Ochetodon humilis*) of the Southern States is one of the smallest of American quadrupeds, being only four inches long, and half of that is tail. More detailed information will be found under the names of these and other mice, as MEADOW-MOUSE, JUMPING MOUSE, etc. See also accompanying Plate of MICE AND JERBOAS.

Consult authorities cited under MAMMALIA.

MOUSE-BIRD. Any bird of the African genus Colius and family Coliidæ; a coly. These birds have soft gray and white plumage, conical brightly colored bills, and long and narrow central tail feathers, and take their name not only from their ashy plumage, but from their mouse-like activity in scrambling about the branches of trees, where they hang head downward (even sleeping that way), and swing and twist like acrobats. They are enabled to do this by the striking peculiarity of structure in the feet, which have all four toes turned forward. They are fruit-eaters, go about in small bands, but fly poorly, and build their nests in dense shrubs. See Plate of KINGFISHERS, MOTMOTS, ETC.

MOUSE-DEER. See CHEVROTAIN.

MOUSE-EAR CHICKWEED (*Cerastium*). A genus of numerous species of plants of the natural order Caryophyllaceæ, natives of temperate and cold countries throughout the world. Some of them are among common weeds; others, having larger flowers, are occasionally planted in flower borders and on rock-work. The form and hairiness of the leaves of some species have given rise to the popular name.

MOUSE-FISH. One of the tropical frogfishes (*Pterophryne histrio*), common in the Gulf of Mexico, the colors of which are highly variable. It is related to the anglers (q.v.), and its 'bait' is its first dorsal spine, which is bifurcate. The fact that it is frequently found in the fields of sargasso-weed of the Atlantic gives it a second name, 'sargassum-fish.'

MOUSE-LEMUR. A very small woolly lemur of Madagascar, nocturnal and mouselike in its appearance and habits. It is a member of the genus Chirogale (q.v.). See LEMUR; CHIROGALE; Plate of LEMURS.

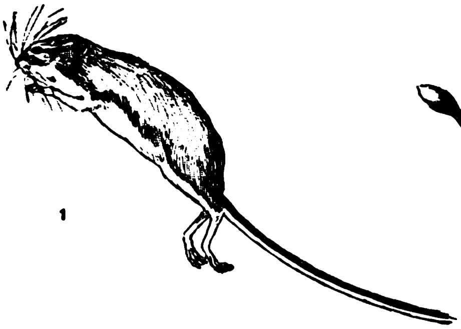
MOUSE TOWER. A tower built on a rock in the middle of the Rhine near Bingen. According to popular tradition, it was hastily erected by Archbishop Hatto I. of Mainz (q.v.) as a refuge from the swarms of mice sent to devour him in punishment for his cruelty to the poor, whom he burned in a granary during a famine. The German name Mäuseturm is probably a popular corruption of Mautturm, toll-tower, for which the structure appears to have been originally intended, and the legend was built about the name. According to some authorities, the building was a watch tower, and the name is referred to Old German *musen*, to spy. It is now used as a signaling station for steamers.

MOUSTERIAN (mo͞o-stē'rĭ-*an*) **EPOCH.** The name applied to a supposed epoch in European prehistoric archæology, so called from Le Moustier, in the commune of Peyzac (Dordogne), France. The epoch is assigned to the beginning of the second Glacial age, and is characterized by distinctly refined stone working, by a cold climate, and by the occurrence of the cave bear, the musk-ox, and the *Rhinoceros tichorhinus* in France. It is well represented also in Belgium, Southern Germany, Bohemia, and Southern England, not only by relics, but by human remains. Consult Mortillet, *Le préhistorique* (Paris, 1900).

MOUTH (AS. *mūþ*, Goth. *munþs*, OHG. *mund*, Ger. *Mund*, mouth; connected with Lat. *mentum*, chin, and ultimately with Skt. *mukha*, face). In an animal, the opening through which food enters the body. Not all animals have mouths, for certain parasitic forms, notably the tapeworm, lack a system for digesting food, and consequently no opening for its entrance is necessary; in such cases the food is absorbed through the surface of the animal. The simplest form of mouth is that which occurs in the Protozoa, where the food is taken into the body through a special opening, which is fairly constant in position and may be surrounded with cilia, sometimes long. Many Protozoa, as well as sponges, have no mouth in any true sense, as the food may be taken in at any part of the body-surface, and therefore the opening has no fixed position and no regular size or form. The mouth of corals, jelly-fish, sea-anemones, and other cœlenterates is simply an opening, almost always central in position, on the lower surface in free-swimming forms, on the upper surface in fixed forms. It is usually circular, but may be flattened, and in one group of jelly-fish it is divided up into four or more, sometimes innumerable, small openings, by the growing together of the lobes on its margin. In the flatworms the mouth is usually circular and is often in the centre of a sucker, but its position is variable, though it is always on the ventral side. It may be near the anterior end of the animal, but it is more often at the centre and is sometimes posterior. Among the various classes of worms the mouth is always anterior, and often terminal, though more often on the lower side of one of the first segments, or, in unsegmented forms, in a similar position. In blood-suckers it lies in the centre of a powerful sucker, and is provided with three chitinous jaws; in vegetable-eating and some carnivorous forms (nemertines) it is a simple opening without jaws, while in such active carnivorous worms, as Nereis, it is provided with powerful jaws. These jaws, however, are clearly modified segmental appendages, and are practically feet which have become modified to assist in seizing food or forcing it into the mouth. In the crustaceans, insects, spiders, and the like (arthropods) the mouth is more or less terminal, and is provided with lateral jaws; sometimes as many as eight pairs of appendages are modified to serve for this purpose. The structure and arrangement of the mouth parts in insects are very complicated, and are of great importance in classification. Roughly they may be grouped as *biting*, when there are freely movable lateral jaws which seize and cut or tear the food; *piercing*, when the various parts are more or less united to form a sharp, piercing instrument, which penetrates animal or plant membranes in search of the fluid food, which is then sucked; *sucking*, when the parts are united to form a suctorial tube, with no adaptation for piercing.

Among echinoderms the mouth shows considerable variety of form. In mollusks the mouth is generally anterior and often ventral, but it is frequently terminal. In the devil-fish, squids, and the like, it is in the centre of the foot. In

MICE AND JERBOAS



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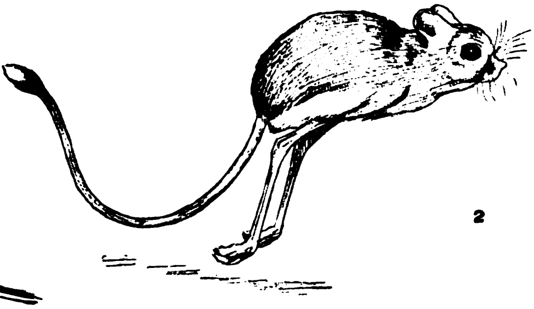

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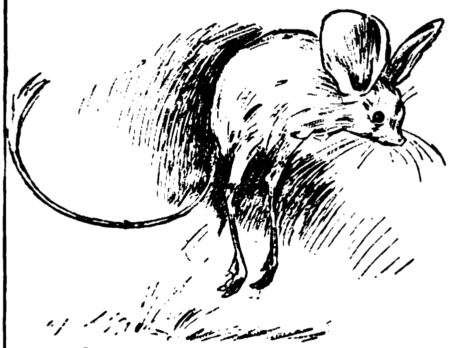

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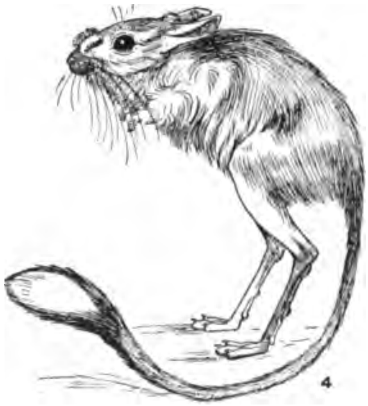

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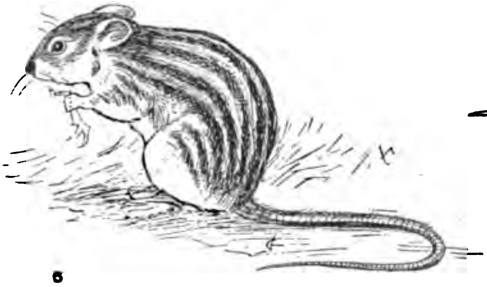

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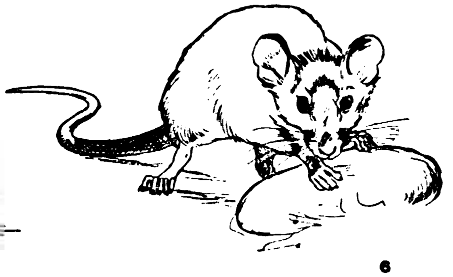

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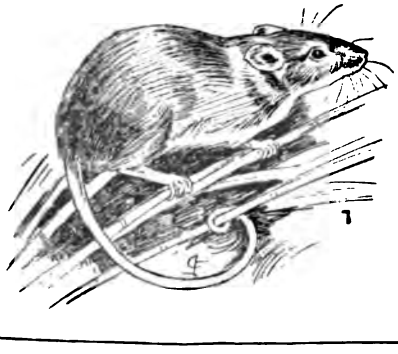

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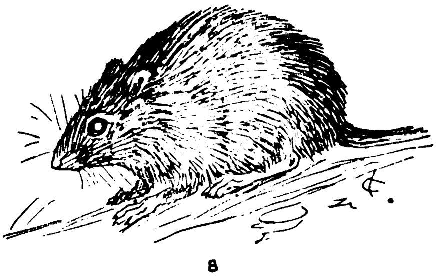

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1. AMERICAN JUMPING MOUSE (Zapus Hudsonius).
2. EGYPTIAN JERBOA (Dipus Ægypticus).
3. YARKAND JERBOA (Euchoreutes naso).
4. KIRGHIZ JERBOA (Alactaga decumana).
5. BARBARY STRIPED MOUSE (Mus Barbarus).
6. HOUSE-MOUSE (Mus musculus).
7. HARVEST-MOUSE (Mus minutus).
8. MEADOW-MOUSE (Microtus Pennsylvanicus).

is practically synonymous with personal property in American and English law. See CHATTEL; PERSONAL PROPERTY; REAL PROPERTY.

MOVEMENT. Several modes of movement are manifested in plants and plant organs. Some of the lower forms (bacteria, algæ, and fungi) exhibit movements of locomotion in certain stages, swimming freely in the water in which they are found. The same is true of the zoöspores and conjugating sexual cells (gametes) of many plants which themselves are not motile. Also, the plasmodia of slime molds show a peculiar flowing of the protoplasm which results in motion from one place on the substratum to another. This is called amœboid movement. Another kind of movement often met with in plants is the so-called hygroscopic movement. This is shown by the awns of certain grasses and other fruits ('seeds') (Fig. 1.), by the valves of many seed-pods (Fig. 2.), by the teeth of the peristome of moss capsules, and by the elaters of liverworts, horsetails (Equisetum), etc. It is a phenomenon having no connection whatever with the vitality of the parts, being due merely to unequal swelling or shrinkage (i.e. warping) of the different tissues by reason of their unequal absorption or loss of water; and this depends on the unlike composition of the material of the cell walls.

From a physiological point of view perhaps the most important form of plant movement is that exhibited by the leaves of the so-called sensitive plants. The best example of this is found in the Mimosa of greenhouses. When this plant is jarred, struck, locally burned, or injured otherwise, its leaves suddenly collapse, even those at a distance from the shock. Its leaves are doubly compound, and in closing the pinnules rise so that the upper faces of opposite ones are brought together, the pinnæ drop downward and forward, while the whole leaf sinks (Fig. 3). If a shock be given to one pinnule, the disturbance there set up, if severe enough, is propagated to other parts of the same leaf and even to other leaves. Almost any portion of the plant can receive a stimulus in this way and pass it on to other regions. The organs which execute the visible response are motor organs (q.v.), cushions of tissue (pulvini) situated one at the base of the leaf, of each pinna, and of each pinnule. Indigenous plants which show this reaction, though not so strikingly, are the common oxalis and different species of Cassia.

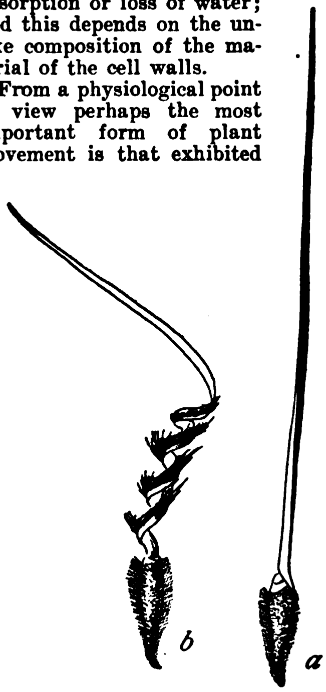

FIG. 1. FRUIT OF ERODIUM GRUINUM.

a, When wet; b, when dry; the straightening of b when tip is caught in grass and the awn absorbs moisture bores the seed containing lower part into the soil, and so 'plants' it.

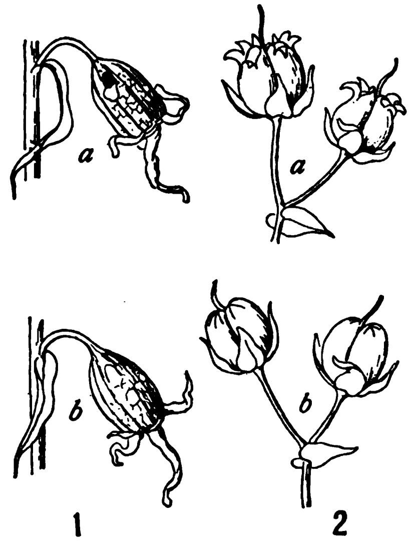

FIG. 2. HYGROSCOPIC MOVEMENTS OF THE VALVES OF SEED PODS.

1, *Campanula rapunculoides*; a, when dry; b, when wet; 2, *Linaria Macedonica*; a, dry; b, wet.

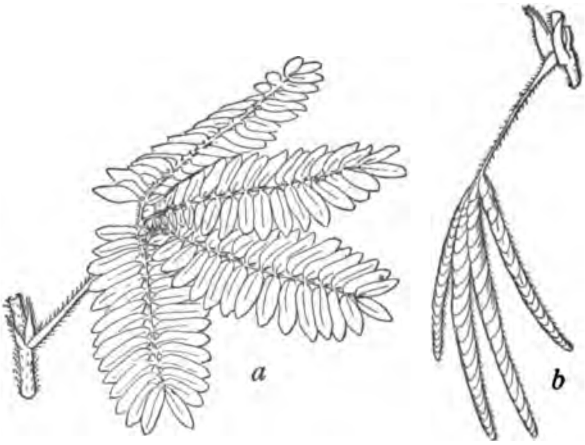

FIG. 3. LEAF OF THE SENSITIVE PLANT (*Mimosa*).
a, In light when undisturbed; b, after shaking.

The so-called 'sleep movements' of leaves of the pea family, Oxalis, etc., are executed by the same motor organs, which, however, are often less perfectly developed. These movements consist of changes in the position of the leaf following variations in the intensity of illumination, so that these leaves have a nocturnal and a diurnal position. Hence the misleading expression 'sleep movements.'

For a discussion of the variety of movements of plants in response to stimulation, which are brought about by unequal growth on opposite sides of an organ, see Chemotropism; Electrotropism; Geotropism in Plants; Heliotropism; Rheotropism; Thermotropism. See, also, Myxomycetes; Locomotion; Rotation; Sleep of Plants.

MOVEMENT. A musical term denoting a division of a cyclical composition. As early as the sixteenth century a number of dances were loosely joined together, the only rule followed being that all should be in the same key, and that the tempo (fast, slow) should alternate. This gave rise to the suite (q.v.), but the modern symphony or sonata was developed from the old overture, which consisted of three parts, a fast one followed by a slow one with the first part repeated. Gradually the three parts were separated and became distinct movements. In the sonata the first movement is always written in a particular form called sonata-form. The different movements are in different (but related) keys. The first and last are always in the same key, which is therefore spoken of as the key of the cyclical composition. When the first movement is in the minor, the last is generally in the relative major. Each movement has its own themes. Occasionally, however, a composer introduces in a later movement (generally the finale) a theme from a former movement. The number of movements depends upon the character of the composition. In works written in sonata-form the usual number is three for sonatas and four for symphonies. In suites the number varies from four to eight. See Form; Overture; Sonata; Suite; Symphony.

MOVEMENT, Perception of. Psychologically a movement is a consciousness of a continuous change of position. It is an idea which is intimately bound up with notions of space and time, or, to speak more strictly, it is an idea which, from the point of view of system, must be treated both as an extensive and as a temporal idea, since every movement must possess a certain extension (q.v.) and a certain rate or duration (q.v.). Our idea of movement is structurally complex. It consists partly of ideas of an object in different positions, partly of certain sensations set up in the body. These sensations, both because they are easily aroused by movements, and because they serve as the most effective basis for the estimation of movements, have by many writers been grouped together under the terms 'movement sensations,' 'kinæsthetic sensations,' or, more simply, as the 'muscle sense' (q.v.). But a classification of sensations in terms of the stimuli which evoke them, or in terms of the objective processes for which they come to stand, is both inadequate and unsatisfactory; to speak of sensations of 'movement' is as unwarrantable as to speak of sensations of 'time,' 'weight,' 'resistance,' 'space,' etc. As a matter of fact, too, we are now able to isolate the components of the idea of movement psychologically and to assign their dependency upon definite bodily processes. There are three qualitatively distinct *sensations* within the 'muscle sense': (1) the *muscle* sensation proper, (2) the strain or *tendinous* sensation, (3) the joint or articular sensation. The latter alone is concerned in our knowledge or estimate of position, and change of position, or movement, of any member of the body. The actual liminal excursion has been found to be least in the case of the larger joints (0.22° to 0.60° for shoulder, hip, and elbow), greatest for the smaller joints (0.50° to 1.30° for knee, finger, and ankle).

But our ideas of the extent of movement are not limited to those which refer to members of our body; we can also estimate the extent of the movement of an object felt (skin) or of an object seen (eye). A stimulus moving over the skin excites end-organs of pressure which possess different 'local signs.' If the first local sign has not lapsed from consciousness when the last is reached, we are able to estimate the extent of the movement in purely cutaneous terms; otherwise we may make judgments in visual terms. The least noticeable extent of cutaneous movement depends upon the place stimulated, the intensity of the pressure, and the rate and direction of the motion. On the forehead it may amount to 10 mm. A very slow movement may pass unnoticed. Movements lengthwise of a limb are less readily noted than movements crosswise, on account of the distribution of the nerve endings in the skin. Movement is often noted before direction of movement, either because the starting point is forgotten or because the judgment 'movement' is more easily aroused than the judgment 'movement in this direction.' The visual idea of extent of movement may be variously formed. (1) If the eyes remain fixed while the object moves across the visual field, the estimation results from the stimulation of different local signs in a manner analogous to that of the purely cutaneous estimation. The least noticeable amount of movement is probably about equal to the 'minimum visible.' (See Extension.) (2) If the fixation point of the eyes follows the moving object, the estimation of the extent of movement of the object is made in terms of the strain, pressure, and articular sensations evoked by the movements of the eyes in their sockets, of the head upon the shoulders, or of the body as a whole. Without the aid of some fixed point of reference, such as is actually used in 'eye measurement' (see Extension) and convergence, estimations of this second type are extremely uncertain, on account of the occurrence of unnoticed movements of the eyes themselves.

Turning to the temporal aspect of the perception of movement, we can say in general that quick movements are more readily noted than slow, whether they appeal to joint, skin, or eye. On the skin a uniform rate in the stimulus is not perceived as a uniform rate in sensation, for a given movement appears more rapid where localization is more accurate. The slowest perceptible visual movement is at the rate of 0.0028 mm. per second. In discriminating between two different rates, the optimal speed is rather slow, because rates of movement which are at all quick are confused by the persistence of the excitation in the form of after-images.

Finally, rate of movement or, more strictly, a change in the rate of movement of the body as a whole, is perceptible, although no estimation of the extent of such a movement is possible. Upon vehicles, like elevators, boats, etc., where there is little jar, it is easy to observe that, once the speed is uniform, it is impossible to perceive any motion whatsoever; acceleration or diminution of this rate, however, sets up certain sensations due to the inertia of the body, and perhaps, too, other sensations mediated by the semicircular canals. See Static Sense.

Bibliography. Delabarre, *Ueber Bewegungsempfindungen* (Freiburg, 1891); Fullerton and Cattel, *On the Perception of Small Differences* (Philadelphia, 1892); Goldscheider, *Gesammelte Abhandlungen*, vol. ii. (Leipzig, 1898); Külpe, *Outlines of Psychology* (London, 1895); Titchener, *An Outline of Psychology* (New York, 1899); id., *Experimental Psychology* (ib., 1891); Wundt, *Grundzüge der physiologischen Psychologie* (Leipzig, 1893); W. James, *Principles of Psychology* (New York, 1890).

MOVEMENT CURE. A hygienic and therapeutic system for the preservation as well as the recovery of health, introduced by Pehr Henry Ling (born in 1766), a native of Smaland, Sweden. It is a modified form of gymnastics, being systematized and specially adapted to the treatment of invalids in a reduced condition, and possesses, in many respects, advantages over ordinary gymnastics. The system consists essentially in carefully prescribed movements of the whole body or of individual groups of muscles, either with or without resistance. Ling's methods obtained wide recognition both in Europe and America. In Sweden a Royal ordinance was issued for the establishment of an institution devoted to the method of exercise. See Ling, P. H.

Various modifications of this system were made from time to time, and massage and movement were gradually combined in the more modern schemes of mechano-therapy, which are designed merely to correct morbid conditions of the body by means of active or passive movements. "These movements are active when they are executed by the patient's own volition, and passive when performed upon his body or with it or upon parts of it by the will of another."

Mechano-therapy has probably reached its highest development in the ingenious inventions of Dr. Gustaf Zander, of Stockholm. About the middle of the last century Zander introduced the first of these ingenious contrivances for administering the well-known 'Swedish movements.' From crude beginnings he developed his 'system' until he had perfected over seventy varieties of apparatus, some of them weighing nearly a ton, by which the most delicate child and the most unwieldy adult can be treated with equal ease and advantage. These machines range from a simple apparatus for moving a single joint or group of muscles to complicated mechanisms which closely imitate the motions of the body performed in horseback or even camel riding—the latter technically known as 'trunk circumduction.' Zander institutes have been established in all the important cities and health resorts in Europe, and there is one in New York City.

Mechano-therapy is not designed, nor should it be resorted to, as a substitute for the natural, unconscious exercise in the open air, such as is obtained in the various outdoor recreations, but is applicable to those suffering from general weakness, or from affections of particular portions of the body, such as local paralysis or joint affections, which would render general movement painful, harmful, or impossible. Another large class of persons who are likely to find benefit are those who are afflicted with deformities, due either to habit or disease. In such cases the orthopedist often finds a valuable ally in the movement cure. The subject is intimately related to massage (q.v.). For fuller information, consult: Grafstrom, *Mechano-Therapy* (Philadelphia, 1899), and Nissen, *A B C of the Swedish System of Educational Gymnastics* (Philadelphia and London, 1891).

MOVERS, mō'vērs, Franz Karl (1806-56). A German Orientalist. He was born at Koesfeld, Prussia, and was educated at Münster and Bonn. After being settled for six years over a church in Berkum, he was in 1839 appointed professor of theology in the University of Breslau, where he remained until his death. His exhaustive and scholarly treatise on the Phœnicians, *Die Phönizier* (vol. i., 1841; vol. ii., 1849-56), is his best-known work. He also wrote *Kritische Untersuchungen über die biblische Chronik* (1834).

MO'VILLE. A seaport, market-town, and summer bathing resort, in County Donegal, Ireland, on Lough Foyle, 17 miles north-northeast of Londonderry (Map: Ireland, D 1). It is noted as a calling station of the transatlantic mail steamers from New York to Glasgow. Population, 1500.

MOVING PLANT (*Desmodium gyrans*). An East Indian plant of the natural order Leguminosæ, remarkable, as are also some other species of the same genus, for the spontaneous motion of the leaves, which are ternate, the lateral leaflets much smaller than the terminal one. These lateral leaflets are in constant motion, being elevated by a succession of little jerks till they meet above the terminal leaflet, and then moving downward by similar rapid jerks. The terminal leaflet does not remain absolutely at rest, although its movements are not like those of the lateral ones. See Movement.

MOWAT, mō'at, Sir Oliver (1820-1903). A Canadian statesman, born in Kingston, Ontario, of Scottish parentage. In that city and in Toronto he was educated. He became a barrister (1841), practiced his profession in Toronto, was made Queen's Counsel in 1856, and the same year was a commissioner for consolidating the statutes of Canada, of Upper Canada, and afterwards of Ontario. He was a Liberal member of Parliament for South Ontario in 1857-64, a Cabinet minister in 1858, Postmaster-General in 1863-64, and Vice-Chancellor of Ontario from 1864 until 1872, when he became Prime Minister of that province and its Attorney-General, as well as a member of Parliament for North Oxford. These positions he held until 1896, when he was made Minister of Justice in the Dominion Cabinet and leader of the Senate. In 1897 he was appointed Lieutenant-Governor of Ontario.

MOWBRAY, mō'brā, Henry Siddons (1858—). An American figure painter, born of English parentage in Alexandria, Egypt. He came to the United States at an early age. In 1878 he went to Paris, where he remained several years, and became a pupil of Bonnat. He is well known as an illustrator. His technique is clever and his color well handled and brilliant. The most important of his works are "Aladdin," "Rose Harvest," "Arcadie," "Scheherezade," and "Evening Breeze."

MOWBRAY, Robert de, Earl of Northumberland. See Northumberland.

MOWER. See Reapers, Reaping.

MOWER, mō′ẽr, Joseph Anthony (1827-70). An American soldier, born at Woodstock, Vt. He fought in the ranks during the Mexican War, but rose, in 1861, to be a captain in the Regular Army. During the first year of the Civil War he took part in the military operations in Kentucky and Tennessee, rendering conspicuous service. In November, 1862, he was promoted to brigadier-general, and was placed in command of a brigade before Vicksburg (1863). In 1864 he was promoted to the rank of major-general of volunteers and commanded a division in Louisiana. Later he accompanied Sherman in the Atlanta campaign. Upon the reorganization of the army at the close of the war, he was commissioned colonel of the Thirty-ninth Infantry and received command of the Military Department of Louisiana.

MOWRY, mō′rĭ, William Augustus (1829—). An American educator and historical writer, born at Uxbridge, Mass. He studied at Phillips Academy and at Brown University, and for many years was engaged in educational work in Rhode Island and Massachusetts. In 1884-85 he was editor of the *Journal of Education,* and from 1886 until 1891 of *Education.* Among his historical publications are: *A History of the United States* (1876); *First Steps in the History of Our Country* (1898); *American Inventions and Inventors* (1900); and *Marcus Whitman and Early Oregon* (1901), a work which aroused considerable controversy.

MOXA. The downy hairs of Artemisia Moxa, a plant of the natural order Compositæ; also the plant itself. The Chinese and Japanese use this substance as a cautery and a counter-irritant.

MOX′OM, Philip Stafford (1848—). An American clergyman, born at Markham, Canada. He came to the United States at an early age, and a year after the outbreak of the Civil War joined the Federal Army. In 1875 he entered the Rochester Theological Seminary, where he remained three years, then entered the University of Rochester, where he graduated in 1879. He was pastor of the First Baptist Church in Cleveland, Ohio, from 1879 until 1885, and of the First Baptist Church in Boston from 1885 until 1894, when he took charge of the South Congregational Church in Springfield, Mass. His publications include: *The Aim of Life* (1894); *From Jerusalem to Nicea: The Church in the First Three Centuries* (1895); and *The Religion of Hope* (1896).

MOXOS, mō′hōs, Mojos, Mohos, or Musu, mo͞o′so͞o. A noted group of tribes occupying the Province of Moxos, on the upper region of the Mamoré and Beni rivers, in Northeastern Bolivia, and speaking a language of the widespread Arawakan stock (q.v.). By submitting themselves to the Inca Yupanqui they became incorporated with the Peruvian Empire (see Quichua), and an Inca colony was established in the province. In 1564 they repelled a Spanish invasion of their country, but in 1674 readily accepted the teaching of the Jesuit missionary Baraza, who worked among them for nearly thirty years, and succeeded in collecting them into fifteen mission villages, at the same time teaching them agriculture, weaving, and carpentry. Moxos missions grew and flourished, other neighboring tribes being also gathered into them, until in 1726 their fifteen villages numbered 30,000 Christian Indians, representing nearly thirty tribes and at least nine distinct languages, the Moxos proper predominating. With the expulsion of the Jesuits in 1767 the mission period came to an end, but the former converts maintained themselves as a civilized population and exist to-day in practically undiminished numbers. Physically they are of rather light complexion, with intelligent and handsome features. They are grave and thoughtful, honest, and devoutly religious, peaceable and civil, but carrying always an air of independence. They are successful farmers, expert boatmen, and skillful with the lariat.

MOYABAMBA, mō′yȧ-bäm′bȧ. A town of Peru. See Moyobamba.

MOYA Y CONTRERAS, mō′yȧ ē kōn-trā′rȧs, Pedro de (c.1520-91). A Spanish prelate and administrator, born in the Diocese of Cordova. Already known as an Inquisitor in Murcia, he was sent to Mexico, became Archbishop of the City of Mexico, and established the Inquisition there in 1574. For one year, 1584-85, he was also Viceroy. After his return to Spain in 1591 he was appointed president of the Council of the Indies.

MOYOBAMBA, mō′yō-bäm′bȧ, or **MOYABAMBA.** The capital of the Department of Loreto, Peru. It is situated in the northwestern part of the department, on the River Mayo, and on a plateau of loose, sandy material, which the floods wash out, forming large ravines penetrating the town (Map: Peru, B 5). The town consists mainly of isolated houses thatched with palm leaves and scattered over a large area. The principal industry is the manufacture of Panama hats. Moyobamba has some trade with Brazil by way of the Amazon, with which the Mayo communicates through the Huallaga, but otherwise it is practically cut off from communication with the rest of Peru. Population, in 1895, 10,000.

MOYSE, mwäz, Hyacinthe (1769-1801). A Haitian revolutionist, nephew of Toussaint L'Ouverture. His success at La Croix des Bouquets, whence he drove the whites to Port-au-Prince, brought on a general revolt in the south and west. In 1794 he put himself under the command of Toussaint L'Ouverture, and with him drove out the English. In 1801 he became commander of the Army of the North in the attack on Spanish Santo Domingo. At the close of the same year he was accused of instigating a revolt in the north; was arrested and court-martialed; and with twenty-three of his men was blown from the cannon mouth.

MOZAMBIQUE, mō′zam-bēk′. The former name of Portuguese East Africa (q.v.), now restricted to the northeastern coast of that colony.

MOZAMBIQUE. The capital of the Portuguese Province of Mozambique, situated on a small coral island separated by a strait a mile wide from the east coast of Africa, at the narrowest part of the Mozambique Channel (Map: Africa, J 6). Its principal buildings are the Governor-General's palace, the custom-house, the hospital, and the cathedral. Mozambique was formerly a centre for the slave trade and has declined in importance since that era. There is some traffic in rice, gum, gold dust, and timber; the shipping amounts to 150,000 tons annually. The population, in 1900, was 5500, of whom 285 were Europeans, 220 Asiatics, and the rest natives.

MOSAMBIQUE CHANNEL. The body of water between the east coast of Africa and the island of Madagascar (Map: Africa, J 6). It is about 1000 miles long, and its width ranges from 200 miles at the middle to nearly 600 miles at either end. The principal river flowing into it is the Zambezi. The Comoro Islands lie in the north entrance to the channel, and on the west shore are the ports of Beira and Mozambique.

MOZARABIC LITURGY (Sp. *Mozarabe*, from Ar. *Mustarib*, from *ta'arrab*, to become an Arab, from *'arab*, Arab), or GOTHIC LITURGY. The ancient liturgy of the Church of Spain. The former title is derived from the name applied to the Christian inhabitants after they were subjected to the Arab domination; the latter is applied to it because it was most widely used during the Gothic period. Its main structure indicates an Eastern origin; a plausible theory regards it as having been brought by the Goths from Constantinople or Asia Minor in the fifth century, and then revised by Saint Isidore of Seville. In the second half of the eleventh century the Roman liturgy began to supersede it; but this change was stubbornly resisted. In the end six churches in Toledo were assigned to the local rite. Cardinal Ximenes made special efforts at the beginning of the sixteenth century to prevent the liturgy from falling into oblivion, and founded a chapel expressly for its use. He also caused a number of learned priests to collate the existing manuscripts and published a revised edition [illegible]. The [illegible] [illegible] and the [illegible] on the other make its [illegible] to liturgical scholars. [illegible] [illegible] [illegible] [illegible]

MOZART. [illegible]

MOZART [illegible]

instructions from her father. When he was only five years old he composed little minuets and was discovered at work on a concerto. At six he had become so proficient as a performer on the piano, and his sister's progress also had been so great, that their father took them on a tour of the leading capitals of Europe, everywhere meeting with notable receptions.

In 1768 the elder Mozart again took his son to Vienna. There this boy of twelve conducted a solemn mass of his own composition, and his operetta *Bastien und Bastienne* was given at a private performance. After a brief sojourn in Salzburg, where Wolfgang was appointed concertmeister to the Archbishop, his father took him to Italy. In Rome he heard the famous *Miserere* of Allegri, which was so jealously guarded by the authorities that musicians were forbidden to copy it under pain of excommunication. After twice hearing it young Mozart wrote it out by ear. His compositions and his performances made such a profound impression that the Pope created him a Knight of the Golden Spur, and at Bologna he was elected a member of the Philharmonic Society. At Milan he received a commission to compose an opera, the result being *Mitridate re di Ponto*, which was brought out in December, 1770, and had twenty consecutive performances. His knowledge of the Italian style of singing was greatly broadened through this Italian trip and especially through his acquaintance with the male soprano Farinelli, the greatest singer of his time.

After another brief sojourn in Salzburg he returned in August, 1771, to Milan, where he brought out his serenata *Ascanio in Alba*, in honor of the nuptials of Archduke Ferdinand, a son of Maria Theresa. The death of Archbishop Sigismund at Salzburg was a severe blow to the Mozarts, for his successor, Hieronymus, for whose installation Mozart composed *Il sogno di Scipione* (The Dream of Scipio), showed little appreciation of his genius. Two other Italian stage works, *Lucio Silla* and *La finta giardiniera*, were produced in Milan and the latter also in Munich, and on the occasion of Archduke Maximilian Francis's visit to Salzburg in 1775 he brought out *Il re pastore*.

Disgusted with the obstacles which Hieronymus constantly threw in his way, Mozart, accompanied by his mother, again started out on his travels in September, 1777. In Mannheim he met the [illegible] [illegible]

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WOLFGANG AMADEUS MOZART

an invitation to compose an opera for Munich. *Zaide* was never finished, but the result of the Munich invitation was the opera *Idomeneo*, which opened a new epoch in his life, being his first masterpiece in the grand style. During a visit to Vienna in 1781, Mozart terminated once for all his relations with the boorish Hieronymus, who had grossly insulted him. He took up his residence with the Webers, who were now in Vienna. His father strongly objected to this, and he moved his lodgings. But he had fallen in love with Constanza, and in August, 1782, they were married. Notwithstanding the grinding poverty of their lot, their marriage was a happy one, for their mutual love atoned for the hardships which constantly confronted them. His marriage took place shortly after the production in Vienna of his opera *Belmonte und Constanza, oder Die Entführung aus dem Serail*. The Italian musicians of Vienna, headed by Salieri, used all means in their power to have the production fail, but it was triumphantly successful. Gluck attended one of the performances and was enthusiastic in his approval of it. Nevertheless, from this time on Mozart was constantly met by the hostile machinations of the Salieri party, which greatly imbittered his career.

The success of the opera led the Emperor to order a new opera buffa of Mozart, who, in connection with its composition, was brought together with Lorenzo da Ponte. The result was *Le nozze di Figaro*. Beaumarchais's work on which the libretto is based had been forbidden in Vienna on the ground of its immorality. Mozart, however, went to work on the score, and when part of it had been composed, Da Ponte found opportunity to have the Emperor hear it, with the result that he ordered its completion and performance. Besides this he gave the composer an order for a musical comedy, *Der Schauspieldirector*, for a garden fête at Schönbrunn. Throughout the preparations for the production of *Figaro* Salieri and his adherents were active in opposition, and the first performance, in May, 1786, came near being a failure. In January, 1787, however, it was received with immense enthusiasm at Prague, where Mozart became a popular idol. The concerts which he gave there were immensely successful, and he was engaged to write another opera. Da Ponte suggested *Don Giovanni* to him, and in April placed the libretto of the work in his hands. By September Mozart and his wife and Da Ponte were in Prague, rehearsals were taken in hand, and late in October *Don Giovanni* was produced, and was even more successful than *Figaro* had been.

During a tour undertaken in 1789 with Prince Carl Lichnowski, the destination being Berlin, Mozart stopped en route at Leipzig, where he played in the Thomaskirche and was deeply impressed with Bach's motets. In Berlin his success was such that Frederick William II. offered him a position as kapellmeister with a salary of 3000 thalers. But a few words of reassurance from the Austrian Emperor, accompanied with an order for a new opera, coupled with his own strong feeling of loyalty, unfortunately induced him to decline the King's offer, the best he had had. The opera was *Così fan tutte*, which was produced in Vienna in January, 1790. After a visit to Frankfort to attend the coronation of the new Emperor, Leopold II., he returned to Vienna. Meanwhile his old acquaintance Schikaneder was managing a theatre in Vienna. The affairs of the house being precarious, he thought to better them by producing an opera by Mozart, and so applied to him in the spring of 1791 to write a 'fairy' opera—'a piece that would attract.' Schikaneder himself furnished for Mozart the libretto to the *Zauberflöte* (*The Magic Flute*). The work was interrupted by an order to compose an opera for the coronation of Leopold as King of Bohemia at Prague, in 1791. It was *La clemenza di Tito*, written in a few weeks by a man already much overworked. It did not make much impression. *The Magic Flute* was brought out in September, 1791, under the composer's own direction, and with distinguished success.

But Mozart's constant struggle with intrigue and pecuniary necessities, and the strain to which he had subjected himself in order to meet these by constant work, had begun to tell upon him, and when, even before he had finished *The Magic Flute*, he received a mysterious commission to compose a requiem, he felt that he was writing his own swan song. It is now known that the commission came from a Count Walsegg, whose intention was to have the work performed as his own, and who therefore kept his identity from Mozart. So fixed became Mozart's idea that he must complete his *Requiem* before death overtook him that even when his wife drove out with him, so that he might be in the open air, he insisted on taking his portfolio of music paper along. It was on one of these drives that his melancholy led him to express the belief that he had been poisoned at the instigation of his Italian rivals, a suspicion which does not, however, seem to have been borne out. Feeling that he would not live long enough to finish the *Requiem* himself, he sketched out the principal features of the uncompleted part, leaving them for his pupil Süssmayer to fill out. The night before his death he gathered some of his favorite singers about him, had the score of the *Requiem* brought to his bed, and the work was sung until the "Lacrimosa" was reached, when Mozart burst into tears and closed the score. His death came at one o'clock in the morning of December 5th, and an eyewitness says that his last motion was an endeavor to imitate the kettledrums in the *Requiem*.

Although much of Mozart's music has been forgotten, he remains to the public one of the most fascinating figures in musical history. His buoyant nature, which seemed to override misfortune and intrigue and to laugh at poverty, has made him a type of the musical bohemian. Mozart is of greatest importance as an operatic composer, and as such he still ranks among the masters of music. His admirable handling of the human voice and his keen appreciation of dramatic effect have kept *Figaro, Don Giovanni*, and *The Magic Flute* in the repertory from the day they were produced. His vocal numbers not only are fine as music, but, being written with a knowledge of the voice, can be sung with telling effect by accomplished singers. With Gluck, Mozart lies at the foundation of German opera. He also was a prodigious worker in other departments of music. He produced no less than forty-one symphonies, the best known of which are those in *E flat Major* (the first symphony to employ clarinets), the *Jupiter* and the *G Minor*, church music, many works of chamber music, pianoforte compositions, and songs.

Bibliography. Jahn, *Life of Mozart*, translated by Townsend, with a preface by Grove (London, 1882), the standard work; Nohl, *Life of Mozart*, translated by Lalor (Chicago, 1893), an excellent short biography; *The Great German Composers* (New York, 1878); Köchel's *Chronologischthematisches Verzeichnis sämtlicher Tonwerke W. A. Mozart's* (Leipzig, 1862; suppl. 1889); *Letters*, translated from the collection of Ludwig Nohl by Lady Wallace (Boston, 1864).

MOZDOK, mŏz-dŏk′. A town in the Caucasian Territory of Terek, Russia, situated on the left bank of the Terek, 58 miles north of Vladikavkaz (Map: Russia, F 6). It has a number of Armenian and Greek churches, of which that of the Assumption attracts many pilgrims. The educational institutions include four Mohammedan schools. Gardening and the manufacturing of wine and spirits are the chief occupations. The town was founded in 1762. Population, in 1897, 14,583, consisting chiefly of Kabardins, Georgians, and other Caucasian tribes, Armenians, and about 4000 Russians.

MOZIER, mō′zhĕr, Joseph (1812-70). An American sculptor. He was born at Burlington, Vt., August 22, 1812, and in 1831 settled in New York, where he established himself as a merchant. In 1845 he retired from business to devote himself to art, and shortly after went to Italy. He studied sculpture for several years at Florence, and then went to Rome, where he spent the greater part of his professional career. Among his best works are: "Esther;" the "Wept of Wishton-Wish;" "Tacite" and "Truth," in the Mercantile Library, New York; the "White Lady of Avenel" (1866); "The Peri;" "Pocahontas;" the "Prodigal Son," Philadelphia Academy; and "Rizpah," one of his latest works. He died at Faids, Switzerland, October, 1870.

MOZLEY, mōz′lĭ, James Bowling (1813-78). An English clergyman. He was born at Gainsborough, Lincolnshire, and was sent in early youth to school at Grantham. In 1830 he was admitted to Oriel College, where he came into intimate association with the leaders of the Oxford Movement—Newman, Pusey, Keble, and Hurrell Froude. With this movement he became formally allied, though he was never among the more dogmatic of its promulgators. In 1834 he took his degree, and shortly thereafter won the Chancellor's prize for an English essay on *The Influence of Ancient Oracles on Public and Private Life*. He remained at Oxford, studying theology under the direction of Pusey and Newman, as fellow of Magdalen, until 1865, during which period he contributed, first to the *British Critic* and later to the *Christian Remembrancer*, articles suggested by the Church movement of the time. He was in full accord with Anglican teachings until the Gorham controversy of 1850 on the subject of baptism led him to attempt a reconciliation of the Christian tradition about baptism with the teachings of Calvinistic theology. His contributions to this subject were: *A Treatise on the Augustinian Doctrine of Predestination* (1855); *The Primitive Doctrine of Baptismal Regeneration* (1856); and *A Review of the Baptismal Controversy* (1862). He removed from Oxford on his marriage in 1856, and became rector of Old Shoreham, Sussex. In 1869 Gladstone appointed him Canon of Worcester, and two years later nominated him regius professor of divinity at Oxford, which post he held until his death. In addition to the works already mentioned, he published his Bampton Lectures on *Miracles* (1865) and *Ruling Ideas in Early Ages* (1877). His letters, with biographical introduction, were edited by his sister (London, 1884).

MOZLEY, Thomas (1806-93). An English clergyman and journalist. He was born at Gainsborough, and attended Charterhouse School. In 1825 he entered Oriel College, Oxford. He became fellow of Oriel, and enjoyed the intimate friendship of the leaders of the Oxford Movement, the personal side of which he has given in his *Reminiscences, Chiefly of Oriel College and the Oxford Movement* (1882). In 1831 he entered the active ministry, but returned to Oriel in 1835 to assume the office of junior treasurer. In 1836 he resigned his fellowship, and became rector of Cholderton, Wiltshire, where he remained eleven years, varying his pastoral duties by writing for the *British Critic*. In 1841 he succeeded Newman as editor of that journal. In 1844 he began writing for the *Times* (London), and in 1847 he resigned his living and removed to London, formally entering upon a long literary career. Once again, in 1868, he returned to the work of the Church, but the following year found him in Rome as correspondent for the *Times*. From 1880 to 1893 he resided at Cheltenham, engaged in literary pursuits.

MOZOOM′DAR, Protap Chunder (c.1840—). A Hindu reformer and theist. He was born at Calcutta, India; studied in the native college there; was led by conviction to join the Brahmo-Somaj (q.v.), and became the editor of the *Theistic Quarterly Review* and the *Interpreter*, published in Calcutta in the interests of the association. In 1874 he visited England, and in 1883 the United States, where he was welcomed by the leading men of several Christian denominations. During his stay he published a book entitled *The Oriental Christ*, and on his second visit he read a paper before the World's Parliament of Religions on the *Brahmo-Somaj*, published in Chicago, 1893. He is the author of the *Life and Teachings of Keshub Chunder Sen* (1887), and has contributed also to British and American periodicals.

MOZYR, mô-zĕr′. A town in the Government of Minsk, Russia, situated on the right bank of the Pripet, 204 miles southeast of Minsk (Map: Russia, C 4). It manufactures leather, beer, and hardware, and trades in grain, animals, and lumber. Population, in 1897, 10,762, including about 5000 Jews.

MPONGWE, m'pŏn′gwâ. A Bantu-speaking people living about the Gabun estuary, in French equatorial Africa. Formerly powerful, they have been broken up by the movements of other tribes, especially by the Fans. Missionary work has been carried on among the Mpongwe for a long time, and their language, which has been reduced to writing through these efforts, is peculiarly rich, so that it has been adopted by neighboring tribes, and thus forms a trade language. The Mpongwe are above the average height and well developed; their hair is woolly, and the skin of light chocolate color. In character they are boastful and indolent. Agriculture and trading are their chief pursuits. As merchants they are untrustworthy, being known as clever swindlers. The political unit is the clan, ruled over by the head men. The so-called king is chosen from the head men by lot in a solemn conclave, and is reviled and mistreated before being proclaimed.

In arts the Mpongwe are at a low level. They are said to cook their food by boiling it in earthen vessels, apparently not being familiar with the method of roasting. As canoe-makers they are skillful, and are admirable boatmen. The canoes, usually 60 feet long, are hollowed out by fire and transported often several miles to water. Around the stations the Mpongwe are nominally Christians, but the isolated natives retain their pagan religion, with its fetish idols, charms, and belief in witchcraft.

MRICCHAKATIKA, mrĭch'ȧ-kä'tē-kä' (Skt. *mṛcchakaṭikā*, clay cart). The title of a Sanskrit play of the sixth century attributed to a king named Sudraka, but probably written for him by the poet Dandin (q.v.). The play, which is in ten acts, is one of the most exquisite of all the Sanskrit dramas. The scene is laid at Ujjain (q.v.), and its central theme is the noble love of the rich courtesan Vasantasena for a merchant named Carudatta, who has been reduced to poverty. Pursued by Sansthanaka, the King's brother-in-law, Vasantasena seeks refuge in Carudatta's house, and the pair fall in love. Escorted to her home by the merchant, she leaves her jewels with him on the pretext that she dares not keep them about her. The gems are stolen by a Brahman who is in love with Vasantasena's maid, the soubrette of the play. When Carudatta perceives this loss, he and his wife sell all that remains to them and thus make good the treasure; but the Brahman, on the advice of his sweetheart, surrenders the stolen jewels to their owner, and Vasantasena thus discovers the depth of Carudatta's love for her. In the merchant's home she sees his little son weeping because he can have but a clay cart, while a neighbor's child has one of gold. She heaps the toy full of jewels for him, and this incident, one of true pathos, gives the play its name. Again pursued by the brother-in-law of the King, she repulses him. Enraged, he chokes her into insensibility, and leaves her for dead, covering her with leaves. She is, however, discovered and revived by a Buddhist monk whom she had saved from a gambling quarrel. Sansthanaka accuses Carudatta of Vasantasena's murder. He is condemned and led forth to execution. Just as the sword is raised, Vasantasena appears, her lover is saved, and, as polygamy is possible in the Hindu drama, the lovers are united. As a picture of Hindu life of the period, luxurious and corrupt, but with noble and unselfish motives, the *Clay Cart* is of great value. The *Mricchakatika* has been edited by Stenzler (Bonn, 1847), Godabole (Bombay, 1896), Vidyasagara (Calcutta, 1898), and Parab (Bombay, 1900). It has been translated into German by Böhtlingk (Saint Petersburg, 1877), Fritze (Chemnitz, 1879), and Kellner (Leipzig, 1894); into Dutch by Vogel (Amsterdam, 1897); and into English by Wilson in his *Select Specimens of the Theatre of the Hindus* (3d ed. London, 1871). Consult Lévi, *Théâtre Indien* (Paris, 1890).

MUCH ADO ABOUT NOTHING. A comedy by Shakespeare, produced in 1597-98 and printed in 1600. It was probably a recast of *Love's Labour's Won* (1590), and was known as *Benedick and Beatrice* (1613). The story of Hero and Claudio is taken probably from the tale of "Ariodante and Ginevra" in Ariosto's *Orlando furioso*, which was translated by Beverly, and dramatized as *Ariodante and Geneuora* (1582). It is found also in Bandello's novels, and in a German play by Jacob Ayrer, *The Beautiful Phœnician* (1596). This contains some features not in the novel but used by Shakespeare, pointing to some unknown intermediate source. Otherwise the comedy is quite original, especially the inimitable Dogberry.

MUCILAGE (Lat. *mucilago*, moldy, musty juice, from *mucere*, to be moldy, from *mucus*, slime; connected with Gk. *μύξα*, *myxa*, slime, Lat. *mungere*, to blow the nose, Skt. *muc*, to release). A name applied to aqueous solutions or jelly-like preparations of vegetable gums or of dextrin (qq.v.). An excellent mucilage is made by dissolving gum arabic in hot water, filtering the solution and adding some antiseptic, to prevent fermentation and the formation of mold. The United States Pharmacopœia contains four mucilages, including *Mucilago acaciæ* and *Mucilago tragacanthæ*.

MUCIN. See MUCOUS MEMBRANE.

MUCIUS SCÆVOLA, mū'shĭ-ŭs sĕv'ō-lȧ. See PORSENA.

MÜCKE, mụk'*e*, HEINRICH (1806-91). A German historical painter, born at Breslau, pupil of Schadow, first at the Berlin Academy, then at Düsseldorf, whither he had followed him. In 1829 he painted with Lessing in Castle Heltorf, near Düsseldorf, a cycle in fresco of episodes in the life of Frederick Barbarossa, and after a visit to Italy in 1833 executed a series of religious and historical paintings, chief among which were: "Saint Catharine Borne by Angels to Mount Sinai" (1836), a composition of which he subsequently had to paint five replicas, "Saint Elizabeth Distributing Alms" (1841), both in the National Gallery, Berlin; "The Virgin and Child, with David, Saint John, and Saint Aloysius," a large fresco in Saint Andrew's Church, Düsseldorf; "Chriemhilde's Dream;" "Saint Ambrose and Emperor Theodosius at Milan;" "Introduction of Christianity into the Wupper Valley," fresco in City Hall, Elberfeld; and a cycle depicting the "Life of Saint Meinrad, Count of Zollern," at Sigmaringen.

MUCK'ERS (Ger. *Mucker*, sulky person, hypocrite, from MHG. *muckzen*, *muchzen*, from OHG. *muckazzen*, to mutter; probably connected with OIr. *for-muigthe*, hidden). The popular but opprobrious name, meaning that they were hypocrites, of an extraordinary sect which sprang up at Königsberg, in Germany, in 1835. The movement seems to have originated in the dualistic and Gnostic views of John Henry Schönherr (who was born at Memel, in 1771, and died at Königsberg in 1826) concerning the origin of the universe by the combination of two spiritual and sensual principles. His followers carried out his system much more completely than himself. The most notable of them were two clergymen, Johann Wilhelm Ebel and Georg Heinrich Diestel, the former an archdeacon, who founded a society to which women—some of noble birth—attached themselves. Scandal was thereby caused, and Ebel's easily misunderstood expressions as to the proper relations of the sexes were made the basis of charges against his chastity and moral influence. His followers were accused of the grossest immorality, and a garden in Königsberg where they met acquired the name of the Seraph's Grove. The subject was brought before the courts (1839-42), and the result was that Ebel and Diestel were degraded from their offices, and the latter was further punished by imprisonment. But the sentence was dictated by strong prejudice against the accused, on account of their religious views and peculiar eccentricities, and the evidence gives no support whatever to the charge of licentiousness. The matter was revamped without proper examination by W. Hepworth Dixon in his *Spiritual Wives* (London, 1868), and thus rendered familiar to English readers. For the facts consult J. I. Mombert, *Faith Victorious*, a life of Ebel (New York, 1882).

MU'CORA'CEÆ (Neo-Lat., nom. pl., from Lat. *mucor*, mold, from *mucere*, to be moldy, from *mucus*, slime; connected with Gk. *μύξα*, *myxa*, mucus, Skt. *muc*, to release). A widely distributed order of fungi mostly microscopic, comprising what are commonly known as molds, which are found on decaying vegetable and animal matter. Phycomyces nitens grows on greasy substances, a habitat not usual with most fungi. Mucor mucedo, one of the most common, appears as a glistening mass of mycelium on fresh horse manure in moist places. It seems to flourish in decaying nitrogenous matter, evolving ammonia. From the mycelium there project toward the light slight white threads (conidiophores), whose tips soon became black, from the developed spores. The spore stalks of the common bread mold appear to be indifferent to light. If the mycelium be kept moist it develops cross-partitions which increase in number, the cells so produced swelling into a spherical form to become thick-walled resting spores; but if grown in a decoction of horse manure the mycelium bears only conidia. The principal genera are Mucor, Thamnidium, Pilobolus, Phycomyces.

MUCOUS MEMBRANE and **MUCUS.** The mucous membrane is continuous with the skin at all the orifices of the body, and lines the passages by which the internal organs communicate with the outer world. For convenience of description it may be divided into three great tracts—the alimentary mucous membrane, the respiratory mucous membrane, and the genito-urinary mucous membrane.

The *alimentary mucous membrane* commences at the lips, and not only forms the inner lining of the intestinal canal from the mouth to the anus, but gives off prolongations which after lining the ducts of the various glands (the salivary glands, the liver, and the pancreas) whose products are discharged into this canal, penetrate into the innermost recesses of these glands, and constitute their true secreting element. Besides these larger offsets, we find in the stomach and small intestine an infinite series of minute tubular prolongations, the anatomical arrangement and function of which are described in the article DIGESTION, ORGANS OF.

The *respiratory mucous membrane* begins at the nostrils, and under the name of *Schneiderian* or *pituitary membrane* (see NOSE) lines the nasal cavities, from whence it sends on either side an upward prolongation through the lachrymal duct to form the *conjunctiva* of the eye; backward, through the posterior nares (the communication between the nose and the throat), it sends a prolongation through the Eustachian tube to the middle ear (the cavity of the tympanum), and is continuous with the pharyngeal mucous membrane (which is a portion of the alimentary tract); it then, instead of passing down the œsophagus, enters and forms a lining to the larynx, trachea, and bronchial tubes to their terminations. From the continuity of these two tracts some writers describe them as a single one, under the name of the gastro-pulmonary tract.

The *genito-urinary mucous membrane* commences at the genito-urinary orifices, lines the excretory passages from the generative and urinary organs, and is the essential constituent of the glands of both. In the female it becomes continuous with the serous membrance of the abdomen at the fimbriæ of the Fallopian tubes. See KIDNEY.

Mucous membranes line all those passages by which internal parts communicate with the surface, and by which matters are either admitted into or eliminated from the body. As a general rule they are soft and velvety, and of a more or less red color, from their great vascularity; but they present certain structural peculiarities according to the functions which they are required to discharge. In all the principal parts of the mucous tracts we find the mucous membrane to present an external layer of epithelium (q.v.) resting on a thin, transparent, homogeneous membrane, which from its position is termed the basement membrane, and beneath this a stratum of vascular tissue of variable thickness, which usually presents either outgrowths in the form of papillæ and villi, or depressions or inversions in the form of follicles or glands, or both. The follicles are almost invariably present, but the papillæ and villi are limited to the alimentary or gastro-intestinal mucous membrane. The mucous membranes constitute the medium through which nearly all the material changes are effected that take place between the living organism and the external world. Thus in the gastro-intestinal mucous membrane we find a provision for reducing the food by means of a solvent fluid poured out from its follicles; while the villi, which are closely set upon the surface of the small intestine, are specially adapted to absorb the nutrient materials thus reduced to the liquid state. The same membrane, at its lower part, constitutes an outlet through which are cast out not merely the indigestible residuum of the food, but also the excretions from numerous minute glandulæ in the intestinal wall, which result from the decomposition of the tissues, and which must be separated from them to prevent further decay. Again, the bronchio-pulmonary or respiratory mucous membrane serves for the introduction of oxygen from the air, and for the exhalation of water and carbonic acid. And, lastly, the mucous membranes are continuous with the cell-lined vesicles or tubes of the various glands, which are the instruments whereby their respective products are eliminated from the blood. Although the various kinds of epithelial cells discharge a special office in relation to the peculiar function of the mucous membrane upon which each kind occurs, yet they all serve one general purpose—namely, that of protecting the surfaces on which they are placed. This protecting power is increased by the presence of the secretion known as *mucus*, which ordinarily forms an extremely thin layer on these membranes, but when they are irritated or inflamed is secreted in very considerable quantity. (See CATARRH.) The exact mode of its formation is still a disputed question, but it is generally believed to be the product of the gradual solution of the uppermost epithelial cells. Besides acting both mechanically and chemically as a shield to highly sensitive membranes, it has other uses, among which two may be especially mentioned: (1) It communicates to the salivary, and probably to other glands, properties which are not possessed either by itself or by the pure glandular secretions; and (2) it serves to eliminate a considerable quantity of nitrogen from the system. This nitrogen is contained in the *mucin*, which forms from 2.4 to 9 per cent. of nasal and bronchial mucus. This mucin contains 12.64 per cent. of nitrogen, and is the substance which gives to mucus its viscid and tenacious character. Normal mucus is devoid of smell and taste, and faintly alkaline in reaction, and hence its constant presence in the mouth gives rise to no disagreeable sensation.

MUCUNA. A genus of leguminous plants. See COWAGE; LUMBRICOID.

MU'DAR (Hind. *madār*, from Skt. *mandāra*, coral-tree), *Calotropis*. A genus of East Indian shrubs of the natural order Asclepiadaceæ. The bark of the root and the thick milky juice of some species are used in the East, where they have long been credited with alterative, purgative, emetic, and sudorific properties which have attracted some attention from European physicians. Mudar is a very common and often troublesome weed in India. The commonest species, *Calotropis gigantea*, a large shrub, with stems often thicker than a man's leg, and broad, fleshy leaves, rapidly attains a large size on very dry sands, where almost nothing else will grow. The short, not easily spun, silky down of the pods is used for making floss and a soft, cotton-like thread, but a strong fibre, useful for cordage and fishing-lines, is obtained from the inner bark. When properly prepared it is especially well adapted to mix with various other fibres, especially silk. The thick, milky juice, collected by making incisions in the bark, is used as a substitute for caoutchouc and gutta-percha. It becomes flexible when heated.

MUD-CAT. See CATFISH.

MUD-EEL. A siren. See MUD-PUPPY.

MUDFISH. A name given to several widely different fishes which frequent muddy waters. (1) In the United States, the bowfin (q.v.). (2) In California, a small marine goby (*Gillichthys mirabilis*) which lives in shallow places that are left bare at low tide, and harbors in excavations made by itself in the mud. (3) One of the killifishes (q.v.), the mummichog, or 'mud-dabbler.' (4) Any of the lungfish or dipnoans, especially the rare *Lepidosiren paradoxa* of Brazilian swamps. (See DIPNOI, and Plate of DIPNOI AND CHIMÆRA.) This is a salamander-like creature which grows to a length of four feet or more, has the dorsal, caudal, and anal fins united into one continuous fin, and the pectoral and ventral fins produced into long jointed filaments. The head is conical, eye small, gill openings without covers, mouth small, and teeth pointed and cusped, adapted to crushing the fresh-water snails (chiefly Ampullaria) upon which it feeds. A closely related West African fish (*Protopterus annectans*), sometimes six feet long, is very abundant in the Gambia River, where it sustains a torpid existence during the dry season by burying itself in the mud, forming a sort of nest or 'case' of hardened mud about it. Many specimens have been dug out and sent, each within its clod, to Europe, and kept alive in zoölogical gardens. They grow rapidly, are active and voracious the year round, when kept in tanks in hothouses feed upon flesh and all sorts of small animals, and frequently eat each other. In the wet season they swim and crawl about the muddy rivers they inhabit, and are sought as food by the natives. They are nocturnal and frequently rise to the surface to breathe. Their breeding habits are little known, but they are believed to be ovoviviparous. The young have external gills. Consult Lydekker, *Royal Natural History*, vol. v. (London, 1895).

MUD'FORD, WILLIAM (1782-1848). An English writer, who as editor of the London *Courier*, for a time the rival of the *Times*, exerted great influence on public opinion. Leaving the *Courier* —which declined in influence after his withdrawal, and presently was discontinued—he became editor and proprietor of the *Kentish Observer*, the organ of the Conservative Party in Kent. In 1841 he succeeded Theodore Hook as editor of *John Bull*. To *Blackwood's Magazine* he contributed many essays and tales, afterwards collected in part. Among his published volumes are *A Critical Enquiry into the Writings of Dr. Samuel Johnson* (1803); *Nubilia in Search of a Husband* (1809); *The Contemplatist*, essays (1811); *An Historical Account of the Campaign in the Netherlands in 1815* (1817); and *Tales and Trifles from Blackwood's* (1849).

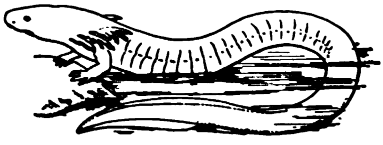
MUDGE, ENOCH (1776-1850). The first Methodist minister raised in New England. He was born at Lynn, Mass., was converted under Jesse Lee, the pioneer of Methodism in New England, and entered the ministry in 1793. He labored as an itinerant preacher in Maine until his health gave way, and in consequence he retired in 1799. He was twice chosen State representative and had much to do with the passage of the Religious Freedom Bill. In 1816 he resumed preaching. From 1832 to 1844 he was pastor of the Seaman's Chapel at New Bedford, Mass.—His son, THOMAS HICKS MUDGE (1815-62), was graduated at Wesleyan University (1840) and Union Theological Seminary (1843); he preached in New England, was professor of sacred literature in McKendree College, Lebanon, Ill. (1857-59), and held pastorates in Saint Louis and Baldwin City, Kan.—ZECHARIAH ATWELL MUDGE (1813-88), a nephew of Enoch, entered the ministry in 1840 and held various pastorates in Massachusetts. He wrote much in history and biography, including *Lives* of Abraham Lincoln (1867) and Roger Williams (1871), and histories of Plymouth (1869), Salem Witchcraft (1890), and Arctic voyages (2 vols., 1875).—JAMES MUDGE (1844—), nephew of Zechariah, was graduated at Wesleyan University in 1865, entered the ministry in 1868, served as missionary in India, and has held pastorates in New England. He is the author of *Growth in Holiness Toward Perfection* (1895); *The Best of Brown-*

ing (1898); *Honey from Many Hives* (1899); and other works.

MUD-HEN. A variant of 'marsh-hen,' some species of coot, gallinule, or rail (qq.v.).

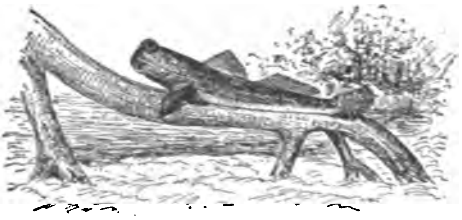
MUD-MINNOW. A small, minnow-like fish of the family Umbridæ, closely allied structurally to the pikes. They inhabit weedy streams, bogs, and ditches in the United States, and also in Austria, where they bury themselves in the mud. They are carnivorous, and extremely tenacious of life. Often when none can be seen in a pool, a swarm of these little dark green fishes may be aroused by raking through the mud. Two American species are known, the Eastern mud-minnow (*Umbra pygmæa*) and the Western 'dogfish' (*Umbra limi*).

MUD-PUPPY, or WATER-DOG. An American salamander of the family Proteidæ, characterized by having four toes on each foot and persistent larval gills. This genus was formerly called Menobranchus. Two species inhabit the central parts of the United States, of which the more common and widespread is *Necturus maculatus.* It reaches the length of one foot, is smooth, slimy, and brown-blotched, with the tufted gills dark red. These creatures remain mostly among weeds or rocks at the bottom of the water during the daytime, but at night they move about, often with quick eel-like motions (a local name is 'mud-eel'), in search of crayfish, worms, insects, frogs, etc. They spawn in April or May. Other salamanders are sometimes given the same name, especially the 'axolotl' (q.v.).


A MUD-PUPPY.

MUD-SHAD. A useless shad-like fish (*Dorsoma cepedianum*), called also 'gizzard' and 'hickory' shad, which is abundant all along the coast from Cape Cod to Mexico, and also throughout the Mississippi Valley. It grows to a length of about 15 inches, and is bluish silvery, the young having a round dark spot at the shoulder.

MUDSKIPPER. One of the curious little fishes (three to four inches long) of the goby family and genus Periophthalmus. They are sometimes called 'jumping fishes' or 'leaping fishes,' and abound on the coasts of West Africa, the Red Sea, Indian Ocean, and eastward to Japan. Their remarkable peculiarity is that they will leave the water to visit every place washed by the surf. By the aid of the pectoral and ventral fins and the gill covers, these fishes skip across the damp sand, ascend the roots of mangroves, and run up wet rocks in quest of flies. They are, says Day, essentially mud-dwelling fishes, dark brown in color, and if placed in a vessel of deep clear water will drown. This amphibious power of these fishes has been acquired without any essential change in the character of the gills; but the fish is in the habit when out of water of puffing out its cheeks with air, which is held for a short time and then renewed. Consult: Day, *Fishes of India* (London, 1878); Semper, *Animal Life* (New York, 1881).


A MUDSKIPPER.

MUD-SUNFISH. A small bass (*Acantharchus pomotis*) of little value as food, numerous in sluggish coastal streams from New York to South Carolina. It is dark green in color, with five indistinct blackish stripes lengthwise, and a black opercular spot.

MUD-TORTOISE, or MUD-TURTLE. A dark-brown turtle (*Cinosternum Pennsylvanicum*) with light dots on the head, found from Canada to Texas. See TERRAPIN.

MUD-WASP, or MUD-DAUBER. Any one of a group of wasps belonging to the old genus Pelopæus, now Sceliphron. They build nests of mud in sheltered places, choosing the cracks of a barn or fence or some sheltered place under the eaves of any wooden building, entering also disused rooms in houses, and sometimes even rooms that are in daily use. The nests consist of a varying number of mud cells placed side by side, usually in a single row, but sometimes in several rows. The cells before completion are packed with a food supply for the future young, and this consists almost invariably of spiders, as many spiders being placed in one cell as the cell will hold. A single egg is laid upon the last spider which has been placed in the cell, and the larva hatching from the egg eats rapidly, consuming the abdomens of the spiders first and subsequently the remainder of their bodies. All of the spiders which have been placed in the cell have been stung and paralyzed by the parent wasp, but many of them are not really dead when the larva reaches them. After the egg is laid and the nest is closed up, new cells are constructed by the same female. The mud or clay with which the nests are constructed is brought in little balls by the aid of the wasp's mandibles, and 20 or more visits are required to complete one cell; so that for the construction of a large nest of 50 cells about 1000 visits must be made by the insect. The larva reaches full growth in a short time, usually ten days or two weeks, and forms a cocoon within the mud cell, the winter being passed in the cocoon, although there may be two or more summer generations, in which case the summer pupal period is short. The group is a large one, and mud-wasps are common not only in America and in Europe, but in India and Australia. Consult: Fabre, *Insect Life* (London, 1901); Sharp, *Cambridge Natural History*, vol. vi. (London, 1901); Howard, *The Insect Book* (New York, 1902). See also the article WASP and its bibliography.

MUEZ'ZIN, or **MUED'DIN** (Ar. *mu'adhdhin*, one who calls to prayer, from *'adhdhana*, to call to prayer, from *'adhina*, to hear). The Arabic name of the Mohammedan official attached to a mosque, whose duty it is to announce the different times of prayer. His chant (*'adhân*) consists of these words, repeated at intervals: "Allah is great [four times]. I testify that there is no God but Allah [two times]. I testify that Mohammed is the apostle of Allah [two times]. Come to prayers [two times]. Come to salvation [two times]. There is no god but Allah." The Shiites also say "Come to good works," and "Prayers are better than sleep" is added before the early morning prayer (*fajr*). Besides these regular calls, two more are chanted during the night for those pious persons who wish to perform special nightly devotions. In small mosques the *'adâhn* is chanted by the imam, and, when the mosque is provided with a minaret, the muezzin ascends it for his chant; in smaller mosques, the chant is made at the side. The office of muezzin is considered a meritorious one, and insures the holder's admission into Paradise.

MUFTI, mŭf'tē (Ar. *mufti*, expounder of the law). The name of a Mohammedan official who expounds the law according to the Koran and traditions; according to his decision, delivered in a memorandum called a *fetwa*, the cadi, or judge, decides the case. In Turkey the *Grand Mufti*, or *Sheikh ul-Islam*, is the head of the Moslem Church, and is appointed by the Sultan. He is the supreme chief of the ulemas or body of Mohammedan theologians. His fetwa is extremely powerful, even under certain circumstances may depose the Sultan. The title mufti is also applied to juris-consults attached to local government councils in the Turkish Empire, but the power of the muftis, with the exception of the Grand Mufti, is largely nominal.

MÜGGE, mụg'ge, THEODOR (1806-61). A German novelist, born and educated in Berlin. His liberal sentiments, expressed in various newspapers and in such pamphlets as *Die Censurverhältnisse in Preussen* (1845), led in several instances to his arrest and prosecution. During the twenty years preceding his death he wrote numerous sketches, tales, novels, and romances, which appeared in a complete edition in 1862-67 (33 vols.). Several, including *Toussaint* (1840) and *Afraja* (1854), have been translated into English by E. J. Morris. The most interesting of his writings are his Norwegian romances and sketches of travel: *Leben und Lieben in Norwegen* (1858); *Skizzen aus dem Norden* (1844); and *Nordisches Bilderbuch* (1858; 3d ed. 1862).

MUGGER. This, the common 'marsh-crocodile' of India and the Malay Islands (*Crocodilus palustris*), is not often more than 12 feet in length. Its head is rough, with a thick and rather broad snout, and each jaw contains 19 teeth on each side. It inhabits rivers, ponds, tanks, and marshes, and goes ashore only when it is obliged to move into some new water by the drying up of its pond, or wishes to bury its eggs in the sand. In extreme drought, however, it buries itself in the mud and remains dormant until the coming of the rains. This is the crocodile which is venerated by the Hindus and is kept in a half-domesticated condition in certain ponds, attended by fakirs, who worship in a neighboring temple of their cult. Consult: the writings of Indian naturalists, especially Adams, *Wanderings of a Naturalist in India* (Edinburgh, 1867); Tennent, *Natural History of Ceylon* (London, 1861); Hornaday, *Two Years in the Jungle* (New York, 1885).

MUG'GLETO'NIANS. A sect that arose in London about the year 1651. The founders were two cousins, John Reeve (1608-58) and Lodowicke Muggleton (1609-98), obscure journeymen tailors, but claiming to have the spirit of prophecy. Muggleton professed to be the 'mouth' of Reeve, as Aaron was of Moses. They affirmed themselves to be the two witnesses of Revelation xi. They asserted a right to curse all who opposed them, and did not hesitate to declare eternal damnation against their adversaries. A few members of the sect still exist. They deny the doctrine of the Trinity; hold anthropomorphist opinions; and to all this add many strange doctrines of their own, as that the devil became incarnate in Eve, etc. Consult: Gordon, "The Origin of the Muggletonians," and "Ancient and Modern Muggletonians," in the *Transactions of the Liverpool Literary and Philosophical Society* for 1869-70.

MUGWORT. A popular name for various species of artemisia (q.v.).

MUGWUMP (Algonquin *mugquomp*, chief, great man). In American politics, a term originally applied to a voter nominally identified with a particular party, but claiming the right to vote with another party. It early passed into the local phraseology of some of the New England villages, being applied in its original (Indian) signification to any local magnate. Its first appearance in print seems to have been in the Indianapolis *Sentinel* in 1872. Its popular use began with an article in the New York *Sun* for March 23, 1884. In September of the same year it was first given to a political party, the Independent Republicans, who refused to ratify the nomination of James G. Blaine for the Presidency. The name was applied to them in a spirit of derision, but was accepted by them, and now regularly denotes any body of voters who profess to be independent of strict party obligations. The name Dudes and Pharisees was also applied in 1884 to those Republicans who opposed the election of James G. Blaine.

MUHAR'RAM (Ar. *muḥarram*, sacred, from *ḥarama*, to forbid). The first month of the Mohammedan year. Originally the Arabs had a solar year by means of intercalary months. The first month was called *Ṣafar I.*, and came in the autumn. It was the month of fairs, pilgrimages, and festivals, and hence acquired the epithet *al-Muḥarram*, the sacred, which in time supplanted the real designation. When in the year 10 of the Hejira Mohammed restored the lunar year, on the ground that intercalary months were an impious interference with the order of things as established by God, Muharram and all the months began to come earlier in each succeeding year. Mohammed is said to have observed the tenth day of Muharram (the *'âshûrâ*) as a fast day, perhaps in imitation of the Jewish Day of Atonement on the tenth of Tishri. Later he appointed the month of Ramadan (q.v.) for fasting. The Sunnites still consider the tenth of Muharram as sacred, and keep it as a fast. The Shiites lament the death of Hosein on the first ten days of the month. (See HASAN AND HOSEIN.) Consult Wellhausen, *Reste arabischen Heidenthums* (Berlin, 1897).

MÜHLBACH, mụl'bäG, LUISE. The assumed name of Klara Mundt (1814-73). A German author, born in Neubrandenburg. Her work, consisting mostly of historical novels, is sensational, inartistic, distorted, but it shows a talent for lively description and narration that gave her a wide but short-lived popularity. *Friedrich der Grosse und sein Hof* and many others of her novels have been translated into English.

MÜHLBERG, mụl′bĕrk. A town in the Province of Saxony, Prussia, on the Elbe, 35 miles northwest of Dresden (Map: Prussia, E 3). It is famous as the scene of a battle in 1547, which resulted in the defeat of the Protestants under John Frederick I., Elector of Saxony, by the Emperor Charles V., and the triumph of the Catholics in Germany. Population, in 1900, 3463.

MÜHLEISEN-ARNOLD, mụl′ī-*zen* är′nold, John (1817-81). An English clergyman, missionary, and author, born at Zell (Württemberg). He was educated in Germany, and after his removal to England was successively missionary of the Church Missionary Society in India and Abyssinia, chaplain to the Bishop of Gibraltar, and chaplain to Saint Mary's Hospital, Paddington, London (1852-61). In 1859 he founded the Moslem Mission Society in England. He was chaplain of East Ham, Essex, from 1861 to 1865, consular chaplain at Batavia, Java, from 1865 to 1871, and rector of Saint Mary's Church, Papendorf, Cape Town, South Africa, from 1876 until his death. His publications include: *Ishmael: or, A Natural History of Islamism* (1859); *English Biblical Criticism, and the Authorship of the Pentateuch, from a German Point of View* (2d ed. 1864); and *Genesis and Science, or, The First Leaves of the Bible* (2d ed. 1875).

MUHLENBERG, mū′len-bĕrg, Frederick Augustus Conrad (1750-1801). An American clergyman and politician, son of Heinrich Melchior Muhlenberg. He was born at New Providence (now Trappe), Montgomery County, Pa., studied in Germany at the University of Halle, and upon his return to America entered the Lutheran ministry in Pennsylvania. In 1773 he became pastor of the Lutheran Church in New York City. He was an ardent patriot, and in 1776 he quitted New York and returned to his native State, at the same time abandoning the work of the Church for political activity. He was repeatedly elected to Congress. The first session of the House of Representatives in Washington's administration chose him as Speaker. He was also made chairman of the Committee of the Whole in 1795, and cast the deciding vote that saved the Jay Treaty.

MUHLENBERG, Gotthilf Heinrich Ernst (1753-1815). An American clergyman and botanist, son of H. M. Muhlenberg, born at Trappe, Pa. He was educated at Halle and traveled in Germany and in England. He was ordained a Lutheran minister and became assistant pastor of a Lutheran church in Philadelphia. In 1779 he retired to the country, where he devoted himself to the study of botany; and it is as a botanist that he is best known. His chief works are: *Catalogus Plantarum Americæ Septentrionalis* (1813); and *Descriptio Uberior Graminum et Plantarum Calamariarum Americæ Septentrionalis Indignarum et Circarum* (1817).

MUHLENBERG, Heinrich Melchior (1711-87). The founder of American Lutheranism. He was born at Eimbeck, Prussia, September 6, 1711. His parents were Saxon, but having suffered greatly in the Thirty Years' War, removed to Eimbeck. The death of his father in his twelfth year threw the family into poverty and occasioned an interruption of his studies, and till his twenty-first year he toiled incessantly to assist in the support of the family. In 1735 he entered the University of Göttingen, where he remained three years. Graduating at Göttingen, he went to Halle in 1738, where, besides studying, he taught in the orphan house. He associated intimately with Francke, Cellarius, and Fabricius. Soon after his ordination application came to Germany from Pennsylvania for some one to be sent to labor among the destitute Lutherans of that colony. The faculty immediately selected Muhlenberg, who was then in his thirty-first year. He accepted the appointment, and the better to qualify himself went to London, where he acquired facility in the use of English. He reached America in 1742, to the great joy of the German Christians. His arrival marked a new era in the history of the Lutheran Church in the United States, its condition gradually improved, and frequent accessions were made to the ranks of the ministry of men educated at Halle and thoroughly devoted to their work. He took the pastoral care of the associated churches of Philadelphia, New Hanover, and New Providence (now Trappe, some 25 miles northwest of Philadelphia), which had united in calling a minister, and these three congregations were the principal scenes of his ministerial labors. The first three years of his ministry he resided in Philadelphia, the next sixteen in New Providence. In 1761 he removed to Philadelphia, but in 1776 went back to New Providence. During the War of the Revolution his sympathy with the colonists excited great opposition, and his life was often in peril. Consult his autobiography to 1743 (in German) edited by Germann (Altoona, 1881), and his *Life* by Mann (Philadelphia, 1887), and Frick (Philadelphia, 1902); also Oschsenford, *Muhlenberg College, a Quarter-Centennial Memorial Volume* (Allentown, 1892).

MUHLENBERG, John Peter Gabriel (1746-1807). A Lutheran preacher and leader in the Revolutionary War, son of Heinrich Melchior Muhlenberg (q.v.). He was born at Trappe, Pa., October 1, 1746, and sent to the University of Halle to be educated, but ran away, and passed a year as a private in the dragoons. Returning to America, 1766, he studied for the Lutheran ministry; was called to Virginia, 1771; to have a legal standing as a clergyman there, went to England, 1772, and was ordained by the Bishop of London; in same year was settled at Woodstock, Va. Soon after the beginning of the Revolutionary War, he told his congregation that there was a time to preach and a time to fight, and at the close of the services he threw off his gown, showing himself in full uniform, and read from the pulpit his commission as colonel. He had the drummers strike up for volunteers, and many of his congregation volunteered and joined his regiment, the Eighth Virginia, popularly known as the German regiment, afterwards noted for its courage and good discipline. In 1774 he was a member of the House of Burgesses, and served on the committee of safety, and two years later he sat in the State convention. He participated in the fighting at Charleston in 1776, and was made brigadier-general the following year, and placed in command of the Virginia line. He took part in the battles of the Brandywine, Germantown, and Monmouth, and in the capture of Stony Point. He defended Virginia against the expeditions of Leslie and Arnold, and was commander-in-chief there till the arrival of Steuben. Upon the invasion of Virginia by Cornwallis, he was next in command to Lafayette, and at the siege of Yorktown he was in command of the first brigade of light infantry. He retired at the close of the war with the rank of major-general. Soon after, he settled in Pennsylvania. He served in Congress in 1789-91, 1793-95, and 1799-1801. In the latter year he was chosen United States Senator, but resigned when Congress met to become Supervisor of Revenue for the District of Pennsylvania, and in 1803 he was appointed Collector of the Port of Philadelphia, in which position he died near Philadelphia, October 1, 1807. Consult his *Life* by his great-nephew, Henry A. Muhlenberg (Philadelphia, 1849).

MUHLENBERG, WILLIAM AUGUSTUS (1796-1877). An American Episcopal clergyman and philanthropist, grandson of H. M. Muhlenberg. He was born in Philadelphia, and graduated at the University of Pennsylvania in 1814. Three years later he was ordained deacon, and served as assistant to Bishop White at Christ Church, Philadelphia. Ordained priest in 1820, he was rector from 1821 to 1828 of Saint James's Church, Lancaster, Pa., where he helped to establish the first public school in the State outside of Philadelphia. He founded in 1828 at Flushing, L. I., a school afterwards known as Saint Paul's, of which he was principal until 1846. Then he was rector of the Church of the Holy Communion in New York until 1858, in the latter year becoming superintendent and pastor of Saint Luke's Hospital, which he had founded. In the later years of his life he was instrumental in establishing an industrial Christian settlement at Saint Johnland, L. I. He died in Saint Luke's Hospital, April 8, 1877. To trace his effect upon his time would be to record the origin of several of the most important movements within the Episcopal Church. Thus he made his New York parish the first free-seat church of his communion in America; he organized the first sisterhood within the same limits in 1845, known as the Sisterhood of the Holy Communion; and the important later developments in the direction of Christian unity (see EPISCOPAL CHURCH) and of liturgical enrichment and flexibility both really grew out of his memorial to the House of Bishops in 1853. Church music and hymnody also owe much to him; he published three books in this department; but his most important literary work is contained in *Evangelical Catholic Papers* (1875-77). For his life, consult biographies by Ayres (New York, 1880) and Newton (ib., 1890); also Coleman, *The Church in America* (ib., 1896).

MUHLENBERG COLLEGE. A collegiate institution at Allentown, Pa., under the control of the Evangelical Lutheran Church, incorporated in 1867. It consists of a preparatory and a collegiate department, the latter with classical and scientific courses leading to the degrees of B.A. and B.S. The total attendance in 1902 was 137. The faculty numbered 13. The college library contained 12,000 volumes. The campus of five acres and the college buildings were valued at $100,000. In 1902 a new site of 52 acres was purchased, on which new buildings were begun, at an estimated cost of $200,000. The income for the year was $16,764, and the endowment was $163,977.

MÜHLHAUSEN, mụl'hou-*zen*. A town in the Province of Saxony, Prussia, on the Unstrut, 30 miles northwest of Erfurt (Map: Prussia, D 3). It is an old town with a number of churches, of which that of Saint Blasius dates from the twelfth century, and a mediæval Rathaus. It is surrounded with modern suburbs and has a gymnasium, a seminary for teachers, and a theatre. There are manufactures of woolen and linen goods, carpets, leather, and cigars. The city has considerable trade in cattle, grain, and fruit. Population, in 1890, 27,400; in 1900, 33,433. Mühlhausen appears in history as early as 925, when it was a fortified post. It rose to importance as a free city in the fourteenth century, and in the Peasants' War was the headquarters of the Anabaptist leader, Thomas Münzer, who was executed near Mühlhausen in 1525. The town was finally incorporated with Prussia in 1815.

MÜHLHEIM, mụl'hīm. See MÜLHEIM.

MUIR, mūr, JOHN (1810-82). An English Sanskrit scholar. He was born in Glasgow, and educated in the University of Glasgow and the East India School at Haileybury. He engaged in the civil service in British India, in 1829-53, and devoted himself to the study of the languages, history, and antiquities of India. In 1853 he retired from the service and devoted himself to the advancement of Oriental literature, especially in its bearing upon Christianity. In 1846 he offered to the University of Cambridge a prize of £500 for the best treatise on the errors of the Hindu systems of philosophy, and on expounding the principles of Christianity to learned natives of India; and he gave, in 1862, £5000 to the University of Edinburgh for the endowment of a professorship of Sanskrit and comparative philology. Muir did much to help the spread of Christianity among the Hindus. His most important work was *Original Sanskrit Texts on the Origin and History of the People of India, Their Religion and Institutions* (1858-70).

MUIR, JOHN (1838—). An American explorer and naturalist, born at Dunbar, Scotland. He studied at the Dunbar Grammar School and then emigrated to the United States, and entered the University of Wisconsin. After his graduation he began to explore the less known portions of the North American continent, devoting his attention particularly to the western coast and to Alaska, where the Muir Glacier is named in his honor. He published: *The Mountains of California; Our National Parks;* and a number of magazine articles on natural history; and edited *Picturesque California.*

MUIR, MATTHEW MONCRIEFF PATTISON (1848—). An English chemist. He was born and educated in Glasgow, studied at the University of Tübingen, and became fellow and prelector in chemistry at Gonville and Caius College, Cambridge. Muir did much to popularize modern chemistry. He published: *Qualitative Analysis* (1874); *Elements of Thermal Chemistry* (1885); *Practical Chemistry* (with Carnegie, 1887); *The*

Alchemical Essence and the Chemical Element (1894); *The Story of the Wanderings of Atoms* (1898); and *The Story of Alchemy* (1902).

MUIR, Sir William (1819—). An English Orientalist. He was born at Glasgow, studied at the universities of Glasgow and Edinburgh, and in 1837 entered the Bengal civil service, in which he rose to high distinction. He became eminent as an Orientalist, was from 1876 to 1885 a member of the Council of India, and from 1885 to 1900 was principal of the University of Edinburgh. His publications include: *Life of Mahomet* (1858-61); *The Corân* (1878); *The Caliphate* (2d ed. 1893); and *The Mohammedan Controversy* (1897).

MUIR-MACKENZIE, m*a*-kĕn′zĭ, Montague (1847—). An English barrister and law writer. He was educated at the Charterhouse School and Brasenose, Oxford, and was a fellow of Hertford College, Oxford (1874-88). In 1873 he was called to the bar, and he was secretary to Lord Chief Justice Coleridge for the four following years. Later he became recorder of Deal (1892), and a bencher of the Middle Temple (1894). His publications are upon technical subjects, such as *Bills of Lading*, *Judicature Acts*, *Laws of Registration*, and *Bankruptcy Acts*.

MUKADDASI, mo͞o′kȧ-dä′sē. See Mokaddasi.

MUKDEN, mo͞ok-dĕn′, or **MOUKDEN.** The capital of Manchuria and of the Province of Shing-king, situated in a fertile region near the Hun-ho, 110 miles northeast of Niu-chwang, its port (Map: China, F 3). It is surrounded by a brick wall and is divided into nine parts, of which the central contains the Imperial palace, the examination hall, and other administration buildings. The city is regularly and solidly built, but is of little architectural interest. It is the seat of a considerable industry, and will probably greatly increase in commercial importance with the completion of the Port Arthur-Harbin branch of the Trans-Siberian Railway, on which it will be a station. Mukden trades chiefly in agricultural products and fur, and is the seat of the administration of Manchuria. In the vicinity of the city are the tombs of the ancestors of the present reigning family of China. The population is estimated at 250,000. The city suffered greatly during the Boxer uprising of 1900.

MUKHTAR PASHA, mo͞ok′tȧr pȧ-shä′, Ahmed (1832—). A Turkish general and administrator, born at Brusa, in Asia Minor. He was educated at the Constantinople military school, was rapidly promoted, and became successively professor and governor of the school. He served in the Crimean War, as a staff officer in the Montenegrin campaign of 1862, and in 1870-71 in campaigns against the Arabs of Yemen, in which he gained the titles of pasha and marshal. He was made commander of the Second Army Corps (1873), and in 1875, at the breaking out of the troubles in Bosnia and Herzegovina, assumed command of the Turkish forces there. After his defeat at the Duja Pass in the Montenegrin campaign of 1876, Mukhtar was sent to Erzerum, to take charge of the operations against Russia on the outbreak of war with that country in 1877. On April 29th he was defeated and driven into Kars; but, in a number of severely contested battles during the following months, his troops displayed great courage, and regained the position, defeating the Russians severely near Erzerum on June 25th, and compelling them in July to raise the siege of Kars. On October 14-15th at Aladja Dagh, the Russians gained an important victory over Mukhtar, driving him back to Kars, and soon afterwards to Erzerum. In November Kars was stormed by the Russians, and before the end of the year Mukhtar was recalled. He put down the Cretan insurrection in 1878 and was put in command on the Greek frontier in 1879. In 1885 he was appointed Turkish High Commissioner in Egypt.

MULA, mo͞o′lȧ. A town of Southeastern Spain, in the Province of Murcia, situated on a branch of the Segura, 18 miles west of the city of Murcia (Map: Spain, E 3). The place is unimportant, but has some reputation on account of the warm sulphurous baths known as Baños de Mula, some three miles east. Population, in 1900, 12,733.

MULAT′TO. See Mixed Races.

MULBERRY (OHG. *mōrberi*, *mūrberi*, Ger. *Maulbeere*, mulberry, from Lat. *morum*, Gk. *μῶρον*, *mōron*, *μόρον*, *moron*, mulberry + *berry*, AS. *beri*, *berige*, OHG. *beri*, Ger. *Beere*, Goth. *basi*, berry), *Morus*. A genus of trees of the natural order Urticaceæ, natives of temperate and warm climates, with deciduous leaves, unisexual flowers in short, thick spikes, a four-parted perianth, containing either four stamens or one pistil with two styles, the perianth of the female flowers becoming succulent and closing over the small pericarp to form with other flowers of the spike an aggregate fruit. There have been about 100 species described, but much confusion exists among them, and some authors have reduced them to ten or even less. The common mulberry, or black mulberry (*Morus nigra*), a long-lived native of the middle parts of Asia introduced into cultivation in Europe more than a thousand years ago, and now almost naturalized there, is a low, much branched tree, with thick, rough bark and broad, unequally serrated and very rough heart-shaped leaves. It is not hardy in the United States as far north as New York, and is seldom seen except in the South and in California, where some of the improved varieties are grown. The fruit, which is purplish-black, with dark-red juice, fine aromatic flavor, and subacid sweet taste, is often procured in prodigious quantities and is much esteemed for dessert, for preserving, and for wine-making. The wood is employed in cabinet-work, but is not of much value. The leaves are sometimes used for feeding silk-worms. It is propagated by seed, suckers, layers, or cuttings, and succeeds best in a rich light soil. The white mulberry (*Morus alba*) has been planted in Southern Europe since 1540, in India and China, where it is native, from time immemorial for its leaves, which are the best food for silk-worms. In North America it has been extensively planted and in places exists in a half wild state as trees a foot or more in diameter. (See Kenrick, William.) The fruit is almost white, and much less palatable than that of the former, although there is great difference among the many varieties. The best variety for feeding silk-worms, on account of its rapid growth and abundant leaves, is that called the Philippine mulberry. A variety, tatarica, called the Russian mulberry, is a hardy, rapid grower, well adapted to hedges, windbreaks, small timber, and ornamental plantings, for which purpose it has been extensively planted in the Western United States. *Morus multicaulis*, by some considered a variety of *Morus alba*, once grown extensively in the United States to feed silk-worms, is seldom seen now. In India the white mulberry is treated as a bush, and cut down twice a year, the stripped shoots being thrown away. Its bark has long been used in China and Japan for making paper. It grows readily from cuttings. The root has a considerable reputation as a vermifuge. The red mulberry (*Morus rubra*), a native of North America, abounding from New York to Nebraska and south to the Gulf of Mexico, is the largest tree of the genus, attaining in the South a height of 70 feet and 3 feet in diameter. It endures severe frosts much better than the preceding, and is therefore preferred for cultivation in some parts of Europe. Its fruit is deep red, and almost as pleasant as the black mulberry. The wood is much more valuable, being fine-grained, strong, and adapted even for shipbuilding. Of each of these three species there are numerous named varieties which are cultivated for their fruits, but they have not received the attention in the United States that they deserve. The Indian mulberry (*Morus indica*) has black fruit of a delicate flavor, and the leaves are extensively used for feeding silk-worms in China, Cochin-China, and Bengal. *Morus alba*, *Morus celtidifolia*, and *Morus corylifolia*, Peruvian species; *Morus lævigata*, the species most common in the north of India; and *Morus Cashmeriana*, probably a form of *Morus indica*, a native of Cashmere, produce pleasant fruit; *Morus dulcis*, a native of the north of India, is said to be superior in flavor to all others.

RED MULBERRY (*Morus rubra*).

The paper mulberry (*Broussonetia papyrifera*), a native of India, Japan, and islands in the Pacific, frequently planted for ornament in America and Europe, differs from the true mulberry in having the female flowers collected in a globular mass. The fruit is oblong, dark-scarlet color, sweetish, but insipid. The tree is of moderate size, or, in cultivation, a bush 6 to 12 feet high with leaves either simple or lobed. The islanders of the Pacific cultivate this species with great care and make a kind of clothing from the bark. For this purpose small branches about an inch in diameter are macerated in water. The epidermis is then removed by scraping. The young shoots, treated somewhat like rag pulp in Europe, furnish much of the paper used in Japan and the East. When the shoots are cut, new ones spring up very rapidly. Silk-worms eat the leaves. See Plate of MULBERRY AND LIQUIDAMBAR, accompanying latter title.

MULBERRY FAMILY. See MORACEÆ.

MUL'CASTER, RICHARD (1530?-1611). An English schoolmaster, whose birthplace may have been the old border tower of Brackenhill Castle on the river Line, or perhaps Carlisle. From Eton he passed to King's College, Cambridge, and thence to Christ Church, Oxford, where he graduated M.A. in 1556. When the Merchant Taylors' School was founded in London (1561), Mulcaster was appointed its first headmaster, a post which he held till 1586. Here he probably had the poet Spenser as a pupil. Ten years later he was elected high-master of Saint Paul's School. This office he retained to the great age of seventy-eight. He died April 15, 1611. In his own time Mulcaster gained wide repute as an efficient teacher, and in recent times much attention has been given to two books: *Positions, wherein those primitive circumstances be examined, which are necessarie for the training up of children, either for skill in their book or health in their bodie* (1581); and the *Elementarie, which entreateth chefelie of the right writing of our English tung* (1582). Mulcaster strenuously advocated physical training as a part of the education of boys, and implied that there should be grammar schools for girls. He taught his boys music and singing, and permitted them to perform in masques and interludes before the Queen. Consult the reprint of the *Positions*, edited by Quick (London, 1888).

MULCH (more correctly *mulsh*, probably from AS. *molde*, earth mold; ultimately connected with Goth. *malan*, Ir. *melim*, Lith. *malti*, Lat. *molere*, to grind, Eng. *meal*). A covering of loose material such as brush, leaves, manure, straw, or earth, maintained on the surface of the soil mainly for the purpose of preventing evaporation, which it accomplishes by breaking the continuity of the capillarity in the soil and thus retarding the rise of water to the surface. Stirring the surface soil, and thus maintaining what is termed a 'soil mulch,' brings about the same result. The use of the mulch of vegetable matter is probably not so common as formerly, but the soil mulch is increasing in favor, and in arid regions where agriculture is dependent upon irrigation and conservation of moisture is a matter of great importance. In addition to checking evaporation, mulches of vegetable matter are useful in protecting the surface soil from puddling and washing, keeping the soil cool, preventing freezing, and retarding growth in the spring. Mulching is a valuable means of reclaiming washed or 'galled' lands, and for securing a growth on dry, bare spots in lawns and meadows. A mulch of barnyard manure not only conserves moisture, but furnishes acceptable plant food.

Mulching berry bushes, orchard trees, etc., on a large scale with coarse manure and refuse material is not to be recommended, because it interferes with cultivation, harbors insects, and causes the plant roots to remain near the surface, thus increasing the danger of injury by drought. Such mulches, except on a small scale and for special purposes, such as protecting small fruits from injury by late frosts by retarding growth in spring, should be replaced by thorough stirring of the soil to maintain a soil mulch. The depth and character of this soil mulch must be determined by a variety of conditions, among which are the kind and root habits of the plant and the character of the soil and climate. It is evident that any crop, such as corn, with an extensive surface root system, would be injured by the destruction of its roots if stirring were frequent and deep. Again, in arid regions the mulch must be deeper and more perfect than in regions of frequent rainfall, in order to be effective and useful.

MULDER, mōōl′dẽr, GERARDUS JOHANNES (1802-80). A Dutch chemist, born at Utrecht. After obtaining the degree of doctor of medicine at the university of his native town in 1825, he commenced the practice of his profession at Amsterdam, but was soon invited to teach botany and subsequently chemistry at the medical school at Rotterdam. In 1840 he was elected professor of chemistry at the University of Utrecht, and kept this post until 1868, when he retired from active service. Mulder is best known for his researches on the proteids. Concerning the chemical nature of these substances, he advanced a theory according to which the proteids contain in common a characteristic ingredient which he named *protein*. The theory led him into a controversy with Liebig and was not accepted. He is the author of numerous excellent works on physiological and agricultural chemistry, on the chemistry of wine and beer, on diet and nutrition, etc. His *Chemistry of Vegetable and Animal Physiology* has been translated into English by Fromberg, and his *Chemistry of Wine* by Bence Jones. He also wrote an autobiography under the title *Levensschets* (published posthumously in 1881; 2d ed. 1883).

MULDER, LODEWIJK (1822—). A Dutch writer, born in The Hague. He was an instructor in the Royal Military Academy at Breda in 1851-59; was then for a time employed in the Ministry of War as an editor of original documents in early Dutch history; and from 1868 to 1872 was an inspector of schools in Utrecht Province. He prepared manuals of the history of the Netherlands (1859, 12th ed. 1881), and of general history (1862, 8th ed. 1880), and wrote several plays and works of fiction, the last including his best-known work, *Jan Faessen* (2 vols., 1856), a tale of the conspiracy against Prince Maurice of Orange.

MULE (OF., Fr. *mule*, from Lat. *mulus*, mule). A hybrid animal, the offspring of the male ass and the mare, highly valued as a beast of burden. The ears are long; the head, crop, and tail resemble those of the ass rather than those of the horse; but in bulk and stature the mule approaches more nearly to the horse. The mule seems to excel both the ass and the horse in intelligence; its powers of muscular endurance are remarkable; and its sure-footedness particularly adapts it to mountainous countries. It is easily kept, endures hunger and thirst better than the horse, lives to a great age, and is comparatively free from disease. Great care is bestowed on the breeding of mules in Kentucky, Missouri, and some other Central States, in Mexico, and in Spain and Italy, and mules of particular districts are highly esteemed. In America, mules are of greatest importance in the Southern States. Texas, Missouri, Tennessee, Mississippi, and Georgia each have over 200,000. The cotton and sugar-cane plantations utilize large numbers because they are easily and cheaply kept. As in other hybrid animals generally, males are more numerous among mules than females in the proportion, it is said, of two or three to one. There is no instance on record of offspring produced by two mules; but instances occur, although rarely, of the female mule producing offspring with the horse and with the ass. The mule is very superior in size, strength, and beauty to the hinny, the offspring of the male horse and the female ass. Several breeds of jacks have been used for producing mules. The chief breeds are Andalusian, Maltese, Catalonian, Italian, and Majorcan. The Catalonian is the best of imported breeds, but in the United States the native jack, a mixture of all breeds, is most used. Black is the preferred color, and the jack should be of good size. The mare should also be well-bred and of good form and color. In the Southern States mules are divided into two classes, the smaller ones 'cotton mules,' and the larger 'sugar mules.'

MULE (in Spinning). See SPINNING.

MULE DEER (so called on account of the large ears), or BLACKTAIL. One of the principal species of North American deer (*Cervus macrotis*, or *Odocoileus hemionus*), originally ranging throughout the open regions of the western half of the United States, but by the end of the nineteenth century restricted to the upper valleys of the Missouri and Saskatchewan rivers, and to the Rocky Mountain region, and the country west and south of it from Northern Mexico to Southern British Columbia. The Southwestern specimens are considered a distinct variety. This deer appears never to have ranged east of the plains, and was always most numerous in the broken country of the West and Northwest. Its favorite haunts are the brushy high-lying valleys. Its favorite place in summer is the summits of the 'mesas,' and the pastures on the chaparral-covered hills or near the timber-line, where it goes to rest along the edge of precipices that give a wide outlook. In winter it comes lower down, and gathers into large herds in the foot-hills, after the manner of the wapiti (q.v.).

It is somewhat larger than the Eastern or Virginian deer (see DEER), and stands about 3 feet 4 inches high at the shoulder. Its body is rather heavy, and its coat is dull yellowish in summer, rather than reddish, and in winter bluish-gray. The ears are very large (suggesting the name), and heavily furred; and its antlers have a short basal snag, above which the beam projects outward and then upward, forking equally and the prongs again dividing, so that there are normally 10 points. The stern bears a yellowish-white disk, and the tail is of moderate length, round, and black at the end. The hide of this species made the best buckskin known to the Indians, and was most used by them for clothing. Its value was soon learned by the pioneers in the West; and from about 1860 to 1870 this deer was pursued so ruthlessly by hide-hunters that about 250,000 skins were sent annually to England alone, for several years. The venison also is of superior quality, and the haunts and habits of the animal, his craft and speed, make him the most interesting to the sportsmen of all the American deer. The fawns are often domesticated, and the adults thrive well in parks, and are to be seen in every zoölogical garden in the world. Consult: Caton, *Antelope and Deer of America* (New York, 1877); Mayer (ed.), *Sport with Gun and Rod* (New York, 1892); Ledekker, *Deer of All Lands* (London, 1898); Van Dyke, in Roosevelt's *The Deer Family* (New York, 1902); and the writings of travelers and sportsmen in the Western United States. See Plate of DEER OF NORTH AMERICA.

MULE-KILLER. A local name in the Southern States for several species of insects and land arthropods, such as the mantis, pirate bug, and whip-tailed scorpion (qq.v.).

MULEY-HASSAN, mōō′lā häs′sȧn, SIDI (1831-94). Sultan of Morocco. He succeeded his father, Sidi Muley-Mohammed, in 1873. He was energetic and warlike, and spent the greater part of his reign in the field, enforcing his authority over the unruly Berber tribes, or extending the boundaries of the Empire in the direction of the Sahara. In 1880 reports of shocking cruelties committed on the Jews in his dominion led to the calling of an international conference at Madrid, which drew up a protocol decreeing liberty of conscience in Morocco, a decision to which the Sultan acceded, but which he altogether ignored.

MUL′FORD, ELISHA (1833-85). An American Protestant Episcopal clergyman and philosophical writer, born in Montrose, Pa. He graduated at Yale in 1855, and studied for the ministry in the Union Theological Seminary, at Andover, and later at Halle and Heidelberg in Germany. A part of his career was spent in ministerial work in various charges, but from 1864 to 1877 he lived in his native town without parochial charge and engaged in study. Among his publications are: *The Nation, the Foundations of Civil Order and Political Life in the United States* (1870); and *The Republic of God: An Institute of Theology* (1881). In 1881 he settled in Cambridge, Mass., and lectured in the Episcopal Theological School there until his death.

MUL′GRAVE, CONSTANTINE JOHN PHIPPS, second Baron (1744-92). A British Arctic explorer. Entering the navy at an early age, he served in the reduction of Martinique and of Havana, and in 1765 was made post-captain. In 1768 he entered the Commons for Lincoln, and became known as one of the 'King's friends' and an opposer of the popular cause. Five years later he was commanding the *Racehorse*, which with the *Carcass* attempted the discovery of a northern route to India, but was blocked by ice at Spitzbergen. On his return he again entered active service and in the naval operations against the French off Ushant (1778) rendered conspicuous service. He published an account of his Arctic voyage in *A Voyage Toward the North Pole* (1774).

MUL′HALL, MICHAEL GEORGE (1836-1900). A distinguished statistician, born in Dublin, Ireland, September 29, 1836. He was reared at the Irish College in Rome. In 1858 he emigrated to Buenos Ayres, where he established, three years later, the *Standard*, said to be the first daily newspaper printed in English in South America. This daring and successful enterprise Mulhall kept going till 1894. Returning to England in 1878, he gave his attention to statistics. In 1884 he was elected to the British Association for the Advancement of Science. Besides numerous contributions to the *Contemporary Review*, his works include: a *Handbook of the River Plata* (1869), the first English book published in Argentina; *Rio Grande do Sul and Its German Colonies* (1873); *The English in South America* (1878). In 1880 Mulhall, who had for some time been gathering materials on his favorite subjects of statistics, brought out his *Progress of the World in Arts, Agriculture, Commerce, Manufacture, Instruction, Railways, and Public Wealth*, since the beginning of the nineteenth century. This was followed by other highly valued works on statistics: *History of Prices* (1885); *Industries and Wealth of Nations* (1896); and a *Dictionary of Statistics* (1892; 4th ed. 1899). Mulhall died December 13, 1900, in Dublin.—His wife, Mrs. MARION MULHALL, is the author of *Between the Amazon and the Andes* (1883), and several essays, including the *Celtic Sources of Dante's Divine Comedy*. For this last monograph she was honored by a chair in the Arcadia of Rome.

MÜLHAUSEN, mu̧l′hou-zen. The second largest city of Alsace-Lorraine, Germany, situated on the Ill and the Rhine-Rhone Canal, 67 miles by rail south-southwest of Strassburg (Map: Germany, B 5). It is divided into the old town, built on an island of the Ill, the new town, between the old town and the canal, and the workingmen's colony (*cité ouvrière*) in the northwest. The old town is irregularly built, and with the exception of the Rathaus, dating from the sixteenth century, and a few modern churches, has few noteworthy buildings. The new town was laid out in the middle of the nineteenth century and has a fine post-office, and a museum established by the Industrial Society. The society is housed in a fine building with natural history collections and a library. The workingmen's colony, established in 1853 by Mayor Dollfus, is provided with model dwellings and with reading rooms, schools, restaurants, baths, and other institutions belonging to a modern town. The educational institutions of Mülhausen include a gymnasium and a number of technical schools. It is the most important industrial city of Alsace-Lorraine and one of the largest textile centres of the Empire. This industry of Mülhausen dates from the middle of the eighteenth century, and the cotton mills are situated partly in the city and partly in the vicinity and especially in the adjacent settlement of Dornach. Over 80,000 persons are said to be engaged in the textile mills and in other establishments connected with the textile industry of the manufacturing district around Mülhausen. Besides cotton and woolen goods and kindred products, there are also manufactured machinery and chemicals, and the trade is extensive in local manufactures and the agricultural products of the vicinity. Population, in 1890, 76,892; in 1900, 89,012, largely Roman Catholics. Mülhausen, after belonging for a short time to the bishops of Strassburg, became a free city of the Empire in 1273. In order to maintain its independence, it entered into an alliance with the Swiss cantons of Bern and Solothurn in 1466, and in 1515 became a member of the Swiss Confederation, and was recognized as such at the Peace of Westphalia. It joined the French Republic in 1798, and passed to Germany with Alsace-Lorraine in 1871. Consult: Metzger, *La république de Mulhouse* (Lyons, 1883); Schneider, *Geschichte der Stadt Mülhausen* (Mülhausen, 1888); Heydenreich, *Aus der Geschichte der Reichsstadt Mülhausen* (Halle, 1900); Jordan, *Der Uebergang der freien Reichsstadt Mülhausen an Preussen* (Mülhausen, 1902).

MÜLHEIM-ON-THE-RHINE, mul′hīm, or **MÜHLHEIM**. The capital of a circle in the Rhine Province, Prussia, on the Rhine, here crossed by a bridge, nearly opposite Cologne (Map: Prussia, B 3). It has a handsome modern Gothic church, a realgymnasium, a textile school, and a commercial school. Manufactured products are wire ropes and cables, velvet, silk, machinery, wagons, chemicals. The town has a safe harbor, and trades in wine. Population, in 1890, 30,996; in 1900, 45,085. Mülheim is of ancient origin, and became a town in 1322.

MÜLHEIM-ON-THE-RUHR, or **MÜHLHEIM**. The capital of a circle in the Rhine Province, Prussia, on the Ruhr, 16 miles north of Düsseldorf (Map: Prussia, B 3). It has a church from the twelfth century, a gymnasium, and a realschule. Coal and iron are mined in the district, and there are extensive iron works, manufactures of machinery, woolen and cotton goods, leather, and glass. Population, in 1890, 27,903; in 1900, 38,292.

MULIER, Pieter, the younger, called Tempesta (1637 or 1643-1701). A Dutch landscape and marine painter, born at Haarlem, son and probably pupil of Pieter Mulier, the elder (died at Haarlem, 1670)—not, as was for a long time erroneously supposed, son of Pieter de Molyn (q.v.). After having traveled through Flanders and Holland to study the best Flemish and Dutch masters, he went to Rome and soon acquired great reputation by his remarkable pictures of storms at sea, whence his surname, given him by the Italians. In Genoa, whither he went from Rome, he was imprisoned under suspicion of having caused his wife to be murdered, and after a confinement of sixteen years made his escape to Piacenza during the bombardment of Genoa in 1684, and passed the remainder of his days in Milan. Five of his most characteristic works (three thunder storms and two landscapes with figures) may be seen in the Dresden Gallery; others in Hamburg, Brunswick, Cassel, Karlsruhe, Vienna (Museum, Academy, Liechtenstein Gallery), Saint Petersburg, in the Brera Gallery, Milan, and several other Italian collections. A portrait of himself is in the Uffizi at Florence.

MULITA, mo͞o-lē′tȧ (Sp., little she-mule). A small armadillo (*Tatusia hybrida*), allied to the peba, but confined to Southern South America; so called from the resemblance of its face and ears to those of a mule.

MULL. The second largest island of the Inner Hebrides, belonging to Argyllshire, Scotland. It is situated north of the Firth of Lorne, and is separated from the west coast of Scotland by the Sound of Mull, from one to three miles wide (Map: Scotland, C 3). It has an area of 347 square miles, is very irregular in shape, deeply indented with bays and sea-locks, and consists mainly of volcanic rock with some outcroppings of granite. The island as a whole is mountainous, rising in Ben More to a height of 3185 feet. The scenery along the coast is very picturesque, and there are beautiful lakes and woods in the interior; but the scenery in the interior is not striking, the mountains being rounded in outline, and large tracts consisting of moorlands. The soil is fertile, but the stormy and humid climate is unfavorable for agriculture, and the land is chiefly used for grazing—cattle, sheep, and horses being exported. The population in 1891 was 4691; in 1900, 4711. The chief town is Tobermory, on the north coast, with a population (1901) of 1019.

MULLA′NY, James Robert Madison (1818-87). An American naval officer, born in New York City. He entered the navy as a midshipman in 1832, and in 1844 was promoted to the rank of lieutenant. During the war with Mexico he participated in the capture of Tabasco. He was commissioned commander in 1861 and captain in 1866, and during the Civil War was assigned to duty with the blockading squadron. At his own request he was transferred from the *Bienville* to the *Oneida*, that he might take part in the battle of Mobile Bay, August 5, 1864. His ship, one of the last in the line, received a terrific pounding from Fort Morgan, and was attacked by the Confederate ram *Tennessee*, which would probably have sunk it had not the monitor *Winnebago* come to the rescue. As it was, the *Oneida* was disabled by the fire from the fort, many of her crew were killed, and Commander Mullany lost his left arm. After the war and while commanding the North Atlantic squadron (1874-76) he gave material aid to Generals William H. Emory and Philip H. Sheridan at New Orleans, and during a revolution in Columbia protected American interests on the Isthmus of Panama. He became a commodore in 1870, a rear-admiral in 1874, and retired in 1879.

MULLEIN (AS. *molegn*, mullein). A name given to members of the genus Verbascum, of the natural order Scrophulariaceæ, of which there are more than 100 species, mostly large biennial or perennial herbs with rather thick tap-roots, and natives of the Eastern Hemisphere. The more or less woolly plants produce flowers upon spikes or panicles. The leaves and flowers were formerly reputed to have medicinal qualities, but are not so recognized in the United States. They contain a sort of mucilage which is obtained by boiling the leaves in water. Three European species are well-known weeds in the United States, the common mullein (*Verbascum Thapsus*), the moth mullein (*Verbascum blattaria*), and the white mullein (*Verbascum lychnitis*). In Kentucky, *Verbascum phlomoides* is reported as established and spreading as a weed.

COMMON MULLEIN (*Verbascum Thapsus*).

MÜLLENHOFF, mụl′len-hôf, KARL VIKTOR (1818-84). A German student of Teutonic antiquities and philology. He was born at Marne, Holstein, and after studying at Kiel, Leipzig, and Berlin, was professor at Kiel (1846-58) and at Berlin (1858-84). Müllenhoff's greatest works were: *Deutsche Altertumskunde* (1870-99), which he left unfinished, and the treatise *De Antiquissima Germanorum Poesi Chorica* (1847). Consult Scherer and Schröder, *Karl Müllenhoff* (Berlin, 1896).

MÜLLER, mụ′lẽr. A family of celebrated quartet players. They were the sons as well as pupils of the principal musician to the Duke of Brunswick, and were all of them born in the city of Brunswick. CARL FRIEDRICH (1797-1873) was first violin in the quartet and was also concertmeister to the Duke. THEODOR HEINRICH (1799-1855) was the viola player. AUGUST THEODOR (1802-75) played the cello, and FRANZ FERDINAND GEORG (1808-55) was the second violin. They were especially educated by their father for quartet work, and were conceded to have reduced the art of string quartet playing to a degree of perfection previously unknown. They were ambitious for greater fame than could be obtained within their own limited environment, and were particularly handicapped by the Duke of Brunswick, in whose employ they were, who had formulated the order that none of his musicians should participate in any musical performance outside that connected with his own corps. In 1830 they resigned their employment, and made their first appearance in Hamburg, where they met with such success that they were invited to Berlin, in which city they were received with great enthusiasm. An extended tour throughout Germany followed, and in 1837 they performed in Paris. Other successful tours made them known throughout the world. They confined their programmes almost entirely to the works of Haydn, Mozart, and Beethoven, and were also a very important influence in raising and establishing a higher standard of musical appreciation.

MÜLLER, ANDREAS (1811-90). A German historical painter, born at Cassel. He was the son and pupil of Franz Hubert Müller (director of the Darmstadt Gallery), and afterwards studied in Munich under Schnorr and Cornelius, and in Düsseldorf under Sohn and Schadow. On his return from Italy, where he stayed in 1837-42, he executed some famous frescoes at Remagen and Sigmaringen. In these works he was assisted by his son FRANZ (1843—). From 1856 till 1882 Andreas was professor at the Düsseldorf Academy. He was noted for his skill in restoring old or damaged pictures.

MÜLLER, AUGUST (1848-92). A German Orientalist, born at Stettin, and educated at the universities of Halle and Leipzig. In 1882 he accepted the post of professor of Oriental philology at the University of Königsberg. His numerous and valuable contributions to Oriental literature include: *Die griechischen Philosophen in der arabischen Uebersetzung* (1873); *Der Islam im Morgen- und Abendland* (1885-87); *Hebräische Schulgrammatik* (1878), the syntax of which was translated into English by James Robertson. He also reëdited (1876) Caspari's *Arabische Grammatik*, which he considerably enlarged, and with Nöldeke published a *Delectus Veterum Carminum Arabicorum* (1890), furnished with copious annotations, and thus rendered useful to those who desire to become acquainted with Arabic poetry. Especially creditable is his edition (1884) of the *History of Physicians* by Ibn Useibia, with Arabic text and a critical commentary. Several of his essays are contained in the *Zeitschrift der deutschen morgenländischen Gesellschaft* and *Beiträge zur Kunde der indogermanischen Sprachen.* In 1887 he was appointed editor of the *Orientalische Bibliographie.*

MÜLLER, mụ′lâr′, CHARLES LOUIS (1815-92). A French historical painter. He was born in Paris, December 22, 1815, and was a pupil of Baron Gros and Léon Cogniet. He received a first-class medal at the Paris Exposition of 1846. Müller is best known by his masterpiece, the "Roll-Call of the Last Victims of the Reign of Terror," formerly in the Luxembourg Museum (replica in possession of J. J. Astor, New York). Other works are: "Lady Macbeth" (1849), Amiens Museum; "Charlotte Corday in Prison" (1875), Corcoran Gallery, Washington; "Primavera" (1846) and "Haydée" (1848), Lille Museum; he also decorated the Salle d'Etat in the Louvre. His pictures are skillfully composed, but the coloring and drawing are mediocre.

MÜLLER, mụ′lẽr, DAVID HEINRICH (1846—). An Austrian Orientalist, born at Buczacz, in

Galicia. He was educated in Vienna, Leipzig, Strassburg, and Berlin; became professor of Semitic philology at Vienna in 1881, and was an editor of the *Wiener Zeitschrift für die Kunde des Morgenlandes.* His very valuable works include: *Himjaritische Inschriften* (1875); *Südarabische Studien* (1877); *Die Burgen und Schlösser Südarabiens* (1879-81); *Sabäische Denkmäler* (with Mordtmann, 1883); *Epigraphische Denkmäler aus Arabien* (1889); *Die altsemitischen Inschriften von Sendschirli* (1893); *Epigraphische Denkmäler aus Abessinien* (1894); *Ezechielstudien* (1895); *Die Propheten in ihrer ursprünglichen Form* (1896); *Südarabische Alterthümer* (1899); *Die Mahri- und Sokatri-Sprache* (1901); and editions of *Kitab al Farq* (1876); of Hâmdâni, *Geography of the Arabian Peninsula* (1884-91); and of part of Tabarî, *Annales* (1888).

MÜLLER, EDUARD (1828-95). A German sculptor, born at Hildburghausen. His first occupation was that of a cook in the ducal kitchen at Coburg, and he practiced his trade subsequently in Munich and Paris, and thence went to Antwerp, where, on the advice of the sculptor Geefs, he proceeded to study at the Academy in 1850. Two years afterwards he continued his studies in Brussels, and in 1857 settled permanently in Rome. Masterly composition, great truthfulness to life, and a high degree of technical perfection are the chief characteristics of his ideal figures and mythological groups, the best known of which include: "Nymph Kissing Cupid" (1862); "Faith, Love, and Hope" (1869), Schröder Mausoleum, Hamburg; "Satyr with the Mask" (1870); "The Faun's Secret" (1874); and "Eve with Her Children" (1880). His masterpiece is the group in heroic size, "Prometheus Bound and the Oceanids" (1874-79), National Gallery, Berlin, chiseled out of a single block of marble.

MÜLLER, FERDINAND VON (1825-96). A German naturalist. He was born in Rostock, studied at Kiel, and in 1848 went to Australia, where he was for several years engaged in botanic explorations, and was director of the Melbourne Public Garden (1857-73). His researches on the subject of the acclimatization of plants yielded highly valuable results. Müller wrote: *Fragmenta Phytographiæ Australiæ* (1862-81); *Plants of Victoria* (1860-65); *Flora Australiana* (7 vols., 1863-70); and *Select Extratropical Plants* (1891).

MÜLLER, FRIEDRICH (called Maler Müller) (1749-1825). A German poet, painter, and engraver, born at Kreuznach. He showed in his youth a talent for art, and began to study painting at Zweibrücken, where his fascinating personality and varied endowments won him the favor of the Court circles. In 1774 he went to Mannheim, and soon acquired a reputation as a poet. His idyls were inspired, first by Gessner, afterwards by Voss, some of them being realistic descriptions of the life of the common people in the Palatinate. He is best known as a dramatist, and as such a true representative of the 'Storm and Stress' period, whose unbalanced enthusiasm is most apparent in *Golo und Genoveva.* To the theme attempted in *Fausts Leben dramatisirt* his powers were hardly adequate. In 1777 he had become electoral Court painter, and in 1778 means were provided to satisfy the artist's longing for Rome. Although he continued there his literary efforts for a time, he more especially cultivated painting, setting up Michelangelo as his idol, but falling into exaggerations and never attaining any real success. Gradually estranged from his art through failures and distress, he devoted himself to art-historical studies, became a sort of ambulant antiquary, and was much sought as a cicerone. Through the patronage of the Crown Prince of Bavaria (afterwards King Louis I.) he was enabled to pass his declining years in comparative ease. Consult Seuffert, *Der Maler Müller* (Berlin, 1877).

MÜLLER, FRIEDRICH (1782-1816). A German engraver, born at Stuttgart. He first studied under his father, Johann Gotthard Müller, an engraver of note, and subsequently in Paris. In 1808 his engraving of "Saint John About to Write His Revelation," after Domenichino, won him a high reputation, which was maintained by his "Adam and Eve Under the Tree of Life," after Raphael. In 1814 he was appointed professor of engraving in the Dresden Academy, and the rest of his life was devoted to the execution of the plate of his greatest work, the "Madonna di San Sisto," after Raphael. His health broke down under the labor imposed by this undertaking, and he did not live to see a finished print of his work. His engravings are only eighteen in number, mostly portraits, including Schiller, Jerome Bonaparte, Jacobi, and a medallion of Napoleon I.

MÜLLER, FRIEDRICH (1834-98). An Austrian philologist. He was born at Jemnik, Bohemia; studied in Vienna and Göttingen, and from 1866 until his death was professor of comparative philology and Sanskrit at the University of Vienna. He was a member of the Academy of Sciences, and was one of the highest authorities on comparative philology and ethnology and the relations of the two sciences. Besides contributing largely on these subjects to the *Mitteilungen der anthropologischen Gesellschaft* and the *Wiener Zeitschrift für die Kunde des Morgenlandes,* and editing these periodicals for a time, he wrote the linguistic and the ethnological parts of the *Reise der österreichischen Fregatte Novara* (1867-73); *Allgemeine Ethnographie* (1873); and a *Grundriss der Sprachwissenschaft* (1876-87).

MÜLLER, FRIEDRICH VON (1779-1849). A German statesman. He was born at Kunreuth, Bavaria; studied law at Erlangen and Göttingen, and in 1801 entered the administrative employ of Weimar. His greatest political achievement was his inducing Napoleon to keep Weimar independent (1806-07). For this he was rewarded by being ennobled and raised to the post of Privy Councilor. He wrote *Erinnerungen aus den Kriegszeiten von 1806-13* (1851). Müller became Chancellor in 1815, and from 1835 to 1848 was Deputy. On his friendship with Goethe, consult Burkhardt, *Goethes Unterhaltungen mit dem Kanzler Friedrich von Müller* (Stuttgart, 1870).

MÜLLER, FRIEDRICH MAX (commonly called Max) (1823-1900). One of the best known of recent Orientalists and philologists. He was born at Dessau, in the Duchy of Anhalt-Dessau, December 6, 1823, where his father, the poet Wilhelm Müller (q.v.), was librarian of the ducal library. Max Müller received the elements of his education at Dessau, and then went to Leipzig, where, under Hermann Brockhaus, he began the study of Sanskrit. This he soon chose as his special pursuit, and at the age of twenty he was ready for the degree of doctor of philosophy. The first fruits of his labors appeared in a translation of the *Hitōpadēsa* (1844). In 1844 he went to Berlin to study under Bopp and Schelling, and to consult the Sanskrit manuscripts there. In Paris, whither he went in 1845, he began, at the suggestion of Burnouf, to prepare an edition of the Rig-Veda, with the commentary of Sāyana (q.v.). With this view he went to England, June, 1846, to examine the manuscripts in the East India House, London, and the Bodleian Library at Oxford, and, on the recommendation of the distinguished Sanskritist H. H. Wilson, the East India Company commissioned him (1847) to edit the Rig-Veda at their expense. The first volume of this great undertaking appeared in 1849, and the sixth and concluding volume was published in 1874. A second edition was issued in 1889-92. In 1850 Max Müller was appointed deputy Taylorian professor of modern languages at Oxford; in 1854 he succeeded to the professorship, and in 1858 he was elected a fellow of All Souls' College. While pursuing his labors connected with the Rig-Veda he published treatises on a variety of philological topics which did more to awaken in England a taste for the science of language in its modern sense than the labors of any other single scholar. Inheriting the poetic imagination and fire of his father, he had at command such a felicity of illustration that subjects dry under ordinary treatment became in his hands attractive. The lectures which he delivered on the Hibbert Foundation on the *Origin and Growth of Religion* (1878), and the Gifford series on *Natural Religion, Physical Religion, Anthropological Religion,* and *Theosophy or Psychological Religion* (1890-92), attracted much attention. He continued to publish on literary, linguistic, and philosophical subjects up to the time of his death, which occurred at Oxford, October 28, 1900. Among his long list of works, mention may be made of a translation into German of Kalidasa's *Mēghadūta* (1847); *The Language of the Seat of War in the East* (2d ed. 1855); *Comparative Mythology* (in the "Oxford Essays" for 1856); *History of Ancient Sanskrit Literature* (2d ed. 1860); lectures on *The Science of Language* (1861; last ed. 1889); *The Science of Religion* (1870). *Chips from a German Workshop*, in four volumes, was published 1868-75; the Hibbert Lectures on the *Origin and Growth of Religion*, in 1878; *Selected Essays*, in 1881; *Six Systems of Indian Philosophy* (1899); *Auld Lang Syne* (1st and 2d series, 1899); and *Ramakrishna, His Life and Sayings* (1899). His translation of Kant's *Critique of Pure Reason*, with a scholarly introduction, appeared in two volumes (1881). He wrote a romance, *Deutsche Liebe* (12th ed. 1901). He was editor of the important series *The Sacred Books of the East;* was one of the eight foreign members of the Institute of France, a Knight of the Prussian Order, a member of the Privy Council of the Queen of England, besides being the recipient of many honorary degrees. After his death appeared his *Last Essays* (1901) and *My Autobiography* (1901), edited by his son. Consult *Life and Letters of the Right Honorable Friedrich Max Müller*, edited by his wife (London, 1903).

MÜLLER, Georg Elias (1850—). A German professor of philosophy, born at Grimma, in Saxony. He was educated at the universities of Leipzig, Berlin, and Göttingen. In 1870 he entered the German army as a volunteer, and took part in the campaign against France. On returning to academic life he became privat-docent at Göttingen (1876), and professor of philosophy at Czernowitz (1880). In April, 1881, he was appointed full professor at Göttingen. He published: *Zur Theorie der sinnlichen Aufmerksamkeit* (1873); *Zur Grundlegung der Psychophysik* (1878); *Zur Theorie der Muskelcontraction* (1891); *Zur Analyse der Unterschiedsempfindlichkeit*, with L. G. Martin (1899); and *Experimentelle Beiträge zur Lehre vom Gedächtnis,* with Pilzecker (1900).

MÜLLER, Georg Friedrich (1805-98). A German evangelist and philanthropist. He was born at Kroppenstädt, Prussia, near Magdeburg, September 27, 1805. He entered the University of Halle (1825) as a divinity student, although his life was anything but exemplary. Late in that year he was converted, and in 1826 began preaching. In June, 1828, he was invited to London by the Society for Promoting Christianity among the Jews, to engage in its service for six months, and in March, 1829, reached London. He settled as pastor of Ebenezer Chapel, Teignmouth, in connection with the Plymouth Brethren; in 1832 he removed to Bristol, and was co-worker with Henry Craik. While at Teignmouth he gave up pew-rents and depended on voluntary gifts, for which a box was placed in the chapel. The result was a largely increased income, and from that time on he would take no salary, depending wholly upon voluntary gifts. In December, 1835, after a visit to the Continent, he published a proposal for the establishment of an orphan-house for destitute children bereft of both parents. Spontaneous offers of money and service were received, and the opening of the home was announced May 18, 1836. At the end of 1856 there were 297 orphans under his care. The number of orphans increased and the buildings were multiplied, until in 1875 "2000 children were lodged, fed, and educated, without a shilling of endowment, without a committee, without organization, by funds drawn from all parts of the world." In 1849 he moved the orphanage to Ashley Down, a suburb of Bristol, to specially constructed buildings. Attended by his wife, he made evangelistic tours all over the world. His *Narrative* and other books and pamphlets had a large sale, and gave information of his work. He died at Ashley Down, March 10, 1898. Consult his biography, by A. T. Pierson (New York, 1899).

MÜLLER, Gerhard Friedrich (1705-83). A German historian, born at Herford, in Westphalia, and educated at Leipzig. Entering the newly established Saint Petersburg Academy, he gave instructions in history, geography, and Latin, and was soon appointed professor of history. In 1740 he went to Siberia and traveled for ten years, engaged in the study of its antiquities and geography. Of his great work on Siberia only one volume was published (1750). On his return he became historiographer to the Empire, and in 1766, after many attacks by his colleagues, was appointed keeper of the national archives. He drew up for the Government a collection of its treatises, and wrote a number of works on Russian history, in which subject he was a high authority. His most important book, a *Collection for the History of Russia*, appeared at Saint Petersburg, in nine volumes (1732-65). His work in geography and cartography was also important.

MÜLLER, mụ'lẽr, IVAN VON (1830—). A German classical philologist. He was born at Wunsiedel, in Bavaria; was professor in the University of Erlangen (1864-93), and from 1893 professor in the University of Munich. His published works are numerous; he is best known as general editor of the comprehensive *Handbuch der klassischen Altertumswissenschaft* (Munich, 1885), and also as the editor of many of the works of Galen, and as reviser of Nägelsbach's *Lateinische Stilistik* (Nuremberg, 1888).

MÜLLER, JOHANN FRIEDRICH THEODOR (known as FRITZ MÜLLER, or MÜLLER-DESTERRO) (1821-97). A German naturalist, known for his contributions to bionomics and to the evolution theory. He was born at Windischholzhausen, near Erfurt. He studied at Greifswald and Berlin. The troubles of 1848 finally drove him from home and Berlin, and he emigrated to Southern Brazil, settling at Blumenau, on the island of Santa Catharina. Here he lived the life of a colonist and pioneer until 1856, when he became a teacher of mathematics and natural history in the gymnasium at Desterro. After various changes he was in 1874 appointed *naturalista viajante* of the museum at Rio Janeiro, and lived at Itajahy. Afterwards he was suddenly dismissed from his position, without any explanation from the authorities, and returned to Blumenau.

Müller published numerous papers on jellyfishes and worms, but more particularly on crustaceans and insects, his articles appearing mostly in Wiegmann's *Archiv für Naturgeschichte, Kosmos, Natur*, and the Annals of the Rio Janeiro Museum. His single book, *Facts for Darwin*, was called out by Darwin's *Origin of Species*, and it gave him wide fame. It was written at Desterro in 1863, was published at Leipzig in 1864, and was translated, with some additions, into English in London in 1869. It was the application of Darwinian principles to certain forms of a single class, the Crustacea. In this book we have, in the chapter on the "Progress of Evolution," the first clear statement of the biogenetic law or recapitulation theory afterwards restated by Haeckel. Müller also proposed the theory of mimicry which bears his name. See MIMICRY.

MÜLLER, JOHANN GOTTHARD VON (1747-1830). A German line engraver, born at Bernhausen, near Stuttgart. He at first studied under the Court painter Guibal, but, developing a talent for engraving, went to Paris in 1770, where for six years he studied under Wille. He won a number of prizes there, and was elected a member of the French Academy. In 1776 Duke Charles recalled him to Stuttgart, where he taught for nine years, and whence he was summoned to Paris to engrave a portrait of Louis XVI., after Duplessis. Next in importance to this is his engraving of Trumbull's "Battle of Bunker Hill." On his return to Stuttgart he became professor of engraving. He was elected a member of the principal European academies, and was knighted in 1818. He engraved thirty-three plates in all, of which, besides those mentioned, the best are: "Madonna della Seggiola," after Raphael; "Saint Catharine with Two Angels," after Leonardo da Vinci; "Schiller," after the portrait by Graf; and "Saint Cecilia," after Domenichino.

MÜLLER, JOHANNES (1436-76). The real name of the German scientist Regiomontanus (q.v.).

MÜLLER, JOHANNES (1801-58). The most masterful, accurate, and influential physiologist and morphologist of his time. He was born at Coblenz, Rhenish Prussia, July 14, 1801; began to study theology, but abandoned it for medicine, beginning his medical studies at Bonn in the autumn of 1819. While there he prepared a prize essay, *De Respiratione Fœtus* (1821). He graduated in 1822. In the spring of 1823 he went to Berlin and studied with Rudolphi, then returned to Bonn as privat-docent, to teach physiology and comparative anatomy. In 1826 he was appointed professor extraordinarius in the University of Bonn, and he was made full professor in 1830. In 1833 he was called to the University of Berlin, where he succeeded Rudolphi as professor of anatomy and physiology, and after Meckel's death he edited the *Archiv für Anatomie, Physiologie und wissenschaftliche Medicin*, and remained at Berlin until his death, which occurred April 28, 1858.

With his unusual powers of application, thoroughness, and breadth, his acuteness and penetration, young Müller opened up in different directions new fields of research. In 1826 he published an important work on the physiology of sight, and a treatise entitled *Ueber die phantastischen Gesichtserscheinungen*, and in 1827 a work based on his lectures on physiology; in 1829 his work on general pathology, and in 1833 the first part of his epoch-making *Handbook of Human Physiology*, which was completed in 1840. In 1834 he was elected a member of the Berlin Academy of Sciences. As a physiologist he was the founder of a new school, working by novel methods. To him physiology owes the foundation of Bell's law, the principle of reflex movements and other nervous activities; comprehensive and detailed views on vision and hearing; a thoroughly well-grounded knowledge of the nature of the blood, lymph, and chyle; the proof of the independence of the quality of glandular secretions from the grosser structure of the glands, and the knowledge of chondrin. Müller opposed the school of nature-philosophers and placed physiology on a sound basis. He was also a founder and leader in the new morphology. The science of comparative embryology was greatly enriched by his researches. He discovered the pronephric ducts which bear his name, and explained the nature of hermaphroditism; he made extended contributions to and laid the foundations of our knowledge of the embryology and metamorphoses of the echinoderms, and he examined into the mode of development of certain sharks, which led up to his subsequent studies on the ganoids and Amphioxus. The debt morphology owes him is shown in his discovery of the lymph-hearts of the Amphibia, the micropyle of the eggs of fishes, holothurians, and the like, the intimate structure of glands, of cartilaginous and bony tissue, of erectile tissue, of the musculature of the intestines, and the finer structure of the peritoneum.

His principal works in comparative anatomy and morphology were his *Vergleichende Ana-*

tomie der Myxinoiden (1834-43), which Carus has called 'the codex of the morphology of vertebrates.' In collaboration with Henle he published, in 1841, *Systematische Beschreibung der Plagiostomen*, and in systematic zoölogy his principal works were *System der Asteriden* (1842), with the collaboration of Troschel, and *Horæ Ichthyologicæ*. Besides these he published upward of two hundred articles, addresses, and reports, most of which appeared in the *Transactions of the Berlin Academy of Sciences* and in the *Archiv für Anatomie, etc.*

Consult the biographical notices by Du Bois-Reymond (*Abhandlungen der Berliner Akademie*, 1859), containing a list of his works; Virchow, *Johannes Müller, Eine Gedächtnisrede* (Berlin, 1858); Bischoff, *Ueber Johannes Müller und sein Verhältnis zum jetzigen Standpunkt der Physiologie* (Munich, 1858); *Proceedings of the Royal Society of London*, vol. ix., p. 556.

MÜLLER, Johannes von (1752-1809). A German historian. He was born January 3, 1752, at Schaffhausen, where his father was a clergyman and rector of the gymnasium. He studied at Göttingen under Heyne, Schlözer, Walch, and others. In 1772 he was appointed professor of Greek at Schaffhausen, and in the same year published his first work, *Bellum Cimbricum*. He now began to devote his leisure hours to the investigation of Swiss chronicles and documents. In 1780 he published the first volume of his great work, *Geschichte der Schweizer*, and in 1781 was called to the Collegium Carolinum at Cassel, as professor of statistics. In 1786 he was appointed librarian and Councilor of State to the Elector of Mainz; here he finished the second volume of his Swiss history; his *Darstellung des Fürstenbundes* (1787); and *Briefe zweier Domherren* (1787). In 1792 he went to Vienna, where the Emperor made him a member of the Aulic Council, and where he in 1800 became first Imperial librarian. In 1804 he left Vienna for Berlin, where he wrote, among other things, an additional volume of his Swiss history. Introduced to Napoleon after the battle of Jena, he was appointed by him (1807) Secretary of State in the new Kingdom of Westphalia. He died at Cassel, May 29, 1809. His works have all been replaced by more modern researches, but in their own day they were of great value. Besides those mentioned, the *Vierundzwanzig Bücher allgemeiner Geschichte*, based on lectures delivered in Geneva (1811 and often republished), are important. Müller's *Sämmtliche Werke* were published (27 vols., Stuttgart, 1810-19; new ed., 40 vols., 1831-35).

MÜLLER, Julius (1801-78). A German theologian. He was born at Brieg, Silesia, and was a brother of Karl Otfried Müller (q.v.). He studied at Breslau and Göttingen, at first devoting himself to law, but afterwards to theology. In 1825 he was appointed pastor at Schönbrunn and Rosen, near Strehlen, where he remained seven years. He was appointed in 1831 second university preacher in Göttingen, and there lectured on practical theology and pedagogics. In 1834 he became extraordinary professor of theology in Göttingen, and soon after full professor in Marburg, whence he went in 1839 to occupy a similar chair in Halle. The work on which his reputation as a theologian chiefly rests is *Die christliche Lehre von der Sünde* (1839; 6th ed. 1889; Eng. trans., from the 5th ed., Edinburgh, 1868); also *Dogmatische Abhandlungen* (1870). He afterwards published pamphlets on subjects of temporary interest, particularly in vindication of the cause of evangelical union against the attacks of the rigid Lutherans. In conjunction with Neander and Nitzsch, he edited a periodical entitled *Deutsche Zeitschrift für christliche Wissenschaft und christliches Leben*. Consult his biography, by L. Schultze (Bremen, 1879).

MÜLLER, Karl Otfried (1797-1840). A German archæologist and philologist, born at Brieg, in Silesia. He studied at Breslau and Berlin, where he was the pupil of August Boeckh. His dissertation, *Liber Ægineticorum* (1817), showed the direction of his future studies, which were devoted to the reconstruction of the history of Greek localities and races. In 1817 he was appointed a teacher at the Magdaleneum in Breslau, in 1819 professor extraordinarius of philology, and in 1823 professor ordinarius at Göttingen. In connection with his studies he traveled widely, and in 1839 secured leave of absence for a visit to Greece and Italy. A sunstroke received while he was copying inscriptions at Delphi led to an attack of fever, from which he died at Athens, where he was buried on the Hill of Colonus. His desire to reconstruct the entire ancient life naturally led Müller to a wide range of scholarly activity. His great work was to be his *Geschichte hellenischer Stämme und Städte*, of which he completed vols. i., *Orchomenos und die Minyer* (1820), and ii., *Die Dorier* (1824); a second edition of these works by Schneidewin (1844; trans. by G. C. Lewis and H. Tafnell, London, 1839). In the same field belonged his treatise, *Ueber die Wohnsitze, Abstammung und ältere Geschichte des macedonischen Volks* (1825), and his *Etrusker* (1828; 2d ed. by Deecke, 1877). His *Handbuch der Archäologie der Kunst* (1830; 3d ed. by Welcker, 1846; trans. by Leitch, London, 1850), though now antiquated in its collections, is of value from the many acute observations it contains. It was accompanied by Müller and Oesterley, *Denkmäler der alten Kunst* (Göttingen, 1834-39), which was continued and completed by Wieseler (1846-56). A third edition appeared (1877-81); a fourth edition of part ii., *Kunstmythologie*, was begun at Leipzig in 1899. His *Prolegomena zu einer wissenschaftlichen Mythologie* (1825) was based on his belief that the elements of the Greek religion were to be found in analysis of the myths, which would refer the specific names to specific places and tribes. He strongly opposed the theories of large foreign influence in Greek civilization. In the last years of his life he undertook to prepare, for the English Society for the Diffusion of Useful Knowledge, a history of Greek literature. A translation by Lewis and Donaldson from the author's manuscript, entitled *A History of the Literature of Ancient Greece*, was published in London in 1840, and with a continuation by Donaldson in 1858. The German original, *Geschichte der griechischen Litteratur bis auf das Zeitalter Alexanders* (1841; 4th ed., revised and continued by Heitz, 1882-84), was published by his brother after his death, as well as *Kleine deutsche Schriften* (1841). A collected edition of *Kunstarchäologische Werke*, in five volumes, was published in Berlin (1872-73). Müller was also prominent as an editor. His edition in Greek and German of *Æschylus's Eumenides* (Göttingen, 1833) gave rise to a fierce controversy with Gottfried Hermann and his school, while his critical editions of Varro, *De Lingua Latina* (Leipzig, 1833), and Festus, *De Significatione Verborum* (ib., 1839), were long standards and are still valuable. For his biography, consult F. Ranke (Berlin, 1870).

MÜLLER, Leopold (1834-92). An Austrian genre painter, born in Dresden, of Austrian parents. He was a pupil of Karl Blaas and of Christian Ruben at the Academy in Vienna. Obliged to support his family after his father's death, he worked eight years as an illustrator for the Vienna *Figaro.* Continuing his studies subsequently, he visited repeatedly Italy and Egypt, and made his name favorably known through a series of scenes from popular life in Italy and Hungary. Afterwards he displayed his coloristic talent to greater advantage in Oriental subjects, such as "Arabian Money-Changers," "Pilgrims to Mecca Resting," "Bedouins in Camp," "Camel Mart," "Young Copt Woman" (New Pinakothek, Munich). Other works include "The Inundation in Vienna, 1862:" "Old Little Matron" and "Last Task of the Day" (both in the Vienna Museum); and "Soldiers in the Thirty Years' War" (Prague Gallery).

MÜLLER, Lucian (1836-98). A German Latinist. He was born at Merseburg, and studied at the universities of Berlin and Halle. In 1870 he was made professor of the Latin language and literature at the Philologico-Historical Institute at Saint Petersburg. His works, which display great erudition and critical acumen, are marred by his bitter attacks on eminent scholars whose opinions differ from his own. They include his famous *De Re Metrica Poetarum Latinorum præter Plautum et Terentium* (2d ed. 1894); editions for the *Bibliotheca Teubneriana* of *Horace* (2d ed. 1879); of *Catullus* (1870); and other Latin poets; editions of *Lucilius* (1872); *Phædrus* (1877); *Ennius* (1884); *Nævius* (1885); Horace's *Odes and Epodes*, with German commentaries (1882); and Horace's *Satires and Epistles* (1841-43). His treatise entitled *Ein Horazjubiläum* (1892) contains a short autobiography.

MÜLLER, Max. See Müller, Friedrich Max.

MÜLLER, Morten (1828—). A Norwegian landscape painter, born at Holmestrand on the Christiania Fjord. After studying in Düsseldorf (1847-50), first under Tidemand and Gude, then at the Academy under Schirmer, he lived in Stockholm, and in 1866 went to Christiania, where he conducted a school for painting, subventioned by the Government. In 1871 he removed again to Düsseldorf, and in 1874 was made a member of the Stockholm Academy and Court painter. The rugged grandeur of the fjords and mountainous woodland fastnesses of his native country are the favorite subjects of his characteristic landscapes, in which he combines a romantic conception of nature with purely realistic color effects. Representative examples are a "View on Christiania Fjord" (1855), and "Entrance Into Hardanger Fjord" (both in the National Gallery, Christiania); "Pine Forest in Norway" (1860, Hamburg Gallery); "Romsdal Fjord" (1876); and "Forest Lake by Moonlight" (1892).

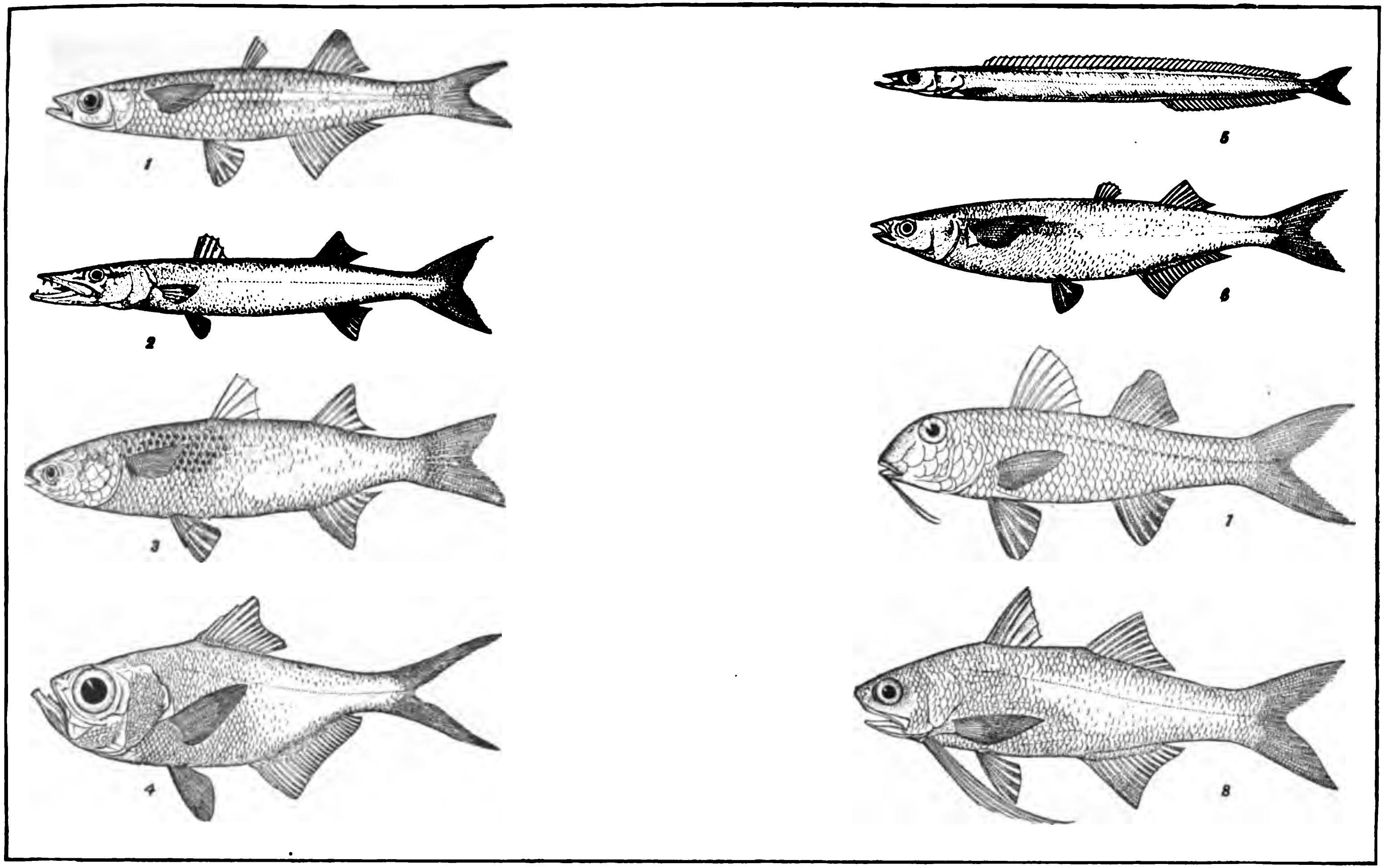
MÜLLER, Otho Friederik (1730-84). A Danish zoölogist, born in Copenhagen. His contributions to the knowledge of Infusoria are especially valuable. He wrote: *Fauna Insectorum Friedrichsdaliana* (1764); *Flora Friedrichsdaliana* (1767); *Vermium Terrestrium et Fluviatilium, seu Animalium Infusorium, Helminthecorum et Testaceorum non Marinorum Succincta Historia* (1771); *Zoölogica Danica* (1779-1806).

MÜLLER, Otto (1816-94). A German novelist. He was born at Schotten, Hesse; was for some time connected with the Court library at Darmstadt, and edited newspapers at Frankfort and Mannheim. In 1854 he established the *Frankfurter Museum.* He was the author of *Charlotte Ackermann* (1854); *Der Stadtschultheiss von Frankfurt* (3d ed. 1878), treating of Goethe's grandparents; *Aus Petrarcas alten Tagen* (1861); *Der Majoratsherr* (1873); and *Schatten auf Höhen* (1881). Consult the biography, by Schulte vom Brühl (Stuttgart, 1895).

MÜLLER, Peter Erasmus (1776-1834). A Danish theologian and antiquary. He was born at Copenhagen, and studied at the university there, passing his theological examination in 1791. After spending some time in the German universities, he visited France and England. Returning, he wrote numerous works; was appointed professor of theology at the University of Copenhagen in 1801, and in 1830 became Bishop of Zealand, the highest ecclesiastical dignity in Denmark. He was an eminent theologian, and his theological works, including that on the Christian moral system (1808) and other volumes, are very highly valued. But his literary reputation rests upon his essays on Danish and Norse antiquities, of which the most valuable are: *Om det islandske Sprogs Vigtighed* (1813); *Kritisk Undersögelse af Danmarks og Norges Sagnhistorie* (1823-30); and, above all, his *Sagabibliothek,* or *Library of the Sagas* (1816-18).

MÜLLER, Victor (1829-71). A German historical painter, born in Frankfort. First instructed there at the Städel Institute by Steinle, he studied afterwards at the Antwerp Academy and under Couture in Paris. Soon, however, he became a follower of Courbet, whose technique, the reverse of Couture's, he adopted, and subsequently helped to promote in Germany. In 1858 he returned to Frankfort, where he soon attracted attention with a series of pictures, thoroughly realistic in conception and of great coloristic charm, but scarcely understood by a public accustomed to the sentimental trend of the Düsseldorf school of that period. He therefore, in 1866, removed to Munich, where such revolutionary departures from traditional treatment as the "Sleeping Wood-Nymph" (1863), or "Hero and Leander," were more likely to be appreciated. Out of a cycle from Shakespeare, which he painted there, "Hamlet in the Graveyard" (1869) is surpassed only by the "Balcony Scene in Romeo and Juliet" (New Pinakothek, Munich). To his influence as a colorist was due not only the introduction of the tone-element into the paintings of the Munich school, but also the truer conception of historical characters and a more wholesome observation of nature among the younger generation of artists.

MULLETS AND ALLIES



1. GULF SILVERSIDES (Menidia peninsulæ).
2. BARRACUDA (Sphyræna barracuda).
3. COMMON MULLET (Mugil cephalus).
4. SLIMEHEAD (Beryx splendens).
5. SAND-EEL (Ammodytes Americanus).
6. CALIFORNIA 'SMELT' (Atherinopsis Californiensis).
7. AMERICAN SURMULLET (Mullus auratus).
8. GULF BARBUDO (Polydactylus Virginicus).

MÜLLER, Wenzel (1767-1835). An Austrian composer, born at Tyrnau, Moravia. He was a pupil of Dittersdorf, and from 1813 was kapellmeister at the Leopoldstadt Theater, Vienna. He wrote more than two hundred operas, besides symphonies, cantatas, and masses. His compositions include: *Das verfehlte Rendezvous* (1783); *Das neue Sonntagskleid* (1793); *Die Schwestern von Prag* (1794); and *Asmodi oder das böse Weib und der Satan* (1834).

MÜLLER, Wilhelm (1794-1827). A German poet, excelling in popular and political songs that attracted great composers, notably Schubert, and also influenced Heine's lyric development. Müller, who was born in Dessau, October 7, 1794, studied philology and history, fought in the War of Liberation, visited Italy (1817-19), was made professor in the Gelehrtenschule at Dessau (1819), and ducal librarian there. He died in Dessau, September 30, 1827. His poems, published under the titles *Müllerlieder* (1818); *Gedichte eines Waldhornisten* (1821); *Lieder der Griechen* (1821-24); *Lieder des Lebens und der Liebe* (1824); *Lyrische Reisen* (1827), were collected with other *Works* by Schwab in five volumes (1830). A new edition by Müller's son, the Orientalist, Max Müller, appeared in 1868; the *Poems* were published in one volume (1874).

MUL'LER, William John (1812-45). An English landscape and figure painter, born at Bristol. He studied with James Pyne, landscape painter, and in 1833 exhibited for the first time at the Royal Academy, the "Destruction of Old London Bridge, Morning." He spent seven months traveling in Germany, Switzerland, and Italy, and in 1838 he visited Greece and Egypt. In 1841 he published his "Picturesque Sketches of the Age of Francis I.," and joined the Government expedition to Lycia, the results of which were paintings of Oriental life and scenery, five of which were exhibited at the Royal Academy in 1845. Among these are "The Tent," "Xanthus," the "Burial-Ground at Smyrna," and "Head of a Cingari." In the National Gallery are some fine Welsh landscapes, and a clever Lycian sketch, both in oil, and in the South Kensington Museum are several water-color drawings. Muller died at Bristol. His art was original, his selections were good, his color was pure and strong.

MÜLLER, mṳ'lẽr, Wolfgang (called Müller von Königswinter) (1816-73). A German poet and novelist, born at Königswinter on the Rhine. He studied medicine at Bonn, and practiced at Düsseldorf, but afterwards removed to Cologne, and gradually gave up medicine to devote himself to literature. Müller's poetry finds its material in the Rhine, its beauty, its legends, and the life of its people. The more important of his books are: *Gedichte* (1847; 3d ed. 1868); *Der Rattenfänger von Sankt Goar* (1856); *Liederbuch* (1857; 4th ed. 1871); *Lorelei*, an epic cycle (1851; 4th ed. 1873); *Erzählungen eines rheinischen Chronisten* (1860-61); and *Im Rittersaal* (1874). His best-known poem is "Mein Herz ist am Rhein." Six volumes of his selected poems were published under the title *Dichtungen eines rheinischen Poeten* (1871-76). Consult Joesten, *Wolfgang Müller* (Cologne, 1895).

MÜLLER-GUTTENBRUNN, gṳ'ten-brṳn, Adam (1852—). An Austrian author, born at Guttenbrunn, and educated at Hermannstadt and Vienna. In 1879 he removed to Vienna from Linz. His first success was *Des Hauses Fourchambault Ende* (1880), supplementing Augier's drama *Les Fourchambault*. This was followed by *Im Banne der Pflicht* (1882), the comedy *Schauspielerei* (with Laube, 1883), and *Irma* (1885). Among his novels and stories, which for the greater part appeared serially, the best-known are: *Frau Dornröschen* (1884; 3d ed. 1891); *Gescheiterte Liebe* (1889); and *Die Magyarin* (1896).

MULLET (OF., Fr. *mulet*, diminutive of *mulle*, from Lat. *mullus*, red mullet). Any one of a variety of useful fishes, principally of the family Mugilidæ. In this family the body is nearly cylindrical, with large scales and two widely separated dorsal fins, the first with four stiff spines. The mouth is small. The best-known mullets belong to the genus Mugil, of which there are many species found in all warm waters. The common or 'striped' mullet (*Mugil cephalus*) is the largest (10 to 12 pounds) and best of all. It occurs on both coasts of America, and also in Europe. It often ascends rivers, and searches for soft or fat substances for food, frequently obtained by thrusting its mouth into the mud. It is easily reared in ponds, readily answers the call which usually summons it to be fed, and was in great request among the ancients. Mullets are used fresh, salted, and smoke-dried. A preparation of their roe, called 'botarcha,' is in great esteem as a condiment in Italy and the south of France. They are often caught in the Mediterranean by angling from a rock, with a bait paste, when they have been previously attracted to the spot by macaroni thrown into the water. The white or 'blueback' mullet (*Mugil curema*) is found on both shores of America, and is of importance as a food fish. An abundant species about the Florida Keys is the 'fan-tail' mullet (*Mugil trichodon*). Mullets are very numerous in surface-swimming shoals in the lagoons of the Gulf Coast in late winter and spring, and are captured generally by means of casting nets. Among the fishermen of Spanish America, mullets are called 'liza,' 'lizita,' and 'macho,' with descriptive adjectives for the various species.

The name is also given in the Western and Southern United States to various suckers of the genus Moxostoma. Consult Goode, *Fishery Industries*, sec. i. (Washington, 1884). See Plate of Mullets and Allies.

MULLET (OF. *molette, mollette*, Fr. *mollette*, rowel, from Lat. *mola*, millstone). In heraldry, a charge in the form of a star, generally with five points, intended to represent a spur-rowel. See Cadency.

MULLIGAN LETTERS. A series of letters written by James G. Blaine (q.v.) to Warren Fisher, a business associate, which, it was alleged, proved corrupt connection, on the part of Blaine, with legislation in Congress favoring the Little Rock and Fort Smith Railroad and the Northern Pacific Railroad. The letters were obtained from Fisher by one James Mulligan, a former clerk of Fisher, who had been called to Washington to testify before a committee of the House of Representatives appointed to investigate the charges against Blaine. Blaine obtained the letters from Mulligan, and on June 5, 1876, read them before the House, after defying the committee to compel him to surrender them. The letters were freely used in the Presidential campaigns of 1876 and 1884 by the opponents of Blaine, who took full advantage of the suspicious sound of several detached sentences. By the adherents of Blaine it was asserted, apparently with good reason, that the letters did not in any way prove corruption or even participation in discreditable business and political transactions on the part of Blaine.

MULLINGAR, mŭl'lĭn-gär'. The capital of County Westmeath, Ireland, on the Brosna, 50 miles west by north of Dublin, with which it is connected by rail and by the Royal Canal (Map: Ireland, D 3). The most important horse and cattle fairs in Ireland are held here periodically. It has a cathedral and infantry barracks. Population, in 1901, 4500.

MULLINGER, mŭl'lĭŋ-gẽr, James Bass (1834—). An English historian, born at Bishop Stortford. He was educated at University College, London, and at Saint John's, Cambridge, where he graduated with high honors. After lecturing at Bedford College, London, he was made librarian and lecturer on history in Saint John's College, and for four years he was lecturer on ecclesiastical history in Trinity College (1890-94). He wrote: *The Ancient African Church* (1869); *The Schools of Charles the Great* (1876); *An Introduction to English History* (with Gardiner, 1881); *The Age of Milton* (with Masterman, 1897); and a *History of Saint John's College, Cambridge* (1901).

MULLION (corrupted from *munnion*, from Fr. *moignon*, stump of an amputated limb, from OF. *moign*, from Lat. *mancus*, maimed; probably influenced by popular etymology with Eng. *mullet*, five-pointed star). The name for a vertical architectural member used to subdivide an opening, such as a window or the bay of a gallery, into two or more divisions within the main framework. It was practically unknown to all ancient styles of architecture. In the early Christian (especially Syrian), Byzantine, and Romanesque styles it occurs with increasing frequency in the very simple form of a circular shaft or colonnette (sometimes a small pier), subdividing a window into two arched openings or the bay of a gallery into two arcades.

It was in the Gothic style that the mullion received its true elaborate development through the use of tracery combined with the enormous increase in the size of windows and other openings, necessitating the multiplication of minor members. The orthodox cathedral window has three mullions forming four subordinate sections, and their profiles are varied and rich, being often a group of shafts and a composition of fillet and cavetto moldings. These Gothic mullions are exquisitely slender and far removed from the heavy pre-Gothic mullion-colonnette, though the column, in more delicate form, was also a Gothic form of mullion. The Renaissance architects abandoned the mullion, returning to the antique idea of undivided openings and equally divided arcades and colonnades. Only occasionally is a single colonnette used as a window-mullion, especially in early work.

MÜLLNER, mụl'nẽr, Adolf (1774-1829). A German dramatist and critic, born at Langendorf, near Weissenfels, Saxony. He studied law in Leipzig, and practiced it at Weissenfels until 1816. Encouraged by the success of several comedies skillfully composed after French models, he produced in 1812 a one-act tragedy, *Der neunundzwanzigste Februar*, in imitation of Werner's *Der vierundzwanzigste Februar* (1810), the first of those 'fate-dramas' with which the German stage was flooded during the following decade. Surpassing its model in the accumulation of horrors, Müllner's play lacked the innate poetry which was the redeeming feature of Werner's production. The same applies to his best-known work, *Die Schuld*, a four-act drama, based on the story of a young man, who, according to a prophecy, is destined to kill his brother. This typical 'fate-tragedy' was brought out in Vienna in 1813, and subsequently on all the principal stages of Germany, retaining its popularity for many years, although its effectiveness was due mainly to clever technical construction. Consult: Höhne, *Zur Biographie und Charakteristik Müllners* (Wohlau, 1875); and Minor, *Die Schicksalstragödie in ihren Hauptvertretern* (Frankfort, 1883).

MULOCK, mū'lŏk, Dinah Maria. An English author. See Craik, Dinah Maria.

MULOCK, Sir William (1843—). A Canadian statesman, born in the Province of Ontario, and educated at the University of Toronto. In 1882 he was elected a Liberal member of the Dominion House of Commons, and in 1896 was made Postmaster-General in the Administration of Sir Wilfrid Laurier. The establishment of a penny postage rate between Canada and other portions of the Empire was mainly due to him, and he also advocated an all-British cable system, and the formation of better steamship facilities.

MULREADY, William (1786-1863). An Irish genre painter. He was born at Ennis, County Clare, April 1, 1786. His father moved to London when Mulready was a child, and he early showed artistic powers which were encouraged by the sculptor Banks, through whose influence he gained admittance to the academy schools. His education and culture were obtained in England, for he never went abroad, and as a genre painter he ranks with Wilkie. His first painting of importance, "Returning from the Ale House," appeared in 1809, while two later works, "Punch" and "Idle Boys," commanded very general attention. Mulready was elected an associate of the Royal Academy in 1815, and the following year, on the merits of his picture entitled "The Fight Interrupted," he was made Academician. From now on his works were eagerly awaited at the yearly exhibitions, their subjects being of the popular order, but painted with great carefulness and fidelity to detail. They were rather small in size, but rich in color, and closely resembled the Dutch school.

His most important works are in the South Kensington Museum and in the National Gallery. In the former are seventeen of his paintings, among them "Hampstead Heath" (1806); "Giving a Bite" (1836); "Choosing the Wedding Gown" (1846): "The Butt" ("Shooting a Cherry") (1848). In the latter are six of his paintings, including a "Snow Scene" and "Crossing the Ford" (1842). "The Bathers" is in the National Gallery, Edinburgh, and his "Wolf and the Lamb" is in possession of the King. Mulready's paintings were before the public for more than sixty years. An early marriage contracted soon after his arrival in London was productive of much unhappiness. He was, throughout his life, a successful and painstaking teacher. Mulready died in London, July 7, 1863. Consult Stephens, *Memorials of Mulready* (London, 1867).

MULTAN, or **MOOLTAN,** mo͞ol'tän'. The capital of a district of the Punjab, British India, 190 miles southwest of Lahore, and 4 miles from the left bank of the Chenab, the inundations of which sometimes reach the city (Map: India, B 2). It possesses railway communication with all the principal cities of India, and has, in the Indus Valley Railway, a commercial outlet from Central Asia, the Punjab, and the United Provinces, to the Arabian Sea at Karachi. Steamers ply to Hyderabad, a distance of 570 miles. The city, situated in a district remarkable for its fertility, is built on a mound consisting of the ruins of ancient cities, and is surrounded by a dilapidated wall from 40 to 50 feet high. The vicinity abounds in mosques, tombs, and shrines, attesting the city's antiquity and former magnificence. The most important of these, situated in the old fort, is the tomb of Rukn-i-Alam, 'pillar of the world,' dating from 1340, an octagonal red-brick structure covered with multicolored glazed tiles and raised mosaics, and forming a conspicuous object in the surrounding landscape, being 100 feet high and built on an elevation. The tomb of Bhawal Hakk, dating from 1264, and the tomb of Shams-i-Tabriz, are also noteworthy. The bazaars are numerous, extensive, and well stocked, and the stores are adequately supplied with European and Asiatic commodities. There are manufactures of silks, cottons, shawls, scarfs, brocades, tissues, etc., and extensive banking interests. The local merchants are proverbially rich. Multan is a military station, with an important cantonment one and one-half miles to the east. Multan was taken by the British in the second Sikh War, in January, 1849. Population, in 1891, 74,562; in 1901, 87,394.

MULTIPLE (ML. *multiplus*, manifold, from Lat. *multus*, many + *-plus*, fold). An integral number divisible without remainder by another integral number. Thus, 35 is a multiple of 7, and also a multiple of 5. *Equimultiples* are multiples containing different numbers an equal number of times; e.g. 21 and 33 are equimultiples of 7 and 11. The *least common multiple* of several numbers is the least number containing each of them without a remainder. The least common multiple contains all prime factors not common to all of the numbers, and all common prime factors with their highest exponents. Thus, the least common multiple of $5 \cdot 7$ (i.e. 35), $3^2 \cdot 2$ (i.e. 18), and $7^2 \cdot 2^2 \cdot 5$ (i.e. 980) is $5 \cdot 7^2 \cdot 2^2 \cdot 3^2$ (i.e. 8820).

Mathematical symbols which satisfy given conditions for different numerical values are said to be 'multiple valued'; e.g. $\sin^{-1}x$ (i.e. the angle whose sine is x) is two-valued between 0° and 360°; thus, if the sine equals ½, the angle has two values, 60°, 120°. (See TRIGONOMETRY.) Contacts above the first order between curves or surfaces are called 'multiple contacts.' A 'multiple point' of a curve is a singularity composed of several coincident points; e.g. if the curve crosses itself twice at the same place, the intersection is called a triple point. A double point admits of two tangents, a triple point admits of three tangents, and so on, and these are called 'multiple tangents.'

MULTIPLE POINDING. A form of action in Scotland, by which competing claims to one and the same fund are set at rest. Its purpose is to avoid double poinding or double distress; and it corresponds to what is known in England as interpleader (q.v.).

MULTIPLICATION (Lat. *multiplicatio*, from *multiplicare*, to multiply, from *multiplex*, manifold, from *multus*, many + *plicare*, to fold, Gk. πλέκειν, *plekein*, to twine). A fundamental process in arithmetic and algebra. In arithmetic, the symbols for multiplication are ., ×. In algebra, they are ., ×, and simple juxtaposition. E.g. $a \cdot b$, $a \times b$, ab, are symbols for a times b. It may be defined as the process by which a number called the *product* is formed from a number called the *multiplier*, in the same way that this multiplier is formed from unity. E.g. the number -3 may be formed from unity by the process symbolized as $-(1 + 1 + 1)$, and similarly, the product $-3 \cdot 4$ may be formed by the process $-(4 + 4 + 4) = -12$. Elementary multiplication is subject to the associative and distributive laws (qq.v.); but there are branches of higher mathematics in which exceptions occur. (See SUBSTITUTION; QUATERNIONS.) For a method of checking multiplication, see CHECKING.

In a series of operations, multiplication takes precedence over addition and subtraction. E.g. $2 + 3 \cdot 6 - 4$ equals $2 + 18 - 4$, not $5 \cdot 2$. The operation of multiplication can be abbreviated by the use of logarithms (q.v.), the slide rule (q.v.), or tables of products and factors or of quarter squares. The plan of multiplication by means of Napier's rods (*Rabdologiæ sive numerationis per virgulas libri duo*, Edinburgh, 1617) has been revived through the manufacture of sets of *Réglettes multiplicatrices* planned by Genaille and Lucas (Paris, 1885). Growing out of the demand for a system by which prime numbers could be detected, there appeared, in the seventeenth century, numerous tables, of service in the theory of numbers. In 1728 Poëtius published a table of factors for numbers up to 100,000. In 1770 Lambert arranged such a table in modern form for numbers up to 102,000. Burkhardt's table (1814-17) includes factors of numbers to 36,000, and Crelle, Pase, and Glaisher have carried these to 9,000,000. The oldest of the large tables is that of Crelle (7th ed. with an introduction by Bremiker, Berlin, 1895). This gives the products to $1000 \cdot 1000$. Zimmermann's *Rechentafel* (Berlin, 1889) and Müller's *Multiplicationstabellen* (Karlsruhe, 1897) give the products to $100 \cdot 1000$, and are well arranged. For the products to $100 \cdot 100$, Jordan's *Mathematische und geodätische Hilfstafeln* (9th ed., Hanover, 1895) is one of the best. Products have also been tabulated by means of quarter squares, a relation known to the Arabs and doubtless of Hindu origin. The construction of these tables depends upon the identity $ab \equiv \frac{(a+b)^2}{4} - \frac{(a-b)^2}{4}$; thus the product of any two numbers is given by subtracting the quarter square of their difference from the quarter square of their sum. Among the various tables of this type, Laundy's (1856) contains the quarter squares of all numbers up to 100,000. Blater's (Vienna, 1887), complete to 200,000, is regarded as the best. See Calculating Machines.

MULVA'NEY. A character in Rudyard Kipling's "Soldiers Three" in *Plain Tales from the Hills* (1888). The trio are Terence Mulvaney, the Irishman, Learoyd, from Yorkshire, and Ortheris, the Cockney.

MUM. See Beer.

MUM'BO JUM'BO. A strange bugbear described by Mungo Park as common to the Mandingo towns of Africa, and used to discipline quarrelsome wives of the natives. The person assuming the character is clothed in a suit made of bark. After various rites the offender is seized by Mumbo Jumbo, stripped, tied, and whipped with his rod. The name is used in a wider sense of negro idols and fetishes.

MUM'MICHOG (North American Indian name). A small minnow-like fish of sluggish tidal streams of the Eastern United States. See Killifish.

MUM'MIUS, Lucius (c.185-130 B.C.). A Roman commander of plebeian birth. In B.C. 146 he was elected consul and placed in command of the war against the Achæan League. The first battle was decisive. It was fought near Corinth and resulted in the complete defeat of the Grecian allies. The cities of Corinth, Thebes, and Chalcis were plundered and then destroyed by the Roman troops. As trophies of his victory, Mummius caused many of the most valuable works of art to be sent to Rome. The surname of Achaicus was given to Mummius, and a triumph was decreed. Cicero speaks of Mummius as a blunt and plain but honest man, and says that, of all his enormous plunder, none was reserved for his own use. In 141 he was again elected consul. Nothing certain is known about his later life or his death, some writers saying that he died in exile at Delos, and others that his death occurred in Rome, and that his daughter received a dowry from the Senate.

MUMMY-CASE. In ancient Egyptian embalming, the case immediately surrounding the shrouded mummy. It was in the outlines of a human body and was made to fit the corpse. There were usually two mummy-cases for each mummy. The inner one was plain, while the outer one was covered with paintings and hieroglyphs, recounting the life and deeds of the dead. The material was usually cedar. The double case was inclosed in an oblong coffin, and this in its turn in a sarcophagus. See Egypt, section on *Manners and Customs*; Embalming; Sarcophagus.

MUMPS (from Dutch *mompen*, to cheat, from *mommen*, to mumble), The. A popular name of a specific inflammation of the salivary glands described by nosologists as *parotitis*. It is an infectious, contagious disease, occurring as a rule in epidemics, although isolated cases are often seen. While it chiefly attacks children and adolescents, adults are not exempt.

The disorder usually begins with a feeling of stiffness about the jaws, which is followed by pains, heat, and swelling beneath the ear. The swelling begins in the parotid, but the other salivary glands usually soon become implicated, so that the swelling extends along the neck toward the chin. One or both sides may be affected, and, in general, the disease appears first on one side and then on the other. There is seldom much fever. The inflammation is usually at its highest point in three or four days, after which it begins to decline, suppuration of the glands scarcely ever occurring. In most cases no treatment further than due attention to the bowels, and protection of the parts from cold, by the application of flannel or of cotton, is required, and the patient completely recovers in eight or ten days.

A singular circumstance connected with the disease is that in many cases the subsidence of the swelling is immediately followed by swelling and pain in the *testes* in the male sex, and in the *mammæ* in the female. The inflammation in these glands is seldom very painful or long continued, but occasionally the inflammation is transferred to the brain, when a comparatively trifling disorder is converted into a most perilous disease.

MUN, mēn, Adrien Albert Marie, Count de (1841—). A French politician and author, leader of the Catholic Anti-Republican Party. He was born at Lumigny, studied at Saint Cyr, and fought in the Franco-Prussian War and against the Commune. Save for an interval (1879-81) he was a member of the House of Deputies from 1876 until 1893. Through his influence the power of the French clergy was thrown to the Boulangists. In 1892 he founded the league of the 'Sacré Cœur' and on the Pope's instructions promised to work with the Republic for reform if the Government would give up its atheism. Mun took a prominent part in the Dreyfus trial, forcing Billot, Minister of War, to concur in the judgment of the court. The French Academy elected him to its membership in 1897 to succeed Jules Simon.

MUN, Thomas (1571-1641). An English merchant and economic writer, born in London. As a young man he was engaged in the Mediterranean trade, and in 1615 was appointed member of the committee, or director, of the East India Company. In 1621 he published *A Discourse of Trade, from England into the East Indies,* in which he defended the East India Company against the charge that it drained England of bullion. His most important book, *England's Treasure by Foreign Trade,* was published after his death in 1664. This work is the ablest of the writings of the mercantilists, and exercised great influence over the economic and political thought of the time, effectually refuting the Bullionist view, that only such foreign trade as yielded a direct balance of bullion was advantageous to the realm.

MUN'BY, Arthur Joseph (1828—). An English poet, born in Yorkshire. He graduated from Trinity College, Cambridge, and was called to the bar at Lincoln's Inn. *Verses New and Old* (1865) contained "Doris," a lovely pastoral. *Dorothy* (1880), a country story in elegiac verse, was immensely popular in England and the United States. Since then have appeared *Vulgar Verses* (1891), written in dialect; and *Susan: A Poem of Degrees* (1893). Munby defended his realism in an appendix to *Dorothy.*

MUNCH, mŭŋk. Peter Andreas (1810-63). A Scandinavian historian. He was born at Christiania, Norway, and educated at the University of Christiania. He became professor of history at Christiania in 1841, and in 1861 was appointed historiographer and archivist of Norway. He maintained that three distinct dialects prevailed in the kingdoms of Norway, Sweden, and Denmark, and that the so-called Icelandic literature was really the production of ancient Norway. He held that the modern Icelanders keep one dialect, and the inhabitants of the Faroë Islands another, of the ancient Norwegian. He rejected the term 'Icelandic,' for which he substituted 'Old Norse.' He published an *Old Norse Grammar*, an *Old Norse Reading Book*, and a *History of the Norwegian People* (8 vols., 1852-63), and edited a number of Icelandic works, including the elder *Edda* (1847), and the *Royal Mirror* (1848). His collected essays, edited by Gustav Storm, were published in four volumes (Christiania, 1873-76).

MÜNCH-BELLINGHAUSEN, mụŋk bĕl′-lĭng-hou′zen, Eligius Franz Josef, Baron (1806-71). An Austrian dramatist, known under the pseudonym Friedrich Halm. He was born at Cracow, studied jurisprudence, and held a number of Government offices in Austria. His first play, *Griseldis*, produced in 1834 (11th ed. 1896), was well received. It was followed by *Der Adept* (1836); *Camoens* (1837); *Imelda Lambertazzi* (1838); and *Der Sohn der Wildniss* (1843; 9th ed. 1894), a conspicuous success on all the stages of Germany, and known on the American stage under the name of *Ingomar, the Barbarian*. In 1854 appeared *Der Fechter von Ravenna*, his greatest work, which was greeted with universal applause. Of all his subsequent efforts the romantic comedy *Wildfeuer* (1864; 7th ed. 1896) alone brought him a renewal of his earlier triumphs. His collected works were published in eight volumes in 1857-64.

MÜNCHEN-GLADBACH, mụŋ′ĸen-glät′-bäɢ. A town in Prussia. See Gladbach.

MÜNCHHAUSEN, mụŋĸ′hou-zen, Hieronymus Karl Friedrich, Baron (1720-97). An adventurous German noble, born on his father's estate, Bodenwerder, in Hanover, where he died. He served in the Russian cavalry against the Turks (1737-39), and told marvelous tales of his adventures. These were first gathered in English by Rudolph Erich Raspe (q.v.), a German exile (Oxford, 1785), as *Baron Münchhausen's Narrative of His Marvelous Travels and Campaigns in Russia*. G. A. Bürger rendered this into German (1786), and in that language it gained universal popularity as a monument of methodical lying unparalleled in literature. Consult: Carl Müller-Fraureuth, *Die deutschen Lügendichtungen bis auf Münchhausen* (1881), which shows that some of Raspe's tales are borrowed from Bebel's *Facetiæ* (1508), and others from Lange's *Deliciæ* (1765). Consult also Griesbach's introduction to a reprint of Bürger's translation (Stuttgart, 1890).

MUNCIE, mŭn′sĭ. A city and the county-seat of Delaware County, Ind., 55 miles northeast of Indianapolis; on the White River, and on the Cleveland, Cincinnati, Chicago and Saint Louis, the Lake Erie and Western, the Cincinnati, Richmond and Muncie, the Chicago, Indiana and Eastern, and the Chicago and Southeastern railroads, being the terminus of the last mentioned road, which maintains shops here (Map: Indiana, D 2). Intercommunication among the various lines is furnished by a belt road that encircles the city. Muncie is the seat of Palmer University, and has a public library with 13,600 volumes, a fine court-house, and a city hospital. A public library building costing $50,000 was nearing completion in 1903, and an appropriation has been made by Congress for a Government building to cost $80,000. The city is situated in the natural gas belt of the State and is near deposits of coal, advantages that have contributed to its development as an important industrial centre, noted particularly for its extensive iron and steel interests. There are also large glass works, pulp and paper mills, canneries, and manufactories of lawn mowers, silver and silver-plate goods, underwear and clothing, handles, caskets, wheels and carriage woodwork, gas engines and supplies, etc. The municipality owns an electric light plant for street lighting. Population, in 1890, 11,345; in 1900, 20,942.

MUN′DA. An ancient town of Hispania in the country of the Turdetani, in modern Andalusia. It is noted for the victory gained here by Cæsar over the sons of Pompey in B.C. 45.

MUN′DAS, or Munda-Kols. The inhabitants of Chota Nagpur, and one of the principal tribes of the Kolarian stock in Northeastern Hindustan. They are also known as Horo-hu. The Mundas are short of stature and very dolichocephalic. Monogamy is the rule, and the position of the wife is higher than with many Oriental peoples. Some writers use Munda as a general term for Kolarian (q.v.).

MUN′DAY, Anthony (1553-1633). An English poet, playwright, and compiler, born in London. In Rome he obtained material for *The Mirrour of Mutabilitie* (1579), a moralistic effort in verse, and after some experience on the English stage he wrote tracts against the Jesuits and other Roman Catholics, particularly Edmund Campion. The best of his eighteen plays is *The Downfall of Robert, Earl of Huntingdon, Afterwards Called Robin Hood of Merrie Sherwodde* (1598-99). Munday also translated French romances, wrote 'pageants,' such as *The Triumphs of the Golden Fleece* (1623), and verse, such as *A Banquet of Daintie Conceyts* (1588).

MUNDÉ, mŭn′dā, Paul Fortunatus (1846-1902). An American gynecologist, born in Dresden. He came to the United States with his father after the revolution of 1848-49, and in 1866 graduated at the Harvard Medical School. In the same year he volunteered as surgeon in the Austro-Prussian War, and he served in a like capacity with the grade of first lieutenant in the French campaign of 1870-71. He settled in New York City in 1873 as an obstetric specialist; in 1880 became professor at Dartmouth Medical College, and in the New York Polyclinic in 1882. He edited the *American Journal of Obstetrics* (1874-92), and wrote: *Obstetric Palpation* (1880); *Minor Surgical Gynecology* (1880); *Appendix to the Midwifery of Cazeaux and Tarnier* (1884); *Pregnancy and the Puerperal State* (1887); and *Diseases of Women* (1891).

MUNDEL′LA, Anthony John (1825-97). An English statesman and philanthropist, born at Leicester, of Italian-Welsh descent. At eleven he began to learn his trade with a hosiery manufacturer; at twenty-three he was a partner with a firm in Nottingham, and he prospered in the business. He was instrumental in forming the first arbitration court for the settlement of differences between employers and employed (1866), and he was elected to Parliament for Sheffield (1868). In Parliament he directed his energies toward the improvement of laws regulating factories and education, and was particularly successful in the lightening of women's and children's labor. In 1880-85 he was vice-president of the Council of Education under Gladstone, and he succeeded in passing a compulsory education act (1881), while as president of the Board of Trade (1886 and 1892) he started a labor department of which *The Labor Gazette* was the organ. In 1894-95 he was chairman of the Poor-Law Committee; he resigned from Parliament in 1894, but was recalled the following year and died while in service.

MÜNDEN, mụn'den. A town of Southern Prussia, in the Province of Hanover, situated at the confluence of the Fulda and the Werra, 11 miles northeast of Cassel. It has a gymnasium and a palace in which a museum was opened in 1898. The chief manufactures are confectionery, hats, chemicals, and cigars. In the vicinity are coal mines and mill-stone quarries. Population, in 1900, 9236.

MUN'DEN, JOSEPH SHEPHERD (1758-1832). An English comedian, now noted especially for Charles Lamb's well-known encomium, *On the Acting of Munden.* Born in London, he began life in a commercial position, but he early found a place on the provincial stage, and in 1790 made his appearance in London. His ability to 'make faces' was famous, and he was greatest in broad farce, though in serious parts he was not without success. Among his best characters were Sir Francis Gripe, Sir Peter Teazle, Old Dornton, and Sir Robert Bramble. He retired in 1824, and died on February 6, 1832, in London. Consult: Lamb, *The Essays of Elia* (1st series, London, 1823); *Memoirs of Joseph Shepherd Munden, Comedian,* by his son (ib., 1844); Hutton, in *Actors and Actresses of Great Britain and the United States,* ed. by Matthews and Hutton (New York, 1886).

MUNDO, mụn'dō. A wild tribe in Cebú and the Panay Islands. See PHILIPPINE ISLANDS.

MUNDT, mụnt, KLARA. A German novelist, best known under her pseudonym Luise Mühlbach (q.v.).

MUNDT, THEODOR (1808-61). A German novelist and critic of the 'young German' school, husband of 'Luise Mühlbach.' In 1848 he became professor of history at Breslau, and in 1850 professor and university librarian at Berlin. He became first known by his *Madonna, oder Gespräche mit einer Heiligen,* a memorial of Charlotte Stieglitz. Mundt edited, with Varnhagen von Ense, Knebel's letters and posthumous works, and also published Luther's *Politische Schriften.* He wrote books of travel and romantically historical novels: *Carmela* (1844); *Mendoza* (1847); *Die Matadore, etc.* (1850); and also *Geschichte der Weltlitteratur; Geschichte der Litteratur der Gegenwart* (1842); *Geschichte der Gesellschaft;* and a critical *Kunst der deutschen Prosa* (1837).

MÚNDURUCÚ, mo͞on'do͞o-ro͞o-ko͞o'. A powerful tribe of the great Tupian stock (q.v.), residing chiefly about the confluence of the Tapajos and Amazon, in North Central Brazil. They are variously estimated at from 30,000 to 40,000. The men are tall, athletic, broad-chested, and of light complexion, and their naked bodies are entirely covered with artistic tattooing. The women are pleasing in manner, with a natural and unconscious vivacity. Both sexes are noted for their honesty. The men practice agriculture and do beautiful feather work. The women are skillful in weaving cotton fabrics and hammocks. Besides their habit of preserving the heads of their enemies, which has gained them the name of Paiguize, or Beheaders, among the surrounding tribes, they have the custom of killing persons hopelessly ill or decrepit.

MUNGER, mŭṇ'gẽr, THEODORE THORNTON (1830—). An American clergyman. He was born at Bainbridge, N. Y., graduated from Yale College in 1851, and from the Yale Divinity School in 1855. The following year he entered upon the work of the Congregational ministry, serving first at Dorchester, Mass. He remained here until 1860, then devoted two years to travel and study, after which he resumed the ministry, locating in Haverhill from 1862 to 1870, and in Lawrence from 1871 to 1875. In the latter year he removed to California, and during the twelve months of his residence established a church at San José. Returning to the East, he became pastor at North Adams, Mass., where he remained until 1885, when he resigned to accept a call to the United Church, New Haven, Conn. He has published: *On the Threshold* (1880); *The Freedom of Faith* (1883); *The Appeal to Life* (1887); and *Horace Bushnell, Preacher and Theologian* (1899).

MUNGHIR, mŭn-gẽr'. A town of India. See MONGHYR.

MUNGO. See SHODDY.

MUN'GO, SAINT (518?-603). The popular name of Saint Kentigern, one of the three great missionaries of the Christian faith in Scotland. Saint Ninian (q.v.) converted the tribes of the south; Saint Columba (q.v.) was the apostle of the west and the north; Saint Kentigern was the apostle of the Strathclyde Britons, who held the country between the Clyde on the north and the furthest boundaries of Cumberland on the south. (See STRATHCLYDE.) He is said to have been the son of a British prince and princess, and is believed to have been born at Culross on the Forth, near Perth, in 518. He planted a monastery on the site of Glasgow, and became the Bishop of the Kingdom of Cumbria (q.v.). The nation would seem to have been only partially converted, and persecution drove Saint Kentigern from the realm. He found refuge among the kindred people of Wales, and there, upon the banks of another Clyde, he founded another monastery and bishopric, which still bears the name of his disciple, Saint Asaph. Recalled to Glasgow in 573 by King Roderick the Bountiful, Kentigern renewed his episcopal and missionary labors, in which he was cheered by a visit from Saint Columba. He died January 13, 603, and was buried where the Cathedral of Glasgow, called Saint Mungo's, now stands. There is a fragment of a *Life* of Saint Kentigern written in the twelfth century, and a longer *Life* by Jocelyn of Furness, written about 1180. Consult Forbes, in *The Historians of Scotland,* vol. v. (Edinburgh, 1874).

MUNGOOS, or **MONGOOSE** (Telugu *mangisu*). The mungoos (*Herpestes griscus*) is a species of ichneumon (q.v.), a native of India, but introduced into other countries, notably Jamaica, for the purpose of destroying rats and other vermin, upon which it feeds. In India it is often kept about the houses to reduce the number of lizards, mice, rats, and snakes. It kills and eats the most poisonous snakes, such as the cobra, the bite of which is either avoided by the animal's agility or else is not fatal to it.

The mungoos was introduced into Jamaica in 1872, when nine specimens were imported to destroy the rats on a sugar plantation. At first they were highly beneficial, reducing the stated annual loss from rats from $500,000 to one-half that, but in less than twenty years the island was almost overrun with them. Not only did they kill rats and mice, however, but snakes, lizards, ground-birds, and even poultry. At one time snakes had become so rare that they were regarded as practically exterminated, but since 1896 they are apparently on the increase. The ground-doves and other terrestrial birds, partly at least by change of habit, are also adapting themselves to this new enemy and their extermination is no longer to be feared. At the present time the mungoos is common and very tame in most parts of the island and in many other islands, and is generally looked on with favor.

The mungoos is from 15 to 18 inches long, and has a tail 14 to 15 inches in length, very thick at the base and tapering to a point. The fur is rather long and grizzly reddish-gray. A very full account of its habits is given in the *Royal Natural History*. For the details of its history in the West Indies, consult: Morris, *The Mungoose on Sugar Estates in the West Indies* (London, 1882); *The Field* (London) for July 13, 1895.

MUNICH, mū̆′nĭk (Ger. *München*). The capital of Bavaria, and the third largest city in Germany, situated at an elevation of 1700 feet, mostly on the left bank of the Isar, on the southern border of a partly swampy and partly fertile forested plateau, 296 miles by rail south of Leipzig (Map: Germany, D 4); latitude 48° 9′ N., longitude 11° 35′ E. The city is only about 25 miles north of the Bavarian Alps, and is subject to a somewhat raw climate characterized by abrupt changes of temperature, which are at times trying. Mean annual temperature, 46° F.

Munich is comparatively modern. It is progressive and handsomely equipped with the latest municipal improvements, having, in fact, been mostly rebuilt since about 1830. It owes its artistic and regal appearance to the art-loving Louis I. and his successors. The very wide avenues and the many buildings constructed in all the leading styles of architecture lend great dignity to the metropolis. The streets are generally regular, and the city is lavishly adorned by numerous squares and pleasure parks and gardens. The largest park is the beautiful English Garden. It contains over 500 acres, watered by branches of the Isar and adorned with small temples, towers, etc. Magnificent thoroughfares are the Maximilianstrasse, lined by public buildings, and the Prinzregentenstrasse, both leading across the river to the Maximilian pleasure grounds on the opposite side. The Ludwigstrasse, stretching northward from the royal palace, is also a splendid street, flanked with impressive Renaissance edifices.

The Max-Joseph-Platz, together with the Marienplatz, represents the centre of life in Munich. The former connects the old and new sections, and is embellished by Rauch's huge bronze statue of King Max Joseph. The Alte Residenz—one of the three parts of the royal palace—extends here along the north side of the square and has in the rear the Court gardens, with their open arcades and frescoes. This structure dates from 1596 and contains four courts, but is of little architectural worth. Its apartments, however, are a source of great interest to sightseers, being luxuriously furnished in the seventeenth century style and rich in historical associations. The throne room was at one time occupied by Napoleon. The royal chapel and the treasury possess numerous objects of intrinsic and historic value.

The other two parts of the palace are the fine Festsaalbau and the Königsbau. The latter, finished in 1833, and fashioned after the Pitti Palace, is notable for its splendid Nibelungen frescoes by Schnorr (1861). The former is a handsome edifice, completed in 1842 in the late Italian Renaissance. It is enriched with Ionic pillars and with allegorical figures of the Bavarian provinces. Several apartments contain Hiltensperger's frescoes from the Odyssey. Beautiful salons are also the throne room, with striking bronze statues by Schwanthaler; the Hapsburg room, with paintings; the Barbarossa Hall, with reliefs by Schwanthaler; and the Hall of Charlemagne, containing ambitious decorations descriptive of scenes from the Emperor's life. But the best known of these apartments are those containing Stieler's thirty-six portraits of beautiful women, painted from various types of Bavaria's fairest womanhood.

Connected with these royal edifices are the great Hof und National Theater dating from 1823, with an attractive portico borne by Corinthian columns, and containing seats for 2200 persons, and the artistic and impressive Court chapel—a structure dating from 1837, in the Byzantine-Romanesque, and having sumptuous decorations. Still another feature in connection with this royal residence are the coach houses and harness rooms, with a collection of historic carriages, sleighs, and sledges. Adjacent also are a valuable ethnographical museum, an Art Union, with works of living artists, and an instructive museum of plaster casts. Other palaces in the city are the palace of Prince Charles, the palace of Prince Regent Luitpold, the palace of Duke Max, with good decorations, and the royal Wittelsbach palace, an artistic red structure begun in 1843.

Munich has no churches of great fame. The Ludwigskirche is a rather attractive example of Italian Renaissance, and contains a noteworthy Last Judgment by Cornelius. The Saint Boniface basilica, dating from 1850, with some three score of gray marble columns, is also worthy of mention, as are the cathedral—the Frauenkirche—the Gothic Mariahilfkirche, and the Gothic Giesinger Church. The synagogue is one of the largest and finest in Germany. All these churches, except the cathedral, belong to the nineteenth century. Among the impressive secular buildings are the War Office, the Post Office, and the new Gothic Rathaus, an attractive building completed in 1874.

The picture and sculpture collections of Munich are famous. The building of the Old Pinakothek, situated in the northern section of the city, not far from the royal palace, was constructed in 1826-36, in the Renaissance style. It is about 174 yards long, and is embellished on the exterior by statues by Schwanthaler. It contains about 1400 canvases. Almost all the great masters of paintings since Raphael's time are represented here by works of the highest excellence. The greatest gems perhaps are Dürer's Saints Peter, John, Paul, and Mark; several portraits and other pictures by Rubens, including the "Battle of the Amazons," the "Massacre of the Innocents," and the "Lion Hunt;" Perugino's "Virgin and Saint Bernard;" Raphael's "Madonna Tempi;" and Murillo's "Two Beggar Boys Eating Fruit." The Old Pinakothek contains in addition valuable cabinets of vases; also engravings and drawings. Its loggie are decorated by Cornelius. Adjacent on the north is the New Pinakothek, with a good collection of modern artists, mostly Bavarian. There are about 700 works. Here is found also an antiquarium with fine bronzes and terra-cottas principally from Rome and Greece. In the vicinity is also the Glyptothek—containing mainly a collection of ancient statuary. The edifice is of a classic and imposing Ionic pattern, graced with columns and artistically embellished. It has Assyrian and Egyptian departments, as well as departments devoted to excellent Greek and Roman examples and to incunabula. The highly prized collection of marbles from the island of Ægina is also in the Glyptothek. Its most valuable sculpture perhaps is the Greek Barberini Faun (B.C. 300).

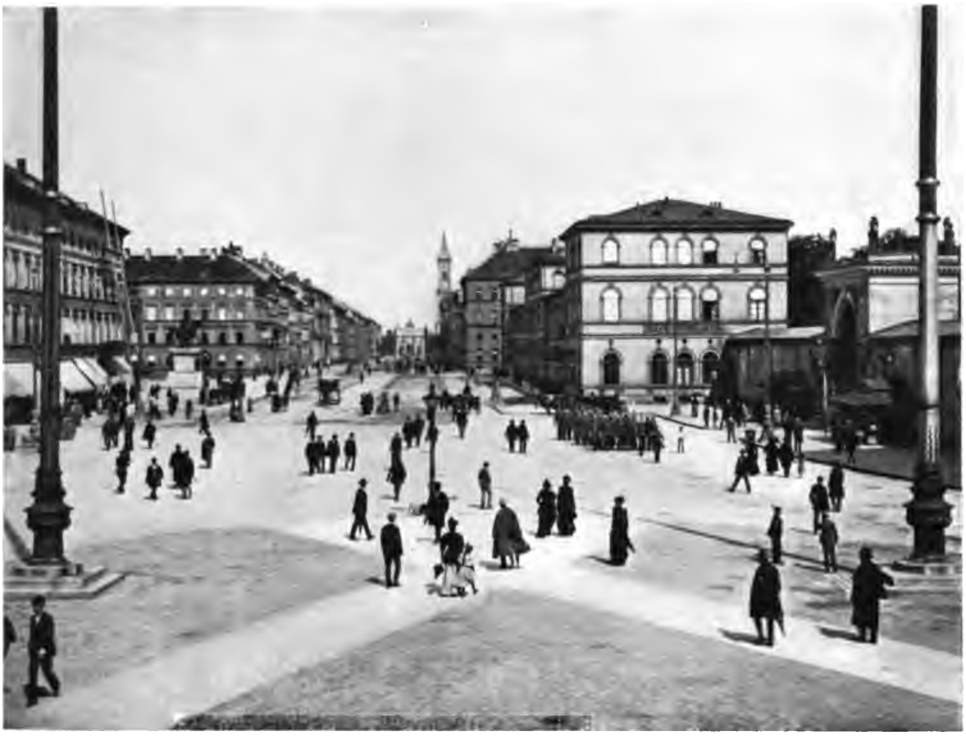
In connection with the realm of art in Munich may be mentioned the Kunstgewerbehaus; also the Academy of Art, an ambitious edifice in Italian Renaissance, completed in 1885. The artists of Munich maintain in the so-called Exhibition Building (finished in 1845) a permanent exhibition of their paintings exposed for sale. The Bavarian National Museum, founded in 1855, and housed in a fine edifice, is of great value. Among its numerous collections covering many departments of human endeavor, the most valuable perhaps are the art works of the mediæval Renaissance and modern periods. The Schwanthaler Museum contains models of the master's works. A noteworthy picture collection also is the Schack Gallery, possessing choice originals, and interesting copies of the great masters by many of Germany's foremost modern painters. Other museums are the collection of pictures and drawings left by the painter Kaulbach, and the Lotzbeck museum of pictures and marbles. Munich is celebrated also as a musical centre, especially for German operas. The National Theater is one of the most important of modern operatic institutions, being intimately identified with the Wagner influence and tradition.

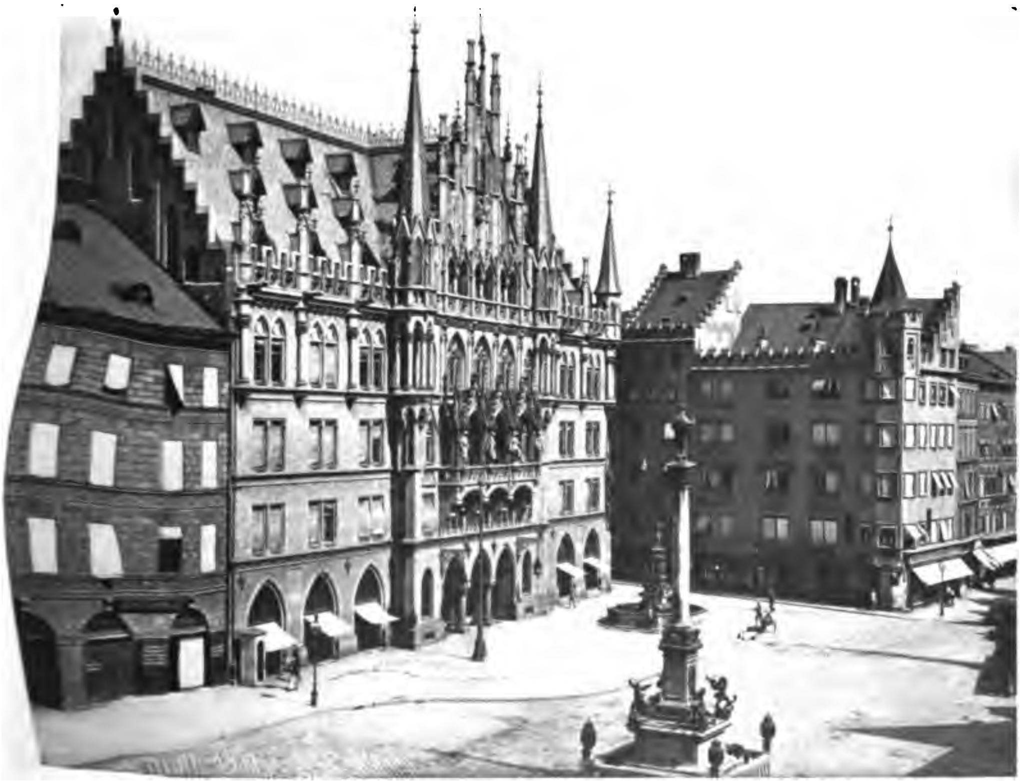
Among the many monuments not already mentioned are those of Louis I., Schiller, Gluck, Schelling, Fraunhofer, Gärtner; the large and striking monument to Maximilian II., dating from 1875; the fine statue of Elector Maximilian I., after plans by Thorwaldsen; an obelisk made of the metal of captured cannon, and erected to the memory of the Bavarian soldiers who died in the war with Russia; the fine monument to Liebig, the chemist; the new and splendid Wittelsbach fountain; also the bronze Fischbrunnen, associated with the Butchers' Festivals. The Church of Saint Michael contains a fine monument by Thorwaldsen to Eugène Beauharnais. The Siegesthor—Gate of Victory—constructed in 1843 in honor of the Bavarian Army, is a splendid arch patterned after that of Constantine at Rome. It is surmounted by a huge figure of Bavaria. On the magnificent Königsplatz, near the Glyptothek, rises the Propylæa, an attractive portal completed with Doric and Ionic features in 1862—a tribute to the cause of Greek independence. Notable also is the ancient Isarthor, with elaborate frescoes. Still other objects worthy of visit in Munich are the Bronze Foundry and the Royal Arsenal, with an interesting military museum, containing relics of the Napoleonic wars.

At the head of the educational institutions is the celebrated university. (See MUNICH, UNIVERSITY OF). The city's educational system is scarcely surpassed either for comprehensiveness or excellence. The Maximilianeum on the right bank is an institution founded by Maximilian II. for advanced civil service instruction. It is surrounded by attractive Gasteig pleasure grounds extending along the river shore. The important Polytechnic School is in a fine modern edifice. Near by is an art industrial school. There are also in the city a military academy and a military school, an academy of science with noteworthy collections, and numerous organizations for the development of all the chief branches of knowledge and its application. Of the many valuable libraries, the Royal Library is by far the most important. Its spacious Florentine building was constructed after 1832, and possesses a magnificent staircase. The library is one of the largest in the world. It contains some 1,350,000 volumes, and over 30,000 manuscripts. It is especially rich in German documents and scholastic literature, possessing some of the rarest of literary editions and other specimens, including a translation of Boccaccio, a codex aureus (in gold letters and dating before 900), and Four Books of Gospels. In this library, also, are the archives of Bavaria—a collection of 500,000 documents. The city has a botanic garden, and a crystal palace, where expositions are held.

Industrially, Munich is important and prosperous. Its iron, bronze, and bell foundries, its lithograph and engraving establishments, its optical and mechanical instrument factories are celebrated, as are its enormous breweries (some 45 in number), which have made the city famous for excellent beer. The large, palatial Hofbräuhäuser are a feature of the city's social life. The other manufactures comprise cotton, wool, and damask goods, wax-cloth, leather, paper-hangings, carriages, pianos, gold and silver articles, machinery, steel wares, etc. In its manufacturing and commercial interests the city has made great strides in very recent times. Beer is the chief export. Also grain, hops, coal, wool, furniture, carpets, and art goods figure in the shipments. Munich has a network of canals for traffic—over 100 miles in length. Numerous important industrial and commercial unions and associations are established here.

Munich is the seat of all the important Gov-





MUNICH
LUDWIGSTRASSE (UPPER)
RATHAUS AND MARIENPLATZ (LOWER)

ernment institutions of Bavaria. It is administered by two burgomasters, about forty magistrates, and some seventy councilmen. The annual budget balances at approximately $4,500,000. The municipal debt is about $25,000,000, offset by nearly twice that amount invested in public property—mostly in buildings and grounds. Over a third of the taxes go to the service and reduction of the debt. The charitable institutions are excellent.

The popular festivals and 'Dults' (fairs) are a feature of Munich. They are all elaborate and interesting—for instance, the annual carnival, the Magdalen Festival in July, and the October Festival. The last is a kind of agricultural fair which attracts the picturesque country population. The environs are of no little interest. Their most unique attraction is the famous Bavaria, an immense bronze statue rising on a low elevation west of the city. It is a hollow female figure 62 feet high, and cast from the bronze of foreign cannon, according to designs by Schwanthaler. It was uncovered in 1850. From its head there is a good view of the city. The adjacent Hall of Fame is a Greek colonnade, dating from 1858. It holds about 100 busts of famous Bavarians, including Jean Paul and Schelling. The Nymphenburg is a royal château near the city. Its grounds are very attractive. The cemeteries of Munich are said to contain the most artistic tombs in the Empire. The population of the city has more than doubled in the last few decades. In 1871 it numbered 169,693; in 1900, 499,959, nearly all Catholics. The death rate fell from 30.4 to 24.1 in a thousand from 1871 to 1898.

HISTORY. The history of Munich may be said to date from the time of Henry the Lion, in the twelfth century. It grew rapidly under the House of Wittelsbach. The city was fortified in 1254, Otho the Illustrious having established his residence here. In the first half of the fourteenth century the library was founded. About the middle of the sixteenth century the art collections were begun. Munich became a royal residence in 1806. From the reign of Louis I. dates the city's present magnificence.

Consult: Kahn, *Münchens Grossindustrie und Grosshandel* (ib., 1891); Aufleger and Trautmann, *Alt-München in Bild und Wort* (ib., 1895); and the *Jahrbuch zur Münchener Geschichte* (ib., 1887 et seq.).

MUNICH, UNIVERSITY OF. One of the leading German universities, founded by Duke Ludwig of Bavaria with the approval of Pope Pius II. as a Studium Generale at Ingolstadt. The members of the faculties took an oath of loyalty to the See of Rome. Though the bull authorizing the opening of the institution was issued in 1458, it was not opened until 1472. True to its pledge, Ingolstadt University remained faithful to the Church of Rome during the trying period of the Reformation. In 1556 the Jesuits gained control of the university and conducted it until their suppression in 1773, though Ickstatt labored from 1746 to remove them. At the instance of Ludwig Maximilian, whose name the institution now bears, it was moved in 1800 to Landshut, where it remained until 1826, when it was transferred to Munich and reorganized. In addition to the collections and institutes brought thither from Landshut, the Government transferred to the university the botanical garden, anatomical theatre, observatory, and antiquarium, and a valuable collection of coins. In 1902 the university consisted of the faculties of theology, law, political science, medicine, and philosophy, with an attendance of 175, 1324, 159, 1095, and 1450 respectively. The university also includes a number of seminars, clinics, museums, a botanical garden, and an observatory. The University Library contains over 400,000 volumes and about 2000 manuscripts. The Collegium Georgianum, founded in 1494 for the education of Catholic priests, and the Maximilianum, founded in 1852 and opened in 1876, for the education of talented Bavarian youth, are affiliated with the university. The income of the university is about $250,000 a year, the greater share being contributed by the Government. The number of professors in 1902 was 117, besides 83 privat-docenten, including such illustrious men as Hermann Paul, the eminent philologist Von Zittel, and Röntgen.

MUNICIPAL ARCHITECTURE (Lat. *municipalis*, from *municeps*, citizens, from *munus*, duty + *capere*, to take). An important branch of civil architecture, that, namely, which has to do with buildings erected out of public funds for the use and amusement of the inhabitants of a city, or purely for the adornment of the city itself. The term is sometimes extended to include public and semi-public buildings for business or amusement erected by private capital, such as exchanges, railway stations, and theatres. It is doubtful if municipal buildings, properly speaking, existed in the prehistoric and the ancient Oriental worlds; the temple and royal palace filled all needs in these civilizations. The great city gates of ancient Babylonia and Assyria were the only structures in the Orient that could be included under the title of municipal buildings.

GREECE. With the development of Greek city life after the seventh century B.C. several classes of such buildings were erected. Among these may be named the *Theatre* (q.v.), which was always erected with public funds, and which first began early in the fifth century B.C. to be built of stone and in the form and style recognized in the ruins of those at Epidaurus, Athens, Sicyon, etc. Of Greek buildings devoted to public games and sports, the most important were the *Stadium* (q.v.) and the *Hippodrome* (q.v.) for the different kinds of races, neither of which gave opportunity for much distinctive architecture. The *Gymnasium* and *Palestra* were devoted to contests requiring less space and to training and practice, and embodied most of the features developed later by the Romans in the Imperial thermæ. Those at Ephesus and Alexandria-Troas are especially well preserved. The commercial centre of the city was the market-place, or agora, corresponding to the Roman Forum (q.v.), an open rectangular space bordered by colonnades and halls, and decorated with monumental entrances, statuary, and fountains. The various halls for the transaction of municipal business, such as the *Prytaneum* and the *Bouleuterion*, were often connected with the market-place, and there were frequently two *agoræ* in each city—the political and the commercial. Those at Priene, Assos, and other cities of Asia Minor are particularly important, as no well-preserved examples have been found in Greece itself. One can judge of the great possibilities of the Greek columnar style even better from these many public porticoes than from the temples. Finally, the so-called *leschoi* were public halls for banquets and other reunions and celebrations. To the list of Greek municipal buildings should be added such decorative and memorial structures as the choragic monument of Lysicrates and the Tower of the Winds at Athens, public fountains, and the like.

ROME. The Romans developed municipal architecture even further in magnificence and variety after the second century B.C. Their theatres were richer in decoration; their amphitheatres were a new form altogether; their circus was architecturally more significant than the stadium and hippodrome. The Roman Forum, which was at first an irregular square without architectural beauty, was later bordered by basilicas (q.v.), great halls for commercial and judicial purposes, while memorial and triumphal arches were placed at its entrances and along its main road. Rome was embellished with new fora by successive emperors, these gifts culminating in the stupendous Forum of Trajan, with its basilica, temple, arch, and triumphal column. In the early days of the Empire a new type of city was developed, in which the various main groups of public buildings were united and harmonized by vast stretches of porticoes. Such porticoes in Rome itself were the Porticus Maximæ, extending to the Tiber, and the mile-long Porticus Triumphi in the Field of Mars. They masked the poorer streets. In the cities of Syria and the rest of Western Asia a great era of rebuilding set in, the old blank-walled main streets being replaced by colonnaded boulevards, decorated with statues and intersecting at right angles. This type, which originated at Antioch, can now best be studied at Palmyra, Gerasa, and other cities near the coast-line.

The many new Roman colonies and municipalities in North Africa and Syria gave even more occasion than the old cities for the carrying out of a regular plan of municipal architecture. The cities of Theveste and Thamugadi are important examples. Pompeii gives an older type. The Pompeian Forum, with its well-preserved basilica; its *curiæ* or municipal meeting-halls, with their colonnades; its Temple of Jupiter, flanked by memorial arches; its 'Pantheon,' with the money-changers' shops; its market-hall, Temple of Venus, lounging-gallery, and other well-grouped structures, shows how the government of a provincial town of moderate size grouped the public buildings around its main square.

Of the theatres, those at Aspendos in Asia Minor, and Orange in France, are the best preserved; of the amphitheatres, those of Rome (the Colosseum), Verona, Capua, Arles, Nîmes, and Thysdrus; of the basilicas, those of Maxentius in Rome, of Pompeii, and of Treves.

With the decline of Roman power and the transfer of the capital to Byzantium, the focus of activity in municipal architecture was shifted and Constantinople, or New Rome, became the scene of an extraordinary work of reconstruction under Constantine, Theodosius, and (later) Justinian. Fora, palaces, triumphal arches, colonnades, basilicas, baths, and churches gave splendor to the new city, though less perfect in detail than the best Roman works. Meanwhile, until the final overthrow of the older capital, public buildings, porticoes, and basilicas were still being erected in Rome, and the majestic ruins of the Basilica of Maxentius and Constantine attest the importance of these expiring efforts of Roman art. After the fifth century there was nothing but lethargy in municipal architecture until the later Middle Ages.

MIDDLE AGES. The growth of municipal architecture in the Middle Ages was very gradual and depended largely upon the character of city government. In the monastic and feudal cities there were no works of municipal architecture of any importance. Conditions were more favorable to the erection of municipal buildings in the free communes and episcopal cities, which possessed complete or partial autonomy.

The most important municipal buildings were the hôtel-de-ville in France, the Rathaus in Germany, and the *palazzo pubblico* or *communale* in Italy. The cities of Northern and Central Italy, of Northern France and the Netherlands, of Northern Germany (especially the Hanseatic League), were most conspicuous for such buildings during the Romanesque and Gothic periods. The plan of the communal palaces varied according to whether the local constitution provided for meetings of a large body of citizens or only of a select few inside the building. The Doge's Palace in Venice had halls for the Gran Consiglio and others for the Council of Ten and the smaller council. At the more democratic Padua, the immense hall, with its wagon roof—the largest in Europe—provided for larger meetings. At Udine and Piacenza are the best examples of a whole lower story open in vaulted arcades for the popular meetings, with halls on the second floor for the smaller committees. These palaces in Lombardy were usually termed *broletti* (Como, Bergamo, Cremona, Monza, etc.). The main meeting room on the second floor was nearly always provided with a balcony or *ringhiera*, from which announcements were made to the people.

The cities of Tuscany and Umbria, later in achieving independence (except Pisa), erected, however, even more magnificent public palaces than their northern neighbors. The Palazzo Vecchio and Bargello in Florence, the Palazzi Pubblici at Siena and Perugia, built during the Gothic period (1250-1350), are the largest in Italy and especially remarkable for magnificent towers. Hardly a city in Italy, even one enjoying but a modicum of administrative autonomy, but had a public palace of some sort, and in some cities there were two palaces, the episcopal and the civil.

Such communal palaces were much rarer in feudal France: they are almost wholly wanting in the southern and central provinces. But the powerful cities of the Netherlands, Lille, Louvain, Mechlin, Brussels, Ghent, Bruges, Ypres, Arras, and Liège, built as magnificent public palaces as their Tuscan compeers. That of Brussels, with its great central towers, is a fine example in the developed Gothic style. Germany is particularly rich in such buildings, not on as large a scale, certainly, but interesting from their very number. Municipal belfries (q.v.) or *campanili* were prominent in many cities of both Northern Europe and Italy.

The communal organization in the cities was usually based upon the association of the labor and trade guilds. It was the officers of these guilds who, coming together for mutual benefit, originated in most cases the city administration and constitution. Many of these guilds had separate buildings for their meetings and they usually repeated on a smaller scale the architectural features of the communal palaces. The Loggia dei Mercanti at Bologna, those at Ancona and Perugia, the Or San Michele at Florence, are a few among many. The lawyers' guild sometimes built sumptuously, as in the Palazzo dei Giureconsulti at Cremona. In the case of some of the very powerful Flemish guilds, such as the cloth guild, their buildings equaled or surpassed the average town-hall; this was the case at Ypres. In some cases the governing body had a separate palace from that where the popular meetings were held. Thus at Pistoia there was a Palazzo del Comune and also a Palazzo del Podestà. Other associations besides the guilds erected common halls: the religious fraternities, such as that which built the Bigallo in Florence, or the various beautiful buildings in Venice. Hospitals, like the Ospedale degli Innocenti in Florence, the Hospital at Milan, and the Misericordia at Arezzo, are distinctly public monuments.

The most important of the minor works of municipal architecture were the bridges (q.v.), fountains (q.v.), and gates. The first two classes have been treated under their separate heads, so that it will be necessary to describe only the city gates. During the Middle Ages the fortification of cities by heavy walls was a universal custom and the gates were fully as important as the triumphal arches and gateways of Roman cities. The great gate at Lübeck and several gates at Florence show the German and Italian styles. They were usually dedicated to a saint and contained a shrine and frescoes or carved images in the central opening; guardrooms on the sides and above contributed to making the gate a monumental structure. The round or pointed single archway was often flanked by two towers, as in the Porta della Vacca at Genoa.

In so far as the general arrangement of the larger mediæval cities is concerned, the Cathedral Square was the main centre of the city, the market-place and a place of resort; but wherever there was also a strong municipal civic organization there was also a second square dominated by one or more city buildings and kept free for public assemblies. Seldom do we find a single square used for both classes of buildings.

MOHAMMEDAN. There was far more of municipal architecture in the mediæval Mohammedan cities of the Orient than Europeans realize. The *bazaars* with their long covered galleries rivaled the gallery arcades of modern cities; the *khans* and *caravanserais* with their immense courts were often on a colossal scale. Numberless *sebils* or fountains were dotted through the streets. The city gates were monumental. The *alcazars* were an interesting combination of governmental palace and fortress. There were numerous hospitals and colleges with attached mosques and mausoleums, as at Ispahan. Few European cities showed so ample a display as Bagdad, Cairo, Damascus, Adrianople, Constantinople, or even the mediæval cities of second rank, like Fez, Kairwan, Emesa, and a hundred more. The Mohammedan engineers in Western Asia were famous for their bridges, fortifications, and castles. The great wealth and advanced culture of the Arabs, Moors, and Persians, and of the Moslem Hindus—far superior to that of the West in the Middle Ages—made it easy to build up beautiful cities, now all reduced to squalor and ruin.

RENAISSANCE. While the Renaissance was more fruitful in works of private and religious architecture than in municipal architecture, a great number of notable buildings were erected for public purposes in the cities of Italy and of Western Europe. The general downfall of civic liberties checked the progress of some phases of municipal architecture, but the change of style ushered in by the Renaissance led to the erection of many new edifices in the more modern style. Thus in Italy the elegant town hall at Verona (Palazzo del Consiglio), by Fra Giocondo (1470); the town hall at Padua, the Loggia del Papa at Siena, the Procurazie Vecchie at Venice, belong to the fifteenth century; to the sixteenth, the Library of Saint Mark, and the Loggetta of the Campanile (demolished by the fall of the tower, 1902), at Venice, the magnificent arcade surrounding the ancient 'Basilica' at Vicenza, by Palladio, and many loggias and administrative palaces in other cities. The Hôtel-de-Ville at Paris (1546), the town halls of Rheims, Rouen, and other French cities, and even of small towns like Beaugency, erected in the sixteenth century; the great town halls of Antwerp and of several Dutch cities, and the picturesque *Rathäuser* or council halls of Bremen, Nuremberg, Altenburg, Cologne, and other German cities, prove that there was still opportunity for effective and beautiful municipal buildings. Fountains were also multiplied, often of great elaboration and sculptural splendor. (See FOUNTAIN.) In the seventeenth and early eighteenth centuries there developed a remarkable movement for the embellishment of cities by the decorative treatment of open squares and spaces. Of this movement the piazza in front of Saint Peter's, with its colonnades, obelisk and fountain, and the Piazza del Popolo, both at Rome, and the Place de la Concorde and Place Vendôme at Paris, are the finest examples. It was in the eighteenth century that a new era of municipal architecture commenced in Germany with the transformation of Berlin under Frederick the Great, followed by that of Munich in the first half of the nineteenth century, and then by that of Vienna, and that of Paris by Baron Haussmann under Napoleon III. New classes of buildings were developed and erected: museums, picture and sculpture galleries, halls of fame, theatres, and public educational buildings. Every style of architecture was employed, but mainly the neo-classic and neo-Renaissance. The triumphal arch again came into vogue. Great boulevards became the fashion. The old-fashioned narrow streets were discredited, even in Italy. The sun was let in everywhere.

RECENT DEVELOPMENT. EUROPE. Of the more recent development of municipal architecture, Paris, Vienna, and Budapest stand out as the most conspicuous examples; but Berlin, Munich, and other German cities, Rome and Naples, and in less degree many other cities in Europe have undergone a process of architectural remodeling. The great operations undertaken by Napoleon III. in Paris under Haussmann's direction included not only the reform of the city's street-plan, but also the erection of many public buildings. This work, interrupted by the fall of the Empire, was resumed under the Republic, and has been steadily prosecuted ever since, at the joint expense of the city and State. The new Opera House, the reconstructed Palais de Justice, the Tribunal de Commerce, the completed and remodeled Louvre, the Saint-Michel Fountain, and since the war of 1870-71 the new Hôtel-de-Ville, Sorbonne (university), and Ecole de Médecine, the demolition of the ruined Tuileries and creation of new gardens on its site, the two new art palaces, and the Alexander III. and other bridges, are the monuments of this remarkable activity. So the new Reichstagsgebäude (Parliament-house), the Museum, the various columns of victory and other monuments, including the recently built Sieges-Allee, at Berlin; the squares and modern public buildings of Munich, the new town hall at Hamburg, indicate the tendencies of German taste in municipal buildings and embellishments; while in Austria-Hungary the marvelous rebuilding of the central portion of Vienna and the more recent architectural enterprises in Budapest are equaled only by the transformation of Paris under Napoleon III. While the architectural treatment of the Viennese public buildings (the Gothic Town Hall, the classic Parliament-house, the Renaissance University, museums, art institute, the Hoftheater, etc.) leaves something to be desired, the general effect is highly impressive by its stateliness and grandeur of disposition along a single splendid street, the Ringstrasse. In Great Britain nearly every important city has in recent years either rebuilt portions of its more overcrowded districts on improved plans, or erected new town halls, exchanges, public baths, schools, and museums; and the English architects have developed in these public works an architectural style of considerable interest and character, quite different from the modified French Renaissance style which has more generally prevailed elsewhere. Italy, though backward in many respects in this field of architecture, has not only remodeled some of the worst-crowded districts of Naples and Rome, but has embellished many of her cities with public buildings in modern style, established new parks and public gardens, and in some cases completed the unfinished façades of ancient buildings—notably that of the Cathedral of Florence (1883-89). The embanking of the Tiber (1879-1900) in Rome, the construction of new bridges, the building of 'arcades' or glass-roofed streets of monumental design, flanked by attractive shops (as at Milan, Naples, etc.), and the erection of railway termini sometimes of considerable architectural splendor, are further evidences of municipal activity.

UNITED STATES. In the United States municipal architecture has until recent years had little to show worthy of serious consideration. While the first fifty years of independent national existence witnessed the erection of many noteworthy Federal and municipal buildings, especially custom houses and State Capitols, these were, for the most part, indifferently placed, with no adequate approach or surroundings. The public buildings of American cities—town halls, railway stations, schools, courthouses, and administrative offices—were cheap and commonplace, or pretentious and ugly. Only rarely, as at Washington, Savannah, and Charleston, has there been until recent years even the semblance of any recognition of the art of municipal planning, or of the importance of artistic treatment alike in the design and setting of public buildings. The rectangular street-plan was universally accepted as the ideal arrangement. Of late, with the general awakening of the art instinct in the United States, stimulated by the object lessons afforded by several great 'expositions' (Chicago, Omaha, Buffalo), there has begun a widespread reform in municipal architecture, of which the new plan for the improvement of Washington, the proposed adoption of the 'group system' for the public buildings of Cleveland, Ohio, the new park system of Boston, and the proposed remodeling of the Chicago lake front, are a few out of many evidences. Recent town halls, exchanges, university buildings (Columbia, New York University, University of Pennsylvania, Washington University, Leland Stanford, Jr., and California universities and others), public libraries, court-houses, and railway stations in the United States are excellent structures architecturally, and give promise that the ugliness of American cities is to be greatly mitigated if not done away with in the near future.

MUNICIPAL ART SOCIETIES. Societies in the United States which take their name from the purpose of their organization, which is the promotion of municipal art, i.e. art as applied to cities. They seek in a general way to beautify cities. Among the means advocated to this end are the planning of cities with regard to artistic beauty, as well as to the needs of traffic; the planting of streets with trees, and the restriction of the billboard nuisance; the increase in the number and size of parks, especially in the congested districts; worthy sites and beautiful architecture for public buildings, and their decoration with statuary and mural painting; the embellishment of the city with statues, monuments, and other works of art—things which have long been esteemed essential in European cities. These ideas are promoted by local societies, like the Municipal Art Societies of New York, Chicago, Baltimore, Cincinnati, etc., the Fairmount Park Association of Philadelphia, and by the American Park and Outdoor Association. Among the achievements of the movement have been the official appointment of Municipal Art Commissions, composed principally of artists, by New York and Chicago, with general supervision over public buildings, monuments, and other artistic undertakings; the enactment of legislation, both State and local, against the billboard nuisance in Chicago; the appointment of commissions of experts to devise comprehensive plans for the growth of Washington (1901) and similar proposals for New York (1903). Two volumes of *Municipal Affairs* are devoted to the movement, vols. ii. and iii. (New York, 1898-99). Consult also C. M. Robinson, *The Improvement of Towns and Cities* (ib., 1900); *Modern Civic Art* (ib., 1902).

MUNICIPAL DEBTS. In a strict sense of the word, debts incurred by municipalities. When, however, the total municipal indebtedness of a country is being discussed, particularly in comparison with State or national debts, the indebtedness of all minor civil divisions is generally included. Municipal debts are divided into bonded or funded, and floating, and the latter may be divided still further into temporary loans in anticipation of revenue and obligations due for material furnished or services rendered. Bonded indebtedness, as a rule, so far exceeds floating indebtedness that the latter is frequently ignored in ordinary discussions.

HISTORY, OBJECTS, AND METHODS. The development of municipal debt is for the most part coincident with the expansion of municipal functions, an expansion which began with the nineteenth century and was particularly active during the decades between 1850 and 1870. A factor which contributed largely to the growth of American municipal debts was the aid given to railway enterprises. Many municipalities so burdened themselves with debt for the sake of assisting in the construction of railways through their limits, that for many years they were obliged to forego the most essential public improvements. Such railway aid was granted by rural as well as by urban communities.

Railway assistance aside, the chief objects for which urban communities issue bonds are the opening and paving of streets, the construction of water-works, sewers, bridges, schoolhouses and other public buildings, and lighting. Counties, in some sections, issue bonds for bridges and for highway improvements. Finally, school districts, chiefly those located in rural sections, issue bonds to raise money to construct schoolhouses. Obviously, loans in anticipation of taxes, and floating debts, may have their origin in almost any of the various needs of the municipality. Loans in anticipation of revenues are usually raised on notes or tax certificates. Obligations for material and for labor or other personal services, or for amounts due on contracts, are frequently acknowledged by warrants on the general treasury, or on some special fund; and such warrants become negotiable paper. When the cost of specifically local improvements, like paving or sewers, is met by special assessments on the property directly benefited, and the collections are delayed or distributed over a series of years, the obligations are met in a variety of ways, ranging from warrants to short-term bonds. In negotiating municipal loans, bonds are commonly sold, after public advertisement, to the highest bidder. Temporary loans on notes are commonly effected at banks.

The financial principles involved in a consideration of municipal debts are in most respects similar to those already set forth under DEBT, PUBLIC; and FINANCE. Municipal bonds are issued for definite periods and the best and common practice is to provide in advance for their payment at maturity. Formerly such provision was made through sinking funds, but for a number of years past there has been a growing tendency to pay off municipal bonds in installments. This plan obviates the necessity of administering a number of special and rapidly accumulating funds, which sometimes present financial difficulties, and are always subject to diversion on the part of unscrupulous or ill-advised municipal officials.

In fixing the term for which municipal bonds are to run, it should be borne in mind that since municipal bonds are issued to distribute the expense of certain improvements over a number of years, the term of the bonds issued should bear some relation to the probable life of the improvement involved. Street pavements, for instance, require renewal in from ten to twenty years; it would therefore be a gross mistake to make bonds issued to cover their cost run forty or fifty years. Land purchases, on the other hand, involve a class of property that appreciates rather than depreciates as time goes on; it might accordingly be permissible to pay for them by an issue of long-term bonds. Another important factor in fixing the life of bonds is the character of the undertaking to which the proceeds are to be devoted. Water-works, for instance, produce a revenue, and not only may, but should be self-supporting. The means are therefore at hand to pay off the debt, and the sooner this is accomplished the quicker can water rates be reduced or the service improved. Schoolhouses produce no revenue; and this fact affords a reason, but not necessarily a sufficient one, for making the life of the bonds co-terminous with the probable useful life of the structure.

The interest rates on municipal bonds have fallen from 6 and 7 per cent. a few decades ago to 3½ and 4 per cent. as a normal figure for the bonds of municipalities of good standing. The premiums generally received virtually lower the interest rate, often to a considerable extent.

DEBT LIMITATIONS. The interests of borrower and lender combine to make necessary some limit to the amount of indebtedness which a municipality may incur, and the purposes for which money may be borrowed. Considering the latter first, it is obvious that permanent loans should never be made to meet current expenses, although occasionally it may be necessary or wise to fund a floating debt that, through bad financiering, has grown beyond ordinary revenues. Public loans to aid private enterprises are generally held to be against public policy, and are unconstitutional in some States. As to the amount of indebtedness which a municipality may incur, prudence demands that this be kept so low as not to overburden the taxpayer with interest and other capital charges, or, in the case of productive undertakings, the patrons thereof. Even where there are no constitutional, statutory, or charter limits on indebtedness and taxation, there is a practical limit to the burden of taxation which the citizen will bear. But most municipalities are subjected to definite limitations as to debt and taxation. Such limits vary widely in different countries and States, and even among the cities of a single State. It is generally some percentage of the assessed valuation, but as the relation of this to the actual value of the property assessed varies widely, comparative debt limits are likely to be very misleading, unless supplemented by explanatory statements. In general, it may be said for the United States that the legal debt limit ranges from 3 to 10 per cent. of the total assessed valuation, although some cities are subject to no legal limitations in this respect. Where the limit is by statute instead of constitution, appeals for its extension or for exemptions on account of certain classes are frequently made to the Legislature. Water-works bonds are quite often exempted from computations of the debt limit, and recently there have been efforts in several States to exclude from the debt limit all bonds issued for revenue-producing works. In Great Britain some classes of loans are subject to the sanction of Parliament, and the control of other classes has been deputed by Parliament to the Local Government Board. This body has a well-organized staff of experts; it gives formal local hearings on applications for specific loans and grants or withholds its consent to the applications. On the Continent of Europe there is some central control of debts in at least Prussia and France. The nearest approach to central control of loans in the United States is found in Massachusetts, but its exercise is due primarily to sanitary rather than financial safeguards. Legislative permission to make water-supply and sewerage improvements is seldom if ever granted in Massachusetts unless the plans for the proposed work are approved by the State Board of Health.

Statistics. Reliable comparative figures of municipal indebtedness are even more difficult to obtain than a comparative summary of debt limitations. The debts of individual cities, especially when reduced to a per capita basis, can be interpreted intelligently only when accompanied by statements regarding tax rates, the extent to which the cost of municipal improvements is met by special assessments, and especially by data as to the character and extent of the services rendered to the citizens by the municipality. Low per capita bonded indebtedness is not necessarily advantageous to citizens and taxpayers, since it may mean that the city in question is either without improvements, or that its water-works, lighting service, bridges, and even sewers, are owned by private companies.

The municipal debts of some of the large European cities in 1888-89 are given by Fairlie* as follows (condensed and rearranged):

CITY	Amount	Per capita
Brussels	$56,000,000	$280
Paris	443,000,000	160
Manchester	79,000,000	150
Liverpool	43,000,000	90
Amsterdam	40,000,000	80
Birmingham	60,000,000	86
Glasgow	43,000,000	59
Munich	25,000,000	55
London	243,206,515	54
Leipzig	17,500,000	40
Berlin	66,219,175	37
Lyons	14,000,000	32
Cologne	10,000,000	29
Bordeaux	6,000,000	24

* Credited by Fairlie to Cadeaux, *Les finances de Paris*; *Statistisches Jahrbuch der Deutschen Städte*, VIII.; Paul Dubois, *Essai sur les Finances Communales*.

According to the English Local Government Board reports, the local debts of England and Wales increased from £92,820,100 in 1874-75 to £252,135,574 in 1896-97, whereas in the same period the debt of the United Kingdom decreased from £768,945,757 to £640,773,697. In other words, the local debt increased in twenty-two years from 12.07 to 39.35 per cent. of the national debt. Fairlie (see bibliography) states that in England the municipal debt trebled from 1875 to 1898, and that in France it increased by two-thirds between 1868 and 1899.

For the United States local debt statistics by cities, States, and for the whole country were given in the Tenth and Eleventh Censuses (1880 and 1890). Beginning with 1899, the United States Department of Labor has devoted a large part of its September Bulletin, each year, to "Statistics of Cities," among which it includes bonded, floating, total, net, and per capita net debts, sinking funds, and legal borrowing limits for cities of 30,000 population and upward. The bulletin for 1902 contained figures for the fiscal year preceding (1900-01, 1901, and 1901-02, according to local conditions) for 137 cities. The per capita net debts (figured on estimated populations) range from $1.48 for San Francisco to $115.57 for Newton, Mass. The average is not given. In connection with the low debt of San Francisco, it should be noted that the water-works and lighting plants are owned by a private company, and that in many respects the city is backward in public improvements. Newton, on the other hand, is a very progressive city. Selecting the largest city in each group of ten, the table following has been compiled from the 1902 bulletin.

Of the 137 cities in the original list, 23 report no sinking fund, and an equal number report no debt limit. Providence, R. I., is allowed to contract debts up to 30 per cent. of its assessed valuation and sinking fund combined, and Norfolk, Va., may go as high as 20 per cent. of the assessed valuation. The lowest limit is 2½ per cent. of the assessed valuation.

Bibliography. Adams, *Public Debts* (New York, 1890); Fairlie, *Municipal Administration* (New York, 1901); the works noted under Debt, Public, and Finance; United States Census Reports for 1880 and 1890; September Bulletins, United States Department of Labor (beginning 1899); British Local Government Board Reports (annual); and the semi-annual "States and City Supplement" to the *Commercial and Financial Chronicle* (New York). The latter contains abstracts of constitutional and legislative provisions regarding municipal debt limits.

DEBTS AND LEGAL BORROWING LIMITS OF FOURTEEN AMERICAN CITIES

(Compiled from *Statistics of Cities*, United States Department of Labor, 1902)

	Estimated population, 1902	Debt				Legal borrowing limit, per cent.
		Bonded	Bonded and floating	Net (total less sinking fund)	Net per capita	
New York, N. Y.	3,583,930	$426,174,823	$432,481,295	$311,140,375	$86.82	10 *
Pittsburg, Pa.	333,500	23,278,702	24,422,156	18,596,793	55.76	7 †
Indianapolis, Ind.	182,500	3,855,735 ‡	4,051,735 ‡	4,051,735 ‡	22.20 ‡	2 †
New Haven, Conn.	112,000	3,429,500	3,884,500	3,823,594	34.14	§
Cambridge, Mass.	94,084	8,374,500	8,374,500	6,374,916	67.76	2½ ¶
Wilmington, Del.	78,500	2,161,399	2,232,393	2,232,393	28.44	§
Somerville, Mass.	63,500	1,461,000	1,761,000	1,761,000	27.73	2½ ¶
San Antonio, Texas	55,500	2,271,000	2,542,827	2,451,052	44.16	8 †
Waterbury, Conn.	48,139	1,570,000	1,570,000	1,495,123	31.06	none
Lincoln, Neb.	42,500	1,566,988	1,861,833	1,812,426	42.65	none
Springfield, Ohio	40,000	893,846	938,846	938,846	23.47	none
Johnstown, Pa.	40,000	534,500	534,500	439,174	10.98	2 ‖
Topeka, Kan.	34,500	1,110,390	1,110,390	1,101,120	31.92	none
Canton, Ohio	33,000	969,189	1,017,169	1,003,289	30.40	none

* Of assessed valuation; excluding water debt. † Of assessed valuation. ‡ Including $856,209 assessment bonds. § Controlled by State legislature. ¶ Of average assessed valuation for three years. ‖ Of assessed valuation; may be 7 per cent. by vote of people, for general city purposes, also an equal amount for school purposes.

MUNICIPAL GOVERNMENT. The administration of the affairs of a city, town, borough, village, or other minor civil division of a State, but generally restricted to the government of pure municipal corporations as opposed to *quasi* municipal corporations, such as counties, townships, and school districts. Municipal government seldom reaches its fullest development outside of the larger cities, but numerous municipal activities are often undertaken in progressive urban communities of only a few thousand inhabitants. Since the municipality is the creature of the State, it follows that its form of government, its various activities, and its powers are not only derived from the State, but are also subject to alteration or. repeal at its will. The municipality has a direct and far more intimate relation with those subject to its government than does the State, supplying many wants common to its inhabitants, and performing or supervising the performance of many services which outside of the municipality are left to private enterprise.

In some of these respects, as in the exercise of the police power, the care of the public health, the administration of charity, and the administration of local justice, the municipality is actually the agent of the State, and discharges duties of interest to the State at large; in others, as in the furnishing of water or light, the State permits the community as a whole to act as a local organization for the satisfaction of purely local needs of interest to the community only. The very remarkable growth of the urban population during the last half century has greatly increased the importance of municipal government, and at the same time multiplied its difficulties. About three-fourths of the population of England and Scotland now live under conditions of urban life, while in the older parts of the United States the town dwellers outnumber the country dwellers. For the origin and nature of the legal powers of municipalities, see MUNICIPALITY; see also the general article GOVERNMENT. For the history, growth in population, and certain economic, social, and political phases, see CITY.

Municipal government may be considered under four main heads: (1) Functions; (2) organization; (3) finance; (4) public policy.

MUNICIPAL FUNCTIONS. The functions of a municipality include all the public activities of the city, whether direct, such as laying out and maintaining streets, or indirect, such as regulating traffic and maintaining order on the public thoroughfares. These activities are many and complex, and frequently overlap, but they may be grouped as follows: (1) The so-called public utilities, which include ways and means of communication and transportation, together with the supply of light and water to the inhabitants; (2) disposal of wastes; (3) protection of life, health, and property; (4) charities and correction; (5) education; (6) recreation; (7) municipal housing. The provision of *ways and means of communication and transportation* is one of the first and most obvious functions of municipal government. Its basis is the public streets, upon the surface of which all land traffic moves, beneath which are placed pipes to bring in municipal supplies and to carry out wastes, and either above or below which are wires for transmitting messages. As an aid to the movement of street traffic, it falls within the duties of the municipal government either to provide street railways or to see that they are provided and properly operated by private enterprise. In many of the English and Scotch cities the street railways have been constructed and are owned by the municipality itself, although it is a common practice to lease them to a private company for operation. In the United States this is usually a function of private enterprise, subject to the supervision of the city. Where waterways are involved, bridges and perhaps ferries must be provided, and frequently docks, wharves, and harbors as well. Bridges are now almost always built at public expense, and are as free to all as the streets, but sometimes bridges are owned by private companies, and sometimes, but rarely in large municipalities, toll is charged for the use of the bridges. The construction and control of harbors is not a municipal function in the United States, and in other countries their care is generally a function of the national government. Municipal docks are far more common than municipal harbors. Where docks are required, they often are or may be an important source of revenue; but the first consideration should be to afford every facility for the speedy and cheap handling of goods and passengers. The relation of municipal government to the telephone and telegraph service is chiefly regulative, especially in the United States, and thus far extends but little beyond the police control of the electric wires involved.

One of the most important municipal services is the supply of water for household and industrial purposes, for fire protection, and for sewer and street flushing. The lighting service, like the water supply, is both for public and private use. The light furnished may be either in the form of gas or electricity. Almost everywhere at present the water and lighting supplies are municipal functions, although they may be intrusted to private companies. Municipal markets for the sale of meat and other food supplies are frequently maintained for the sake of both convenience and sanitation. The sanitary aspects of cattle markets, abattoirs, and slaughter houses are of great importance. Consequently, where markets are not provided, the municipal health authorities exercise, or should exercise, a rigid supervision over private markets, and also over the various foods prepared or exposed for sale therein. The supply of such articles as milk and ice to the inhabitants is left to private enterprise, but on sanitary grounds is usually subject to regulation by the municipal government.

WASTES. By far the greater part of the large quantity of water supplied to the modern municipality must be removed again in a more or less befouled condition. All American, many British, and the largest Continental cities have found water to be the best vehicle for removing excreta, and as a result we have the modern sewerage system, which carries away this dangerous waste together with the water otherwise befouled by domestic use. The surface drainage from roofs, yards, and streets may be removed with the sewage, or else in separate conduits. The food wastes of the kitchen and table, consisting of decomposable organic matter, and commonly known as garbage, require separate disposal; and the same is true of ashes, waste paper, and other rubbish. Street dirt must be collected and removed, and the streets must be sprinkled to keep down the dust which is inevitable even with the best sweeping. All these are municipal functions which cannot be left to private enterprise. Finally, the human dead must be considered under the general head of wastes, and cemeteries must be provided for burying or crematories for burning the bodies. Cemeteries are frequently, but crematories rarely, owned by municipalities. The other services included under the heading, in so far as they are performed with regularity and system, are almost invariably rendered by the municipality, either directly or by contractors at its expense and under its supervision.

PROTECTION OF LIFE, HEALTH, AND PROPERTY. The protective functions of a municipal character include the work of the police, the courts, the fire department, and the board of health, together with the building inspection service, and the provision of public baths, wash houses, and water closets. *The charities and correction service* includes poor relief and the maintenance of asylums and reformatories. *The educational service* embraces not only the work of the common schools preparatory to the college, but manual training, and sometimes technical education, night schools, vacation schools, libraries, and museums. The municipality in undertaking the work of elementary education and poor relief is acting as the agent of the State, and is subject to more or less central control so far as these activities are concerned. *The recreation service* includes the establishment and maintenance of parks, playgrounds, gymnasiums, together with the provision for public concerts and lectures. The three first named institutions might also be included under both education and health service, while concerts and lectures may be included under education as well as recreation. *Municipal housing* is practically unknown in America, but is a marked feature of municipal activity in Great Britain. It has arisen partly through the demolition of whole blocks of unsanitary houses, which seemed to make necessary a provision for rehousing the ejected tenants, and partly from a desire to afford municipal aid in the efforts being made by philanthropists to improve the home condition of the working classes. The houses built at municipal expense are generally designed to provide living places thoroughly sanitary in their construction and appointments for the poorest class of self-supporting wage-earners.

ORGANIZATION. The successful administration of the many and varied activities just outlined demands a degree and character of organization resembling in some respects that of a large private corporation. In the government of States it is common to divide the functions of government as well as the officials who discharge them into three groups—the legislative, the executive, and the judicial. The same general plan might be followed in considering municipal government, but separation into these three branches is by no means so easy, on account of the greater overlapping of municipal functions. The judicial power, except as it is exercised by municipal mayors, is more a State than a municipal function, and will not be further considered, except to note the existence of municipal police courts for the prompt trial of persons arrested for misdemeanors or crimes. The legislative functions of municipal governments are exercised primarily by the council, and the executive, by various officers and boards, with the mayor as the chief executive officer. Some of the executive boards possess *quasi*-legislative powers, while others, such as boards of health, exercise both legislative and judicial functions. The mayor's duties are legislative, judicial, and executive. He often presides over the meetings of the council, casts the deciding vote in case of a tie, usually has the power to veto ordinances, appoints officials, supervises the affairs of the city, hears and passes upon charges involving possible dismissal of officials, and sometimes acts as a judge of municipal courts. In the United States the mayor is elected by popular vote, though formerly he was quite generally elected by the council; elsewhere he is commonly appointed either by the city council or by the central government. (See MAYOR.) In extent of power the mayors of the United States rank first, and there is a strong tendency to increase their powers and responsibilities. In point of training the mayors of Germany take the lead; in that country the mayoralty is a profession, and a successful officer is promoted from one city to another and larger as his ability and reputation increase. In all countries the mayor is the chief representative of the city, but in Great Britain alone the office is mainly one of dignity and honor. In that country the mayor is a member of the council and presides over its meetings, but he does not possess the veto power. The importance of the mayor's office in the United States is largely due to the control which he exercises over legislation through his power of veto, and to his power of appointing and removing executive officers. The latter power is generally subject to approval by the council, but it is in freedom from this restriction that the growing importance of the office chiefly consists. The extension of the power of appointment is significant because it diminishes the number of officials elected by popular vote, as well as the number chosen by the council, and combined with the power of removal, which is coming to be generally granted, enables the mayor to shape municipal policy and to direct the manner in which that policy is carried out. The later municipal charters quite generally grant the mayor the power to appoint the various heads of departments, except the chief financial officer, who is usually elected by popular vote. Aside from the exercise of judicial power involved in the removal of officials for cause, mayors do not usually act as judges except in the United States and Great Britain, and in these countries their judicial functions are chiefly in the capacity of justices of the peace. In the larger cities of the United States this function is seldom exercised by the mayor, and in some sections it is entirely lacking; but it may still be found in force in Delaware, in the Southern States, Indiana, Iowa, and elsewhere. See MAYOR.

THE COUNCIL. The powers and duties of the city council vary greatly in the different countries of the world, and quite as much so in the several commonwealths of the United States, or even in the cities of a single State. Germany leads in the comprehensive control of its councils over municipal affairs, and Great Britain ranks next in this particular. The German councils control schools and charities, which in Great Britain are under two sets of quite independent authorities, but while the German councils are in some respects subject to the board of magistrates, including the head magistrate, the burgomaster or mayor, and while the latter has other important functions, the English council has full local control within its sphere. The French municipal councils, unlike those of Germany and Great Britain, have few or no administrative powers, their control being limited chiefly to the appropriation of money and questions of policy. In the United States the councils formerly closely resembled those of Great Britain, and frequently had control of charities and of other municipal activities, but one by one many of their powers have been taken from them and bestowed on the mayor or else on independent boards. Among these boards may be mentioned water, sewerage, street, park, fire, police, and health boards, or combinations of two or more of these into a single board. Again, single-headed departments, more or less independent of the council, have been created by municipal charters or by special legislation. The financial control of some of these new bodies has been left with the city council, at least to the extent of making or withholding appropriations, and borrowing money by means of bond issues. In Great Britain and the United States the councils are restricted to the exercise of those powers specifically or impliedly authorized by the State, and implied powers are seldom so construed as to warrant permanent loans, purchase of land, erection of buildings, or other public works. On the Continent of Europe grants of municipal authority are far more general and limitations specific, but the central government exercises a general control and supervision over the municipalities unknown in the United States, and rarely if ever practiced in Great Britain. In the latter country, however, the Local Government Board, in sanitary matters, and the Board of Trade, in the case of municipal enterprises which produce revenues, pass upon loans, and by their power of granting or refusing authority for these they exercise no little control over municipal councils. The council in the United States, particularly in small cities, is generally a single-chambered body, elected by districts, but there are numerous instances of a select council, or Upper House, the members of which are frequently elected by a larger constituency than those of the Lower House, or by the city as a whole, and sometimes serving for a longer term. In England the council sits as one body, but it is composed of councilors elected by the people and of aldermen chosen by the council, usually from its own membership. (See GREAT BRITAIN.) In Continental Europe there usually is but one chamber of councilors, and frequently the members are elected on a general ticket. As a rule, the councils in European countries are far larger than those in the United States, containing from 50 to 150 members, and in one case, Budapest, 400 members. In the United States, even where two chambers exist, there are rarely over 50 to 60 members, but Philadelphia is a notable exception, with nearly 200 members in both branches. The tenure of municipal councilors is from one to four years in the United States; three years for councilors and six years for aldermen in Great Britain; four years in France and Spain; five years in Italy; six years in Austria, Prussia, Hungary, Holland, Belgium; and nine years in Bavaria. In most of the European countries provision is made for periodic renewal of the council. The usual rule is renewal by thirds or halves, annually, biennially, or triennially, according to the length of the term. The most universal legal qualification for councilmen, aside from age, is residence. In America councilmen must not only reside in the city which they represent, but, by written or unwritten law, within the district which elects them. In France any taxpayer is eligible, even though not a voter, provided the number of non-resident councilmen does not exceed one-fourth the whole. In England taxpayers residing within fifteen miles of the municipality may be elected for any district thereof. Property qualifications for a portion of the members of the council are required in European countries, but in a few cities, including Dresden and Leipzig, half of the membership must be from non-property-holders. In the United States property qualifications for membership in the council were formerly quite common, but are no longer required. In all countries the work of councils is largely done by committees, and this is particularly true of those countries where the council has large powers and duties, which doubtless accounts for the large bodies in Great Britain and elsewhere in Europe. In Chicago and in most small cities the presiding officer of the council is the mayor. In other large American cities there is usually a president of the council elected by the city at large. In Europe the council usually elects its own presiding officer. Generally speaking, members of municipal councils receive no salary and frequently service is compulsory. In a number of the large cities of the United States, however, members receive pay ranging from a small per diem allowance to $2000 a year, which is the amount paid to members of the New York Council.

EXECUTIVE BOARDS AND OFFICERS. These range from the mayor and council committees to the more or less independent boards and commissions so common in the United States, and on down to minor officials acting under these officers. The number and variety of services which these boards and officials perform has been partly indicated in the enumeration of the city's functions. In cities where the council is supreme, the committees of that body exercise large executive powers. Great reliance, however, is placed on trained executive officers selected by such committees or by the council as a whole for the various departments of municipal activity. Outside of the United States such officials are seldom chosen by popular vote, but in this country it is not uncommon to choose many of these officers by popular election. Minor positions are, of course, filled by the board concerned or by the chief executive officer responsible for the work undertaken by the appointee, rather than by popular election or by the council. The town clerk is the most important official in an English municipal corporation. Besides his duties as recording officer of the council and general secretary of the municipality, he acts as legal adviser of the council and as custodian of records. His tenure of office is frequently for life, he receives a high salary, and he is a trained official much as is the mayor of a German city. The city clerk in the United States is never an officer of such training and importance. Generally he is simply a recording officer to the council, or perhaps a kind of mayor's assistant. Legal advice to the municipal authorities in the United States is given by an officer styled the corporation counsel, and suits are prosecuted and defended by a city attorney, although the two classes of service may be rendered by one man, and the names vary in different localities. The city engineer is everywhere a trained man, and municipal engineering has become a distinct branch of the engineering profession. In the large cities the legal and engineering work is so extensive and important as to require large staffs of experts. This is also the case in the financial department, using the latter term to embrace all the executive officers employed in assessing, collecting, and disbursing money, and in maintaining a check on collections and disbursements.

FINANCE. Under this head *Ordinary Revenues* include the proceeds of taxes, special assessments for benefits, like the frontage tax for street paving, and various licenses and fees. *Extraordinary Revenue* includes money from loans, bond issues, and trust funds or bequests. Some cities of Continental Europe receive no little revenue from landed property, and the cities of Great Britain and Germany, and a few in the United States, derive considerable revenue from municipal franchises. Where municipal ownership prevails in British cities effort is often made to turn into the common treasury a revenue for the reduction of the general tax rate. In the United States a portion of the revenue from water-works, and less frequently from municipal industries, is sometimes applied in a similar manner. The taxing power is generally limited to the council, the chief exceptions being the education and poor authorities in Great Britain, which have an independent power of taxation. In the United States the councils often have to raise large sums by taxation for independent boards, and also for the county and for the State. It is common for the independent boards to incur bonded indebtedness without consulting the council, but only as the authority, in general or specific terms, is granted by the State Legislature. The sub-departments under the general head of finance are tax assessors, who place a valuation on taxable property; a board of review or appeals from the rulings of the last-named officers; tax collectors; the treasurer, who receives money from the collectors; the disbursing officer or controller, who issues or approves warrants for the payment of bills and claims; and the auditing department. In some cities, particularly the smaller ones, the treasurer is also the disbursing officer, and the council instead of a controller may approve claims. The *municipal budget*, or the estimate of receipts and expenditures upon which the tax rate and appropriations are based, is prepared according to various methods. In general, the several departments make up their respective estimates, and these are amended by the mayor, or by a special board created for that purpose, and sent to the council for further amendment and final ratification.

CITY CHARTERS. The municipality being a mere creature of the State, its area, powers, and form of government are laid down by the Legislature in the form of (1) a specific act or charter; (2) a given act for cities of a given class; or (3) a series of either general acts relating to groups of cities or to all municipal corporations; or (4) special legislation on any subject and at any time that suits the wishes of the Legislature. Strictly speaking, the first only is a city charter, but the other grants of power have the same general effect, except that 3 and 4 are successively more confusing and less satisfactory than 1 and 2. In the United States city charters may or may not be, as the Legislature sees fit, submitted to popular vote for approval. Frequently both charters and charter amendments are so submitted, and where general municipal corporation acts prevail the transition from one class to another is generally by popular vote, but it may follow from an increase in population. As a rule, voters of a municipality have some voice or influence in framing new or amending old charters, except perhaps where general legislation prevails. This participation goes so far in some cases as to permit the framing of the designed changes by an authorized charter commission or to the adoption of changes requested by the municipal officials. In Missouri, California, and Washington, charter-making is virtually under the control of the municipality, subject to more or less specific legislative restrictions. Far more commonly, the respective legislatures pass enabling acts, which may or may not be in the nature of charter amendments, and leave their adoption to the popular vote.

OTHER MUNICIPAL PROBLEMS. A comprehensive term used in discussions of municipal affairs is *Municipal Reform*. This is nothing more or less than an effort to secure honest and efficient municipal government. The problem varies with each locality, and even changes in a given locality from year to year. The bane of municipal government is partisan politics. The remedy for bad municipal government, from whatever cause, invariably lies with the citizens and taxpayers, who are often too indifferent to their own interests, or at least to the public interest, to insist on good government. A decided reform in municipal affairs was effected in Scotland in 1833, and in England and Wales in 1835, as a result of agitation directed against incompetent and corrupt borough government. The reform acts of the year named were supplemented from time to time, and in 1882 a consolidated municipal corporations act was passed. In 1888 another act was passed, providing that cities and towns of more than 50,000 inhabitants should be administrative counties, and also creating a more unified government for Greater London, known as the London County Council. In 1900 this unification was carried still further, but only to the extent of reducing by consolidation into some fifteen borough governments a large number of minor authorities. In the United States the progress of municipal reform, as reflected by changed methods of administration, is difficult to trace. This is largely due to the many independent State legislatures controlling municipal affairs, to the great variations of practice within each State, and to the spasmodic efforts for reform. One of the notable steps in many States has been the adoption of constitutional amendments, from 1850 to 1880, prohibiting special acts of the Legislature which apply to a single municipality. Other great agencies of municipal reform in the United States have been the various local reform organizations, notable among which have been the good government clubs, and their federation into the National Municipal League.

(See subhead *Charters,* above.) Other organizations whose annual proceedings are noted below (see *Bibliography*) have played an important part in municipal reform.

The need for *Municipal Specialists* becomes more and more imperative as the muncipal activities increase in number and complexity. Mayors in Germany, city clerks in England, and city engineers in all countries are already a distinct professional class, stimulated by the prospect of advancement to more important cities as their abilities increase. Sanitary or health officers, professional accountants, superintendents of water supply and other public works are also rapidly gaining in professional ability, and public recognition of such ability is likewise increasing.

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MUNICIPALITY, or **MUNICIPAL CORPORATION.** A town or city possessed of certain privileges of local self-government; also the governing body in such a town. Municipal institutions date back to the Roman Empire. The provincial towns of Italy, though subjected to the rule of a Roman official, were allowed to enjoy the right of regulating their internal affairs. A class of the inhabitants called the *curia,* or *decuriones,* elected two officers called *duumviri,* whose functions were supposed to be analogous to those of the consuls of the Imperial city, and who exercised a limited jurisdiction, civil and criminal. There was an important functionary in every municipality called the *defensor civitatis,* or advocate for the city, the protector of the citizens against arbitrary acts on the part of the Roman governor. The municipal system declined with the decline of the Empire, yet it retained a fair degree of vitality, and rose to renewed life in union with feudalism, and with the Anglo-Saxon institutions of Great Britain. Indeed, some cities of Italy, France, and Germany have derived their present magistracy by direct succession from the days of Imperial Rome, as is notably the case with Cologne. The bishop, as the shield between the conquerors and the conquered, in many cases discharged the duties or obtained the functions of the *defensor civitatis.* To the north of the Alps, under the feudal system, he became officially the civil governor of the city, as the count was of the rural district. In Southern Europe, where feudalism was less vigorous, the municipalities retained a large share of freedom and self-government. Of the cities of the Middle Ages, some were entirely free. Venice, Genoa, Florence, Hamburg, and Lübeck all stood in this position. Next in dignity were the free Imperial cities in Germany, which, not being comprehended in the dominions of any of the princes, were in immediate dependence on the Empire. Most of these cities rose to importance in the thirteenth century, and their liberties and privileges were fostered by the Holy Roman emperors to afford some counterpoise to the growing powers of the immediate nobility. The chief organs of government in the German cities were the councils, usually one for deliberation and a smaller one for administration, both being chosen from the various trade and artisan guilds. There were also from two to four burgomasters in each city who presided over the council meetings. The Italian cities were governed by executive officers known as consuls, usually twelve in number. By the side of these were a council and a general assembly of the citizens. During the contest between the Italian cities and the Emperor an officer, called the *podestà,* was put in control of the cities which the Emperor succeeded in subjecting to his authority. Other cities, seeing the advantage of a single executive, voluntarily introduced this officer in place of the consuls. In Southern France the Italian consular system existed, but occasionally the *podestà* appears as the chief municipal officer. In the northern part of France the *maire* and *échevins* were most frequently the governing authorities of the towns.

Before the Norman Conquest the English

burghs were subject to the rule of an elective officer called the 'portreve,' who exercised in the burghs functions similar to those of the shire-reve in the shire. The Normans recognized the already existing privileges of the towns by granting them charters. One of the most important of these privileges was the *firma burgi*, or lease of the town to the inhabitants in consideration of the payment of a fixed sum in lieu of all feudal dues. This involved the right of the inhabitants to elect their own magistrates, the independent exercise of jurisdiction in their payment of the local taxes, and the performance of the quota of taxes assigned by Parliament. A sheriff or viscount was placed by the King over each shire, and a bailiff instead of the former elective officer over each burgh. In the larger towns the bailiff was allowed to assume the Norman appellation of mayor. The municipal franchise seems to have been vested in all the resident and trading inhabitants, who shared in the paymentof the local taxes and the performance of local duties. Titles to freedom of the town were also recognized on the grounds of birth, apprenticeship, marriage, and sometimes free gift. In all the larger towns the trading population came to be divided into guilds or trading companies, through membership of which admission was obtained to the municipal franchise. Eventually the whole community was enrolled in one or other of the guilds, each of which had its property, its by-laws, and its common hall, and the community elected the chief officers. It was on the wealthier and more influential inhabitants that municipal offices were generally conferred; and it gradually became the practice for these functionaries to perpetuate their authority by coöptation. Contentions and disputes arose regarding the right of election, and eventually the Crown threw the weight of its influence into the scale of self-elective ruling bodies. This was the period of incorporation, when charters were granted incorporating not the inhabitants of the town, but the governing body. No new governmental powers were conferred, but the corporations were given the right to hold property and to sue and be sued. The desire of the Crown to control the representatives which the towns were now allowed to send to Parliament led to a reckless policy of granting municipal charters, so that presently the urban communities were overrepresented in Parliament. During the period of the early Stuarts the writ of *Quo Warranto* was used frequently to deprive the towns of their liberal charters, with a view to replacing them with charters of a less liberal type, in order that the Crown might the more easily control the Parliamentary representation of the towns. The burghs of Scotland had a history much like that of the burghs of England; their earlier charters were mere recognitions of already existing rights, and were granted to the inhabitants at large. In the course of the fourteenth and fifteenth centuries the municipal suffrage fell more and more into the hands of restricted bodies of men until an act of 1469 gave to the councils the right of appointing their successors, the old and new council together electing the office-bearers of the corporation. This state of things continued till 1833, not without much complaint. In the Scottish burghs the several trades possessed a much more exclusive monopoly than in England. Along with the outcry for Parliamentary reform arose an outcry for municipal reform; and a separate municipal reform act putting an end to the close system was passed for each part of the kingdom.

In the United States the English system of municipal administration became the type for the government of the early towns and cities. In nearly every instance a special organization was provided for the cities and was outlined in a charter granted by the colonial legislature or by the Crown. Generally the governing body of the municipality consisted of the mayor, recorder, aldermen, and councilmen. At first the corporation seldom acted as the agent of the State, but was an organ for the satisfaction of purely local needs, such as the management of local property and finance. It had no power of government except the right to issue local police ordinances. Gradually, however, the municipal corporation came to be an organ for the administration of matters of State concern, as well as of purely local matters. Thus the regulation of matters relating to public education, the public health, poor relief, elections, local justice, etc., is quite generally intrusted to the municipalities. As now understood, therefore, a municipal corporation in the United States is a body politic and corporate created by the State for the purpose of State administration as well as of local administration, and vested with certain privileges, such as the right to hold property, to sue and be sued, etc. The transformation of the municipality from an organ of local government to an organ for the administration of central matters created the necessity for legislative control, which has had the result of depriving the cities to a very large extent of the management of their local affairs. The corporation is not the body of the people, nor is it the officers collectively considered, but rather that artificial body or legal entity created by the act of incorporation and limited thereby. A distinction must be made between a municipal corporation proper and what are known as *quasi* corporations not created upon petition of the people of the district, but rather as territorial or political divisions of the State, such as counties, townships, and school districts created for the convenience of State administration. The laws regulating the incorporation of English towns and cities have little application to municipal corporations in this country. Here none are founded on common law or royal charter, and but few are based upon prescription. It may be said that they exist only by legislative enactment, and possess no powers not created by statute. A few municipal corporations are created by charter singly, but general laws of incorporation have been passed in many States, and at the present time the constitutions of more than twenty States forbid the Legislature to incorporate cities and, as a rule, villages by special act. In twelve of these the prohibition extends also to amendments or changes of charters. When the incorporation is single or special the charter sets out that the inhabitants are constituted a body politic with such a name and style; that by that name they may have perpetual succession, and may use a common seal, sue and be sued, etc. The territorial boundaries are defined and provision made as to the form of government—usually by a council made up of aldermen and councilmen, or by trustees—as to division into wards, qualifications of voters, powers of city council to collect debts and impose taxes, etc. General laws of municipal incorporation usually start by abolishing all special charters existing and establishing general regulations for the incorporation, government, and regulation of municipal corporations throughout the State. Frequently such laws classify the towns to be incorporated as regards their importance into cities of first or second grade, towns, and villages. To become operative, the charter granted by the Legislature must be accepted by the body of citizens to be incorporated.

When established the municipal corporation is, in the absence of constitutional provisions to the contrary, completely subject to the power of the Legislature; thus it has been held that the latter may repeal charter provisions, allowing the licensing of liquor dealers, and even such as relate to police regulations. In other words, a municipal charter is not a contract, and may always be altered or revoked, with the important exception that the rights of existing creditors must not be disregarded. The Legislature has general control over public property; thus it may authorize a railroad to occupy streets of a city without its consent and without payment therefor. But the courts are beginning to hold that the municipalities may also own private property which is not directly devoted to governmental purposes, and which is no more subject to control of the Legislature than the property of private individuals. Such are wharves, cemeteries, ferries, libraries, parks, hospitals, etc. The Legislature cannot deprive the municipality of property of this kind, or direct that it shall be applied to other purposes, as, for example, that land used for a city reservoir shall be converted into a public park. The power of the municipality to alienate its public property without legislative authorization has generally been denied by the courts, although the right to dispose of private property as it sees fit has been readily conceded. It is also a general rule that the public property of a municipal corporation is not subject to execution in satisfaction of a judgment. No exact form of words is necessary to give force to the charter, and the corporation may even be created by implication, as where powers and privileges are conferred upon the inhabitants of a locality which cannot be enjoyed or exercised without acting in a corporate capacity.

The powers which may be exercised by a municipality are such as are expressly granted in the charter, such as may be fairly implied therefrom, and such as are essential to the declared objects and purposes of the corporation—not simply convenient, but indispensable. Any fair or reasonable doubt concerning the existence of a power claimed is resolved by the courts against the corporation. That is to say, the rule of strict construction applies. In some of the recent decisions, however, there is evidence of a tendency to depart somewhat from this rule in the direction of conceding to municipal corporations wider powers, especially as regards the management of public utilities. Thus it has been held that a municipality which has the right to establish an electric light plant for lighting the streets may without an express grant from the Legislature distribute lights to private families. Where the city is given discretionary power upon any subject it is not for the courts to say whether such discretion has been wisely used or not, unless fraud is shown or the discretion is being manifestly abused to the oppression of the citizen. Thus, if it have power to open new streets or grade old ones when necessary for the welfare of the city, the question of necessity is one for the determination of its own authorities. But when a municipal corporation is empowered to take certain action for others, and it is beneficial for them to have it done, the law requires that it should be done, although the language is merely permissive in form. Among the principal powers usually conferred upon municipal corporations may be mentioned the right to acquire and hold such property as may be necessary to the proper exercise of other powers granted, the right of taxation and of eminent domain, the appointment or election of officers, the maintenance of local courts, the enactment of ordinances, and the maintenance of actions in the courts. Many special powers are given, such as relate to the incurring of loans, special assessments, licenses, police regulations, wharves, ferries, entertainment of guests, etc. It is a general rule of construction that the legislative power conferred upon municipal corporations cannot be delegated to other authorities, nor can they divest themselves of it in any manner whatever. The power to act for the general welfare of the city is usually granted, in addition to other powers expressly enumerated. Under this grant it is generally held that municipal corporations may pass such ordinances not inconsistent with other provisions of the charter or the laws of the State as may be expedient in maintaining the peace, good order, safety, and welfare of the community. Thus they may enact ordinances to provide for a proper observance of the Sabbath, for the closing of saloons at night, for restraining domestic animals from running at large on the streets, for the suppression of vagrancy, for the prevention of cruelty to animals, etc. But the 'general welfare' grant does not authorize the municipality to levy taxes of any kind. As a result of their contractual powers, however, municipalities may incur debts, provided they are to be paid out of the ordinary income of the city for the current year. The better opinion seems to be that in the absence of a specific grant municipalities may borrow money where it is necessary to the successful existence of the corporation, or where its non-exercise would render inoperative and incomplete privileges granted. Where the Legislature imposes a duty on municipal corporations which necessarily involves large expenditures the power to borrow may be deduced. It has been held that where the city had express power to establish meat markets, a fire department, or a liquor dispensary, the power to borrow could be implied as a necessary means for carrying out these undertakings. It may be laid down as a rule, however, that municipal corporations have no general borrowing power or power to issue negotiable paper in evidence of debts without legislative authorization. The constitutions of many States contain provisions limiting the amount of indebtedness which municipal corporations may incur. The prohibition is usually construed to apply to indebtedness of all forms. It is, however, held by some courts that contracts for meeting the ordinary expenses of the municipality and in anticipation of receipts do not create an indebtedness within the meaning of the limitation. A municipality cannot escape liability for its obligation arising *ex delicto* by pleading that its indebtedness has reached the constitutional limit. Those who contract with a municipality whereby its indebtedness is increased do so at their own risk. If, therefore, an individual lends money to a city which has no legal power to borrow he cannot recover it by pleading ignorance of the powers of the city. But where municipal bonds contain recitals that the city is acting within its constitutional power, and has complied with all the requirements of the law, it will be estopped from disputing the truth of such representations as against a bona fide purchaser of the bonds.

The legislature has no power to enact legislation which will have the effect of impairing the obligation of a contract between the city and a private party. Thus it cannot so limit the taxing power of a municipality as to render it impossible for the city to meet its ordinary expenses and pay interest on its outstanding bonds. On the other hand, the legislature has no power to authorize a municipality to levy taxes for other than public purposes. Thus it cannot authorize the granting of aid by a municipality (if it involves taxation) to a private enterprise to enable it to begin business, since that would amount to taking private property without compensation. Among the public purposes for which a municipality may levy taxes may be mentioned the construction of sewers, the laying out of parks, the establishment of water-works, etc. Moreover, the legislature cannot levy a special tax upon the inhabitants of a municipality for other than strictly municipal purposes. Thus it cannot require them to defray the expenses of improving a navigable stream or to take stock in a railway company, although they may be required to build a local canal or levee. The city may be compelled by mandamus to fulfill its obligations to private parties, as where it refuses to levy a tax for the purpose of paying interest on its outstanding bonds or for the satisfaction of judgments against it. The city may be enjoined from doing an injurious act to an individual or from committing trespass upon his premises. Furthermore, it may be enjoined at the instance of a taxpayer from violating the law or doing other acts prejudicial to the general welfare, as where the city proposes to enter into a contract which will create an indebtedness in excess of the constitutional limits. Municipal officers may also be proceeded against under a writ of *quo warranto* for usurping powers not legally conferred upon them. In the United States the practice of frequent interference in the affairs of the cities by the legislature has led to so many abuses that in most of the recent constitutions provisions have been inserted prohibiting the legislatures from passing special acts which apply to a particular city when a general law can be made applicable. These provisions, however, have frequently been evaded by arranging the cities into classes in such manner that a particular city will constitute a class by itself and by making the act applicable to a single class. The practical difficulties of dispensing entirely with special legislation has led the courts in some instances to sustain the constitutionality of methods of classification which seem unreasonable if not ludicrous. Where a part of a municipality is detached from the main body of the city the old corporation retains all the liabilities and private property of the city if no provision to the contrary is made by legislation. Property of a public character falling within the limits of the new corporation passes into its control, the theory being that there has been no transfer of title, but simply a change of trustee. A new municipal corporation, embracing substantially the same boundaries as the old, is regarded in law as the successor of the old, entitled to all its property rights and subject to its liabilities. Upon the repeal of the charter of a municipal corporation a court of equity will lay hold of its private property and administer it for the benefit of the creditors of the corporation. It is a general rule of construction that if the existence of a municipal corporation is not questioned by the State it cannot be put in issue by a private individual in a collateral proceeding.

In discussing the liability of municipal corporations for torts it is necessary to distinguish between the two classes of powers which they exercise, viz. public governmental functions on the one hand and private corporate functions on the other. When acting in the former capacity municipal corporations are acting as the agent of the State and are governed by the rules of public law, one of which is the irresponsibility of the government for the tortious acts of its agents. When acting in a private local capacity, primarily for the advantage and benefit of the locality, the municipal corporation is subject to the rules of the private law, according to which it is held liable for the torts of its officers. The rule of liability for torts does not apply to *quasi* corporations, such as counties, townships, school districts, etc., because they are agencies of the State created for the purpose of State administration, and usually without solicitation or concurrence of action of the inhabitants. The principal torts which are imputable to municipal corporations when acting in the latter capacity are negligence, non-compliance with the statutes, nuisance, and trespass. The courts have generally held that municipal corporations are not liable for failure to exercise discretionary legislative power which may be conferred by the legislature or for the manner in which they may exercise it if done in good faith. Thus, it is not liable for its neglect to abate a nuisance, as where an individual was injured by an explosion of fireworks which the municipality was authorized to prohibit. But where the duty is ministerial and absolute the corporation becomes liable for the injury arising because of failure to perform it, and where it positively licenses something which constitutes a nuisance it will be held liable for any injuries that may result therefrom. In the exercise of a discretionary power, as in the construction of a sewer, the city will not be held liable for injuries resulting from defective service unless it results in the positive invasion of an individual's property and unless it can be shown affirmatively that the municipality has been guilty of negligence. It is a general rule that a municipal corporation is not liable for injuries arising from neglect or failure to enforce strictly its ordinances for the good government of the city, but an act of the Legislature making the city liable for property destroyed by mobs has been held to be constitutional. In the exercise of its police powers the city is not generally liable for the acts of omission of its agents, as where a policeman shoots a bystander while attempting to kill a dog running at large. The same is true of negligence on the part of the fire department and of the health department. In all these cases the municipality is acting in its public governmental capacity as an agency of the State. In the management, however, of institutions not directly connected with the function of government, such as wharves, gas and water works, markets, and wash-houses, municipal corporations are held liable for injuries that may result therefrom, the theory being that in this capacity the corporation is engaged in private business, from which often a revenue is derived. It is also a general rule that municipal corporations are responsible for the management of streets. The rule, however, does not apply to *quasi* corporations in the management of public highways. This is due to the fact that, unlike pure municipal corporations, they are engaged chiefly in the performance of public governmental duties from which they do not generally derive any revenue or particular private advantage. The peculiar rule exists in New England that the property of any citizen of a municipality against which a judgment has been recovered may be seized in execution thereof. Elsewhere the remedy is execution upon the private property of the municipality. Consult: Dillon, *The Law of Municipal Corporations* (Boston, 1890); Jones, *The Negligence of Municipal Corporations* (New York, 1892); Goodnow, *Comparative Administrative Law* (New York, 1893); id., *Municipal Home Rule* (New York, 1897).

MUNICIPAL LAW. To the Romans, municipal law meant the special law of the cities, other than Rome, which were included in the Roman Empire. A *lex municipalis* was a city charter, granting limited self-government in matters of local interest. On the Continent, toward the close of the Middle Ages, the phrase was sometimes used to describe any local law, whether of a city or a province, as contrasted with the general law of Christendom, i.e. the Roman law, civil and canon. Later, with the development of international law, municipal law came to describe local law in contrast with international law. The term is no longer used in this way on the Continent: municipal law now means city law as contrasted with national law; but among English-speaking peoples national law is called municipal in contrast with international law. English municipal law has thus become the very inappropriate description of all the law, written or unwritten, by which England is governed in matters purely English.

The expression 'municipal law' is sometimes, however, employed in the United States in the Continental sense above indicated, to describe the organization of municipal corporations and the local laws enacted and enforced by municipal authorities. It is under this head (municipal corporations), therefore, that information concerning the organization of city, county, township, and village governments, the organization and jurisdiction of local courts, and police laws for the regulation and restraint of vice, may be found. See MUNICIPALITY. Consult the authorities referred to under JURISPRUDENCE.

MUNICIPAL LEAGUE, NATIONAL. An organization composed of associations seeking to accomplish municipal reform in the various cities of the United States. It was established in New York in 1894, as the outcome of a national conference held in Philadelphia in July of that year to promote the interests of good government. It has no political interests whatever, but confines its operations to the securing of good municipal laws, the appointment of men of integrity and ability to office, and the correction of abuses in municipal methods of government in American cities. The reforms recommended by the League are being tried with considerable success by various municipalities throughout the United States, Cuba, Hawaii, and Porto Rico. The League is also directing attention to the question of instruction in municipal government, in American educational institutions, and to the subject of uniform municipal accounting and statistics. A meeting is held annually to confer and report on the subject of municipal reform.

MUNICIPAL OWNERSHIP. Possession by a municipality or any minor civil division of the State. The term is, however, more commonly limited to public as opposed to private ownership of water-works, lighting plants, street railways, telephone systems, and other revenue-producing industries designed to meet the wants of urban populations. The term generally implies municipal operation as well as ownership, but exceptions are frequent and sometimes notable. The term 'municipal socialism' has sometimes been used in much the same sense as municipal ownership; but it is more inclusive, embracing various efforts to meet the collective wants of a municipality, whether founded on municipal ownership or not. In its broadest sense, municipal socialism would provide for all wants common to the citizens of a municipality, in so far as they were not met by the State. A narrower usage would apply the term more particularly to unusual municipal enterprises, such as the management of coal-yards or bakeries. The term 'municipal trading' has been applied in England to municipal ownership, but it has not gained currency outside of Great Britain.

The services which a municipality may be expected to render its citizens are more comprehensive than those included under municipal ownership, municipal socialism, or municipal trading, as may be seen by referring to the article MUNICIPALITY. The object of the present article is to consider those undertakings which require the use of the streets or other public places, and which might be carried on by either municipal or private enterprise, but are actually carried on by the former. Since by their nature such undertakings exclude competition, they are called natural or municipal monopolies. Under either kind of ownership they can be carried on only by authority from the State, in the form of general or special legislation, besides which a private corporation must generally secure the grant of a municipal franchise permitting it to use the public streets. Within the limitations stated the most common objects of municipal ownership are sewerage systems and water-works, and gas and electric-lighting plants. More rarely street railways, ferries, and telephones are owned by the municipality.

Aqueducts for the supply of the cities of antiquity were the nearest approach to municipal ownership as the term is understood to-day, although from remote times cities have owned lands, improved harbors, built docks, and derived revenues therefrom. But these services were confined to a relatively small number of important cities until the nineteenth century, when water-works, gas-works, electric-light and power plants sprang up with increasing rapidity. At the opening of the twentieth century these services were to be found in practically all the larger and in the majority of the smaller municipalities of the civilized world, particularly in the United States, Great Britain, and to a less extent on the Continent of Europe and in Australia.

The proper scope of municipal ownership is still a subject of debate. Perhaps the nearest approach to a general agreement is (1) that it may rightly embrace all those services which are primarily or largely of a sanitary character, like water supply and sewerage, and (2) that it should be restricted to quasi-public industries, in which private competition is impossible or at best uncertain. Under (2) some draw the line so as to include only imperative and universal needs, the supplying of which is at the same time a natural monopoly. The difficulty with such a limitation is that it varies with local conditions, time, and individual opinions. Thus the demand for public lighting in the larger cities of the present day is far more imperative than was that for a public water supply a hundred years ago, or in some localities to-day. There is a growing conviction that the relative cheapness and efficiency of service are the chief facts to be considered in deciding between public and private ownership, and that local conditions determine whether public or private ownership is the better in these respects. A third point upon which there is more or less agreement is that municipal ownership should not be carried so far as to increase municipal debts beyond prudent limits. So far as revenue-producing municipal works of a monopolistic character are concerned, it is generally possible so to adjust income and expense that the revenue from such undertakings will meet capital charges as well as other expenses. But there is also the possibility that the popular demand for low charges will result in a deficit that must be met from the general tax rate, and with a large number of municipal undertakings to be provided for it is conceivable that this might prove financially embarrassing if not disastrous.

WATER-WORKS. With the exception of sewerage systems, which rarely yield a revenue, water-works are the most common form of municipal enterprise.

The relative decrease in public ownership from 1870 to 1890 was due to the remarkable activity of private water-company promoters at a time when the municipalities were just awakening to the need for such improvements, but lacked the funds for public ownership, or had not become infused with its spirit. In the larger cities municipal ownership is the rule, all but eight of the 38 cities of over 100,000 population (census of 1900) owning their own works at the beginning of 1903. New York, which was first supplied by a private company in 1776, put municipal works in operation in 1842. Chicago was supplied by a company in 1840, and by its own works in 1854. Philadelphia built its works in 1801. At Boston a private company established water-works in 1652—the first public water supply in the United States. A second small company built works in 1796, and continued to operate on a small scale until 1893, when its pipes were bought by the city, which had built works in 1848. The Baltimore works were built by a company in 1807, and bought by the city in 1854. Cleveland built its works in 1854-56. At Buffalo a company established works in 1852 and was bought out by the city in 1868. In San Francisco the water-works are still under private ownership. At Cincinnati a company built works in 1820 and sold them to the city in 1839. Up to the close of 1896 changes from private to public ownership had occurred in 205 cities and towns, against only 20 changes from public to private ownership. There have been many changes to municipal ownership since 1896. In the North Central and Northwestern States municipal ownership is decidedly in the majority, and in the Pacific States the reverse is true. New England is about evenly divided, with Massachusetts strongly in favor of municipal ownership, and Maine even more strongly in favor of private.

In the *United States* in 1801 there were but sixteen works, of which only the plant at Winchester, Va., was owned by the city it served. The development of municipal ownership during the century is shown by the accompanying table:

NUMBER OF PUBLIC AND PRIVATE WORKS IN THE UNITED STATES AT THE END OF EACH DECADE, BEGINNING WITH 1800 *

YEAR	Public	Private	Total	Per cent. of total, public
1800	1	15	16	6.3
1810	5	21	26	19.2
1820	5	25	30	16.6
1830	9	35	44	20.5
1840	23	41	64	35.9
1850	33	50	83	39.7
1860	57	79	136	41.9
1870	116	127	243	47.7
1880	293	305	598	49.0
1890	806	1,072	1,878	42.9
1896	1,690	1,489	3,179	53.2

* Compiled from the Manual of American Water-Works for 1897. Figures for 1898, but excluding all places of less than 1000 population by the Census of 1890, published in the Report of the United States Commission of Labor for 1899, show 1787 municipal (53.73 per cent.) to 1539 private works.

In *Canada*, in 1896 municipal ownership prevailed in 75 per cent. of the municipalities having works, or 109 of 145 cities and towns. At Montreal water-works were built by a company in 1801 and bought by the city in 1845. At Toronto private works were built in 1841 and bought by the city in 1873.

In *Great Britain and Ireland*, in 1901, of 64 county boroughs in England and Wales, including the great towns, 45 owned their water supplies, and of the 141 other boroughs 139 had municipal works. All the large towns of Scotland own their works. In Ireland, Dublin and Cork have municipal service. About half the so-called urban districts in England, other than boroughs, have municipal works. Water-works appear to have been introduced by the municipality of London in 1283; by Plymouth in 1585; and Oxford in 1610. Manchester and Liverpool each bought out a private company in 1847, Glasgow in 1855, Birmingham in 1876, and Sheffield in 1888. Edinburgh transferred municipal works to a company in 1819, but they were restored to municipal ownership in 1869. Greater London has been served for years by eight companies, beginning with the New River Company, whose works were completed in 1613 with the aid of James I. The other seven companies date from 1721 to 1822. After years of agitation for municipal ownership, a Parliamentary act was passed in 1902 providing for the purchase of the London companies and the control of the water supply by a joint board representing the several boroughs and the other public bodies comprised within what is known as Greater London. The transfer is to be made in June, 1904.

Most of the large cities of the *European Continent* have extensive water-works. In *Germany* practically all places of 50,000 population and upward have municipal works. Berlin secured control of her water-works in 1873, buying them from a company which began to build them in 1853. Hamburg and Frankfort-on-the-Main, Vienna, Moscow, Paris, Rome, and other large cities own their water-works. The municipal water-works of Rome may be said to date from 312 B.C. (See AQUEDUCT.) At Paris an old Roman aqueduct was restored in the seventeenth century, and a small municipal supply seems to have been continued from that date until more adequate works were installed by the city about the middle of the nineteenth century. As a rule, private ownership prevails in Latin-speaking countries. In Australia there are a number of important municipal works.

GAS-WORKS. In North and South America these are rarely under municipal ownership, but in Europe they are frequently owned by the municipality.

Of 981 towns in the *United States*, each having a population of 3000 and more by the census of 1900, returns for the close of 1901 showed 21 municipal works; but of these the Philadelphia plant was leased to a private company in 1897, after over fifty years of municipal ownership and operation. Two of the 21 municipal plants supply natural gas. The municipal works at Richmond, Va., were established in 1852.

Of 693 gas-works in *Great Britain and Ireland* reported late in 1901, 240 were owned by the municipalities served, and they supplied barely half the population involved. In 1883 there were only 143 municipal works. With the exception of London, Liverpool, and Dublin, nearly all the large towns have municipal works.

At least 41 of 54 cities of *Germany* having a population of 50,000 and upward have municipal works, and as far back as 1885 figures for the whole country showed 338 municipal to 329 private gas-works. Among the larger cities with private works are Munich, Frankfort-on-the-Main, and Altona.

Municipal works are found in most of the cities of Holland, Norway, Sweden, and Switzerland, and in a few cities of France, Italy, and Australia.

SEWERAGE. Municipal ownership is almost universal, but many countries are practically without sewerage systems for household wastes. It is doubtful if any country is better provided with sewerage facilities than the United States, where 1096 of the 1524 places with a population of 3000 in 1900 reported sewerage systems late in 1901. Of the 1096 places with sewers, private ownership was reported in 47 instances. Most of these sewer companies were in small places; but Atlantic City, N. J., Wilmington, N. C., and Austin, Texas, each with more than 20,000 inhabitants in 1900, were served by sewers owned by private companies.

STREET RAILWAYS. This class of service has been developed since 1850, and up to 1870 was confined chiefly to the United States. Municipal ownership outside of Great Britain is rare, and even there it has sprung up recently. In fact, until 1893 Huddersfield, England, and the railway on the Brooklyn Bridge were the only examples of municipal ownership and operation, the first dating from 1882 and the second from 1883. A few British cities constructed railway tracks and leased them to companies between 1870 and 1893. At the close of 1901 there were 40 municipalities in Great Britain that owned and operated horse or electric street railways, and 27 (including a few in the other list) that owned railways, but leased them to operating companies. Among the 40, such large cities as London, Manchester, and Sheffield are included, but there are also private lines in some of these 40 places. The operation of the railway on the Brooklyn Bridge, New York City, was assumed by a private company in 1898, in connection with the Brooklyn railway service. In 1901 the small city of Grand Junction, Colo., assumed the ownership and operation of a short horse railway line. In 1902 an electric railway at Saint Thomas, Ont., was taken over in like manner. The street railway system of Toronto, Ont., was bought by the city at the expiration of the franchise of a company in 1891. After being operated for a few months by the city it was sold to a company, under a contract providing for conversion, by the purchaser, from horse to electric traction, together with a payment to the city of a percentage of gross receipts increasing with the latter. In other countries than those already named there are a few street railways owned by the city and leased to operating companies. A subway to accommodate street railway traffic in congested districts of Boston has been built by the city and leased to a company, and the same general plan is being carried out on a much more comprehensive scale in New York.

ELECTRIC LIGHTS. This service was started on a practical scale in or about 1880.

Probably the first municipal plant in the *United States* was put in operation in 1882, at Fairfield, Iowa. At the close of 1898 there were in places of 1000 or over by the United States census of 1890, 460 municipal and 2572 private electric-lighting plants. At the close of 1901, in places of 3000 population and over, by the census of 1900, there were 193 cities and towns with municipal and 1190 with private plants, besides 85 cities having both. The largest municipal plants are at Chicago and Detroit; but these, like many other American municipal electric-lighting plants, are for lighting streets and public buildings only.

The first electric-lighting plant in the *United Kingdom* was established by a private company in 1882. The oldest municipal plant was started by Bradford, in 1889. At the close of 1901 there were only 248 works in operation in the United Kingdom, of which 168 were municipal. In addition, 84 municipalities and 31 companies were then installing works. Among the larger municipalities Glasgow bought out a company in 1892, Liverpool in 1897, Leeds in 1898, Sheffield in 1899, and Birmingham in 1900; Dublin built works in 1892, and in 1893 Edinburgh and Manchester did likewise. London is divided between municipal and private ownership, with the latter far in the lead. From the outset municipal ownership of electric-lighting plants has been encouraged by the general Government; and that to such an extent, especially in the earlier years of the industry, as to check the growth of private plants.

On the *Continent of Europe* private ownership of electric-lighting plants seems to be the rule, with some exceptions in the northern part. The works at Berlin were opened by a company in 1886, but the city controls their operation in important particulars, and shares largely in the gross receipts. At Hamburg, Germany, municipal works were put in operation in 1889.

TELEPHONES. This service, like the telegraph, is national rather than municipal in scope, and is generally controlled by large companies, as in the United States, or by the general governments, as in many countries of Europe, in Japan, and in Australia. Tunbridge Wells, England, and Glasgow, Scotland, inaugurated the first municipal telephones in Great Britain in 1901, and early in 1902 some 40 other plants or projects were under way. The English trunk lines are owned by the national postal authorities; municipal telephones are reported at Amsterdam.

FERRIES. In the United States there are about 10 cities with municipal ferries to 70 with private ones, Boston being the most notable example of municipal ownership. In Great Britain a large municipal ferry between Liverpool and Birkenhead is owned and operated by the latter municipality. Public bodies at Glasgow and at Belfast also control ferries. There are a few other municipal ferries in Great Britain.

OTHER INDUSTRIES. The chief additional services that might properly be discussed under municipal ownership, as here considered, are docks and wharves and public markets. The former, particularly on a large scale, are more frequently found in Europe than in America; but New York City has expended many millions on dock construction, and receives a considerable yearly revenue from dock leases. Municipal markets are common in Europe, Australia, and Canada, where they are frequently exclusive in character. In the United States they exist, but they are in competition with private markets. Of cities and towns of over 30,000 inhabitants 129 were reported in 1901 to have municipal markets, but doubtless the list was incomplete, and at the same time it included some outdoor markets or market places. New York, Boston, Baltimore, and New Orleans have large markets, which yield considerable revenue. Subways for electrical wires have been constructed in a number of American cities for lease to the various owners of wires. A few cities have built subways for general use and receive a rental therefrom.

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MUNICIPAL REFORM ACTS, ENGLISH. The various acts passed by Parliament in the nineteenth century aiming to reform the government of the English municipalities. The Parliamentary reform of 1832 having left untouched the notorious abuses in the English system of municipal government, a Parliamentary commission was appointed the following year to investigate exhaustively the general condition of municipal corporations throughout the Kingdom. A monumental report was made by the commission showing that the municipal governments were in the hands of self-elected cliques; that the corporate funds were wasted; that public improvements were almost wholly neglected; that the municipal courts were corrupted and prostituted for party purposes; and that the whole system of municipal institutions as then constituted was a source of weakness rather than of strength to the country at large. The report of the commission was followed by the Municipal Corporations Act of 1835, which has been well called "the great charter of English municipal freedom." By this act 178 boroughs were reformed, 125 others given corporate privileges, and provision was made for the remedying of many defects, and the correction of the most notorious abuses of the municipal system. It admitted to the franchise all property-owners and occupiers of property rated at £10 per annum, and established a uniform system of municipal organization. This scheme provided first for an elected council, varying in size according to the population of the borough; the council was to be a bicameral body, the Upper House consisting of a certain number of aldermen elected by the council. The act further provided for a mayor to be chosen by the body of councilors and aldermen from among their own members. The mayor, aldermen, and councilors were to constitute the full municipal governing body. The chief features of this act have remained as the framework of the English municipal constitution; although the various acts of Parliament, passed from time to time, modifying in unessential particulars the municipal structure made a consolidation and revision of the statutes necessary. This was accomplished by the consolidated municipal code of 1882. By the Local Government Act of 1888 the municipal constitution was modified to the extent that cities and towns with a population of 50,000 inhabitants were made distinct counties for administrative purposes, the municipal councils assuming all duties which would otherwise devolve upon county councils. Consult: Chalmers, *Local Governments* (London, 1883); Goodnow, *Comparative Administrative Law*, vol. i. (New York, 1897); Shaw, *Municipal Government in Great Britain* (ib., 1895). See works referred to under MUNICIPAL GOVERNMENT; MUNICIPALITY.

MUNK, mụnk, HANS (1589-1628). A Danish navigator, born at Elsinore. In 1619, by order of King Christian IV., he set out with two ships to discover the northwest passage to the Indies. He penetrated Davis Strait as far north as 69°, and then turned southward and spent the winter on Chesterfield Inlet. Cold, famine, and scurvy destroyed so many of his men that when he regained the coast of Norway in September, 1620, only two persons besides himself survived. He sailed on a second voyage in 1621, and upon his return in 1623 reported that he had reached 75° north latitude, and had seen an open sea beyond. An account of his first voyage was published at Copenhagen in 1623, under title of *Efterretuing af navigatinonen og reisen til den Nye Danmark af Styrmand Hans Munk.*

MUNK, Hermann (1839—). A German neurologist. He was born at Posen, studied at Berlin and Göttingen, and in 1862 became docent in the former university. Seven years afterwards he was promoted to assistant professor of physiology, and in 1876 he was placed at the head of the physiological laboratory in the veterinary college. In 1897 he became full professor in the university. Besides studies on the productive methods of threadworms, Munk wrote on the physiology of the nerves and especially on the brain: *Untersuchungen über das Wesen der Nervenerregung* (1868) and *Ueber die Funktionen der Grosshirnrinde* (2d ed. 1890).

MUNK, Salomon (1805-67). A French Orientalist. He was born in Glogau, Silesia, of Jewish parents, studied at Berlin, Bonn, and Paris, and in 1840 was made custodian of Oriental manuscripts in the Paris National Library. He accompanied Montefiore and Crémieux to Egypt, bringing back many valuable manuscripts. Although he had become blind, he was in 1865 appointed professor of Hebrew, Chaldee, and Syriac in the Collège de France. He was a member of the Académie des Inscriptions et Belles-Lettres, and published an edition (with French translation) of the *Guide of the Perplexed* (1856-66) by Moses ben Maimon (see Maimonides). His further works include *Palestine* (1845) and *Philosophy Among the Jews* (1848).

MUNKÁCS, mụn′käch. A town of Hungary, situated on the River Latorcza, about 70 miles east-southeast of Kaschau (Map: Hungary, H 2). It has manufactures of coarse cloth. In the vicinity are mined alum, iron, and crystals. The fortress of Munkács, situated on a rock near the town and used as a prison, is noted for its many sieges, especially for its defense against the Austrians, to whom it surrendered in 1688 after a siege of three years, the garrison having been commanded by Helen Zrinyi, the wife of the patriot leader Tökölyi. Population, 1900, 14,416.

MUNKÁCSY, mụn′kä-chē, Michael (1844-1900). An Hungarian historical and genre painter, whose real name was Michael Lieb. He was born at Munkács, February 20, 1844, the son of a petty official, became an orphan at an early age, and in 1855 was apprenticed to a joiner. After several years of hard work and privation, chance threw him in the way of the portrait-painter Szamossy at Gyula, who aided and befriended him, as did also the landscape painter Ligeti, at Budapest, whither Munkácsy had gone in 1863. A small grant from the art society there enabled him to study for a year (1865) at the Academy in Vienna, after which he proceeded to Munich, where he studied under Alexander Wagner, and found a special protector in Franz Adam, the battle painter. In 1868 he went to Düsseldorf to work under Knaus. Two years later his first important picture, "The Last Day of a Condemned Man" (in the collection of Mrs. W. P. Wilstach, Philadelphia), took Paris by storm, bringing him the gold medal. His future was forthwith assured, and in 1872 he took up his residence in Paris, where for several years he continued to depict episodes from the popular life of his native country with impressive truthfulness and a sombre, blackish coloring. In 1876 he entered upon a new field, painting a series of charming Paris interiors, in which he adopted a richer coloring, but his most important production of this period was "Milton Dictating Paradise Lost" (1877, Lenox Library, New York). It was not, however, until 1881 that he reached his own ideal with the completion of the now world-famous "Christ Before Pilate" (John Wanamaker, Philadelphia), which has become one of the most widely discussed pictures of recent times. It was exhibited all over Europe and in the United States in 1886, on which occasion Munkácsy visited New York. In 1884 he painted his second biblical subject, "Christ on Calvary," like its predecessor replete with dramatic life, treated in the light of history with ethnographic reality and supreme coloristic vigor. It also was brought to America in 1887, and the artist's next important work, "The Last Moments of Mozart" (1886), a touching representation of the dying composer rehearsing his famous *Requiem*, found its way into the collection of Gen. Russell A. Alger, Detroit, Mich. His subsequent creations were of a decorative character, and comprise the "Apotheosis of the Fine Arts," for the Art-Historical Museum in Vienna, and "Arpád Taking Possession of Hungary" (1896), for the new House of Parliament in Budapest. The strain and disappointments connected with this work brought on a mental disease, and the artist passed the last three years of his life in the sanitarium at Endenich, near Bonn, where he died, May 1, 1900. Many of the prominent public and private collections of the United States contain examples of his paintings. Consult: Tahi, in *Die Kunst für Alle*, xv. (Munich, 1900).

MUNN, Orson Desaix (1824—). An American journalist and lawyer, born in Hampden County, Mass. He was educated at the Monson Academy. In 1846, in conjunction with Alfred E. Beach, he bought the *Scientific American*, which had been founded six months before. In 1876 he began to issue the *Scientific American Supplement*, and in 1885 he established a monthly *Architects' and Builders' Edition.*

MÜNNICH, mụ′nĭk, Burkhard Christoph, Count (1683-1767). A Russian general and statesman, born at Neuenhuntorf in Oldenburg, Germany. In the War of the Spanish Succession, he served as captain of Hessian troops. He became a colonel in the Polish army in 1716, entered the Russian service in 1721, and six years afterwards became general. He was created commander-in-chief of the Russian army by Peter II. in 1727, and in 1732 was made field marshal and president of the War Council. He played a distinguished part in the war with Turkey, overran the Crimea in 1736, and advancing beyond the Dniester, made himself master of Moldavia. After the death of the Empress Anna Ivanovna in 1740, he opposed the party of Biron, the Regent, whom he overthrew. The regency was conferred on Anna Karlovna, mother of Ivan, the young heir to the throne, and Münnich became Chief Minister and the most powerful man in Russia. After the coup d'état which placed Elizabeth Petrovna on the throne (1741), Münnich was arrested, and the sentence of death passed upon him was changed only at the foot of the scaffold to exile in Siberia, where he remained for twenty years. Peter III. restored to him his estates in 1762, and he was made director-general of the Baltic ports by the Empress Catharine. Consult: Halem, *Geschichte des Feldmarschalls Grafen Münnich* (Oldenburg, new ed., 1838).

MUÑOZ, mōō′nyōth, Juan Bautista (1745-99). A Spanish historian, born at Museros, Valencia, and educated at the University of Valencia. His leading work was *Historia del nuevo mundo* (1793), which Charles III. had commissioned him to write. It follows the course of American discovery down to 1500. The council of the Indies, to which he had been appointed cosmographer (1770), forbade its publication; but Charles IV. sanctioned it, despite the author's revelations concerning the atrocious treatment of the aborigines by Spaniards in the New World. Some writings of Muñoz are to be found in vol. lxii. of the *Biblioteca de autores españoles* and elsewhere in the collections of the Academy of History, Madrid, but many of his manuscripts were burned in the library of Valencia when that city was stormed by the French (1812).

MUNRO′, Hugh Andrew Johnstone (1819-85). An eminent English classical scholar. He was born in Elgin, Scotland, was educated at Trinity College, Cambridge, and was from 1869 to 1872 the first university professor of Latin at Cambridge. His edition of Lucretius (4th ed. 1885), with commentary and prose translation, remains one of the standard English contributions to Latin scholarship. His edition of Horace (1868), containing a valuable introduction, and his *Criticisms and Elucidations of Catullus* (1878) are also highly esteemed. He contributed to the *Journal of Philology* and other learned periodicals, and wrote much Greek and Latin verse.

MUNRO, Neil (1864—). An English novelist, born at Inveraray, in Argyllshire, Scotland, June 3, 1864. He was educated at the parish school, and subsequently entered the office of the Glasgow *Evening News*. He is the author of admirable tales and romances dealing with life in the Scottish Highlands. They include: *The Lost Pibroch* (1896); *John Splendid*, which gained him his reputation (1898); *Gilian, the Dreamer* (1899); and *Doom Castle* (1901).

MUNRO, Sir Thomas (1761-1827). A Scottish major-general, Governor of Madras, born and educated in Glasgow. He was noted as a civil ruler, beginning with his appointment to the newly acquired district of Baramahal. Afterwards he was made Governor of Canara, and then of Ballari, Cuddapah, Karnul, and the Palnad, where his wise rule was most effective in quelling disorder. He established the ryotwar system of land tenure now in vogue throughout a large part of British India, whereby peasants may hold property by paying a land tax to the State. In 1819-26 he was Governor of Madras.

MUNROE, mŭn-rō′, Charles Edward (1849—). An American chemist and educator. He was born at Cambridge, Mass.; graduated from the Lawrence Scientific School in 1871, and in the same year became assistant in chemistry. From 1874 to 1886 he was professor of chemistry at the United States Naval Academy, and then devoted himself to the study of explosives. In 1886 he was appointed chemist to the torpedo corps at Newport, R. I., and in 1892 received a chair in chemistry and the post of senior dean in Columbian University. Munroe invented a smokeless powder, and attained an international reputation as an authority on explosives. His publications include *An Index to the Literature of Explosives* (1886).

MUNROE, Kirk (1856—). An American writer of books for boys, born near Prairie du Chien, Wis. He studied civil engineering at Harvard, and while professionally engaged on the routes of the Northern and the Southern Pacific railways gained material for many of his tales. Afterwards he worked for various newspapers in New York City, and was the first editor of *Harper's Young People* (1879-82), but on his marriage with a daughter of Amelia Barr, the novelist, went to reside in southern Florida, a district that colored his writings, which include: *The Flamingo Feather* (1887); *Dory Mates* (1889); *The Fur Seal's Tooth* (1893); *At War With Pontiac* (1895); *With Crockett and Bowie* (1897); *Under the Great Bear* (1900); and *The Belt of Seven Totems* (1901).

MUN′SEE. A subtribe of the Delaware (q.v.), originally constituting one of the three great divisions of that tribe and dwelling along the upper streams of the Delaware River, and the adjacent country in New York, New Jersey, and Pennsylvania. They were considered the most warlike portion of the tribe and assumed the leadership in war councils. From their principal totem they were frequently called the Wolf tribe of the Delaware. They were prominent in the early history of New York and New Jersey, being among the first tribes of that region to meet the whites. By a noted fraudulent treaty known as the Walking Purchase, the main body was forced to remove from the Delaware River about the year 1740. They settled on the Susquehanna, on lands assigned them by the Iroquois, but soon afterwards moved westward and joined the main Delaware tribe on the Ohio River, with whom the greater portion eventually became incorporated. A considerable body, who were converted by the Moravian missionaries, drew off from the rest and formed a separate organization, most of them removing to Canada during the Revolution. Others joined the Ojibwa and Stockbridge Indians. The majority were incorporated in the Delaware, with whom they participated in their subsequent wars and removals. Those who still keep the name of Munsee are in three bands, two of which are consolidated with other tribal fragments, so that no separate census is available. These tribes are the Munsees of the Thames, Ontario, Canada, 120; Munsee (or Christian). and Chippewa. northeastern Kansas, 90; and Stockbridge and Munsee. Green Bay Agency, Wis., 530. Those of the United States are officially reported as civilized and entirely competent to manage their own affairs. The mixed band in Kansas has dissolved tribal relations.

MUNSELL, mŭn′sĕl, Joel (1808-80). An American editor, publisher, and antiquary, born in Northfield, Mass. He settled in Albany, N. Y., in 1827, and entered journalism. He subsequently became the editor of various publications, among which were the *New York State Mechanic*, the *Lady's Magazine*, and the *New England Historical and Genealogical Register*. He rendered valuable services to the cause of American history by publishing the *Annals of Albany* (10 vols., 1849-59); *Collections on the History of Albany* (4 vols., 1855-57); and a series of books, some of considerable value, known as the "Munsell Historical Series."

MUNSEY, mŭn′sĭ, FRANK ANDREW (1854—). An American publisher, born at Mercer, Maine. In 1882 he established at New York City *The Golden Argosy*, a children's weekly, which he afterwards changed to *The Argosy*, a monthly for adults. In 1890 he founded *Munsey's Weekly*, which he changed to the monthly *Munsey's Magazine* the next year. He also founded *The Puritan* and the *Junior Munsey*, and afterwards obtained control of the Washington *Times*, the New York *Daily News*, and the Boston *Journal*.

MUNSON, mŭn′son, JAMES EUGENE (1835—). An American inventor, born at Paris, Oneida County, N. Y. He studied for a time at Amherst, then removed to New York City, where he became a court stenographer, a position which he held for more than thirty years. He formulated the Munson system of stenography, an automatic typesetting machine, and a mechanism of operating typewriting machines by telegraph, and published a number of books of phonography.

MÜNSTER, mụn′stĕr. The capital of the Prussian Province of Westphalia, situated in a level district at the confluence of the Aa with the Münster Canal, 65 miles northeast of Düsseldorf (Map: Prussia, B 2). The town is mediæval in appearance, with its ancient gabled buildings, old Renaissance houses, rococo dwellings of the eighteenth century, arcaded markets, and shaded allées. The site of the former fortifications, which divided the old and new towns, has been converted long since into promenades. Münster has many churches, of which two are prominent: Saint Lambert's and the cathedral. The former is a graceful, pleasing structure. It is Gothic, dates from the fourteenth century, has been restored in recent times, and possesses a majestic new tower. The church is associated with the history of the Anabaptists in the sixteenth century. The cathedral is of the thirteenth century, and has some noteworthy features, though none of great interest. The imposing Church of Our Lady also merits mention as well as the beautiful Romanesque tower of the Ludgerikirche.

The Rathaus is a handsome, gabled, Gothic structure. The Peace of Westphalia was signed in it in 1648, in a curious room called the Friedenssaal, which contains portraits claimed to have been painted by Terburg. Among the interesting old buildings are also the Renaissance Weigh House; the Renaissance Stadtkeller, the headquarters of the Kunstverein, with pictures of minor value; and the Schuhhaus, or the ancient guild-hall of shoemakers. The castle was the episcopal residence in former times, and is now occupied by the leading officials of the city. In its grounds is a botanical garden. The Government offices, the law courts, and the attractive Gothic post-office are modern. The splendid modern Ludgerus fountain is adorned with interesting religious statues. The Roman Catholic university, which ceased to exist as such in 1818, when the institution was reduced to a theological and a philosophical faculty (which figured as the Academy of Münster from 1843), was revived in 1902 by the establishment of a faculty of law. Noteworthy also among the many educational institutions are the royal pedagogical seminary, a seminary for priests, and two 'Konvikte.' Münster has a Museum of Christian Art, the Pauline Library, with about 115,000 volumes, and an extensive Roman Catholic gymnasium. There is a notable zoölogical garden, which is much frequented by the citizens, and contains an antiquarian collection. The industrial products of Münster include leather, linen and cotton fabrics, starch, thread, and sugar. There are also carriage works and distilleries. A large trade is carried on in the produce of the country. Carriages and sculptures of stone are exported. The population in 1871 was 24,815; in 1901, 63,776, mostly Catholics.

HISTORY. Münster had its origin in a celebrated monastery which appears as early as the time of Charles the Great. A considerable settlement sprang up around the monastery in the first part of the twelfth century. The town received municipal rights about 1180, and in the course of many years the inhabitants succeeded in vindicating their liberties against their feudal lords, the bishops of Münster. In the thirteenth century Münster entered the Hanseatic League. In the fifteenth century it became a centre of learning and religious life, and during the Reformation suffered greatly from the strife of parties. In 1533 Münster fell into the power of the Anabaptists, whose leader, the celebrated John of Leyden (q.v.), erected the city into a kingdom of Zion with himself as sovereign (1534). The city was taken by the Bishop in the following year, and John of Leyden was put to death. Against the ambitious and warlike Bernhard of Galen, Bishop of Münster, the city carried on a desperate struggle in defense of its rights, but it was finally compelled to submit with the loss of almost all its liberties (1661). The Bishopric of Münster, which held a prominent place among the ecclesiastical States of the old German Empire and embraced a territory of nearly 4000 square miles, was secularized in 1803.

MUN′STER. The largest of the four provinces of Ireland, occupying the southwest part of that country and bounded north by Connaught, east by Leinster, and west and south by the Atlantic (Map: Ireland, C 4). It contains the six counties of Clare, Cork, Kerry, Limerick, Tipperary, and Waterford. Area, 9481 square miles. The population of the province in 1841 was 2,404,460; in 1891, 1,173,643; and in 1901, 1,075,075.

MÜNSTER, mụn′stĕr, SEBASTIAN (1489-1552). A German theologian and geographer. He was born at Ingelheim, studied at Heidelberg and Tübingen, and in 1529 left the Catholic Church for the Reformed. He was professor of theology and Hebrew at Heidelberg until 1536, when he became professor of mathematics at Basel. He edited in 1534 the first Hebrew Bible to appear under the care of a German. But his chief work was his *Cosmographia* (1544), a geography which was translated into Italian, French, and Latin, and passed through twenty-four editions in a hundred years.

MÜNSTERBERG, mṳn'stēr-bĕrk, Hugo (1863—). A German-American psychologist, born in Danzig. He received the degree of Ph.D. at Leipzig in 1885 and that of M.D. at Heidelberg two years afterwards, and taught psychology at Freiburg for five years (1887-92). In 1892 he became professor of psychology at Harvard University. He devoted himself mainly to the physiological side of the science, and it was under his supervision that the psychological laboratory at Harvard was organized. His more important publications are: *Die Willenshandlung* (1888); *Gedankenübertragung* (1889); *Der Ursprung der Sittlichkeit* (1889); *Beiträge zur experimentellen Psychologie* (1891); *Psychology and Life* (1899); *Grundzüge der Psychologie* (1900); *American Traits* (1901).

MÜNSTER-LEDENBURG, mṳn'stēr lā'den-bōōrk, Ernst Friedrich Herbert, Graf zu (1766-1839). A Hanoverian statesman. He was born at Osnabrück; studied at Göttingen, and in 1788 entered the governmental service of Hanover. For three years (1801-04) he was Ambassador to Saint Petersburg, and as Cabinet Minister at London immediately afterwards did much to bring about the entente between Russia and England. His foreign policy was marked by deep opposition to Napoleon. In 1813-14 he was at the headquarters of the allied forces, and he was a member of the Vienna Congress (1814-15). In Germany his programme was progressive, but anti-Prussian; the constitution of the Kingdom of Hanover and its formation in the midst of Prussia may be considered typical of his policy. In 1831 Münster retired from office. Consult Hormayr, *E. F. H. Graf Münster* (Jena, 1875).

MÜNSTER-LEDENBURG, Georg Herbert, Graf zu, Freiherr von Grotthaus (1820-1902). A German diplomat, son of the foregoing, born in London, England. He was educated at Bonn, Heidelberg, and Göttingen, served for a time in the first chamber of the Hanoverian Parliament, and from 1856 to 1864 was envoy extraordinary of the Government of Hanover at the Court of St. Petersburg. After the annexation of Hanover to Prussia in 1866 he declared himself pro-Prussian, and from 1867 was a member of the Upper House. He represented Goslar in the Diet of the North German Confederation from 1867 to 1870, and in the German Reichstag from 1871 to 1873. He became Ambassador at London in 1873, at Paris in 1885, and in 1900 retired from the diplomatic service. He wrote several works on contemporary German and Continental public affairs, including *Politische Skizzen über die Lage Europas vom Wiener Kongress bis zur Gegenwart* (1867), and *Der norddeutsche Bund und dessen Uebergang zu einem deutschen Reiche* (2d ed. 1868).

MUNTANER, mōōn'tȧ-nâr'. En Ramón (1265-1336). A Spanish chronicler, born at Peralada, in Catalonia. On the burning of his native town by the French he became a wandering soldier and minstrel, and for thirty years led an adventurous life. Having returned to Catalonia, he began in 1325 to write in Catalan the history of the princes of Aragon from the time of James the Conqueror to the coronation of Alfonso IV. This chronicle of great events, of which he was an eye-witness, is valuable for the history of his time, and is remarkable for its accuracy, homeliness, epic beauty, and grace. It remained in manuscript until the middle of the sixteenth century. The most ancient editions of the original are those of Valencia (1558) and Barcelona (1562). The former is entitled *Chronica o descripcio dels fets e hazanayes del inclyt Rey Don Jaumes Primer . . . e de molts de sos descendents, etc.* It has been translated into German, Italian, and French. Lanz published an edition of the original at Stuttgart in 1844. Consult also the edition by A. de Bofarull (Barcelona, 1860).

MUNTHE, mṳn'te, Ludvig (1841-96). A Norwegian landscape painter, born at Aaröen, near Bergen. He was first instructed by Schiertz, a German painter and architect at Bergen, and then became a pupil of Flamm at Düsseldorf, which he subsequently selected for his permanent residence. A thoroughly realistic treatment characterizes his paintings, of which autumn and winter scenes in stormy or gloomy weather, forest and coast views form the prevailing subjects, and which may be judged by such specimens as a "Pine Forest in Winter" (1870), Hamburg Gallery; "Wood Interior in Winter, with Stags" (1878), National Gallery, Christiania, which was awarded the gold medal in Paris; "Birch Wood in Autumn" (1886), and "Autumn in Holland" (1895), both in National Gallery, Berlin.

MUNT'JAC (Javanese name). Any of a genus (Cervulus) of small Oriental deer which dwell solitarily in the jungle, and whose young are spotted. The species best known is that of India, called 'barking deer' by Anglo-Indian sportsmen, or 'kakar' (*Cervulus muntjac*) by the Hindustani. It is a little larger than a roebuck. Its lyrate antlers are peculiar in that they rise from pedicels about five inches high, or as long as the antler itself, and have only one short basal spur. The female has no antlers; nor has she the great exposed upper canine tusks, which, like those of the musk, are the effective weapons of the bucks in their fights. Allied species, some with smaller horns, are found in China and the Malayan islands, and an interesting fossil genus (Amphitragulus), inhabiting Tertiary Europe, was totally hornless in both sexes. See Plate of Fallow Deer, Musk, etc.

THE INDIAN MUNTJAC.

MÜNTZ, mṳnts, Charles Achille (1846—). A French agricultural chemist, brother of the art critic Eugène Müntz. He was born at Sulz, Alsace, studied under Boussingault in Paris, and, after acting as his assistant for ten years, succeeded him as director of the chemical laboratories in the Institut National Agronomique. Müntz made special research on the feeding of cattle and horses, and, following Boussingault's method, tested his theories by practice on great herds, on Parisian cab horses, and, in the case of his contributions to viniculture, in various vineyards. He founded a Bibliothèque de l'Enseignement Agricole, published the results of his experiments in the *Annales* of the Agricultural Institute, and other chemical and agricultural journals, and wrote: *Recherches sur l'alimentation des chevaux*, with Girard (1884); *Les engrais*, with the same (1888-91); and *Les vignes* (1895).

MÜNTZ, EUGÈNE (1845-1902). A French art critic, born at Sulz, Alsace. He took Taine's place as professor of the history of art at the École Nationale des Beaux-Arts, where he lectured from 1885 to 1893. He made a specialty of Italian art, and the following works are of unique value: *Notes sur les mosaïques de l'Italie* (1874-92); *Les arts à la cour des papes pendant le XVème et le XVIème siècle* (1878-98); *Les précurseurs de la Renaissance* (1881); *Histoire de la tapisserie* (1882); *Etudes sur l'histoire de la peinture et de l'iconographie chrétiennes* (1882); and *Histoire de l'art pendant la Renaissance*, vol. i., *Italie: les primitifs* (1888); vol. ii., *Italie: l'âge d'or* (1892); vol. iii., *Italie: la fin de la Renaissance* (1895); *Léonard de Vinci, l'artiste, le penseur, le savant* (1899).

MÜNZER, mụn'tsẽr, THOMAS (c.1489-1525). A religious enthusiast of the German Reformation, born at Stolberg, in the Harz Mountains. He acquired a good knowledge of theology, taught at Aschersleben and Halle, became in 1519 chaplain of a nunnery at Beutwitz, and in the following year received a call as preacher to Zwickau. There he gained great popularity by his attacks on the monastic and mendicant Orders. In 1521 he was compelled to leave the town, and went to Bohemia, where his preaching, however, met with little sympathy. In 1523 he became pastor at Allstedt, in Thuringia, married a nun who had abjured her vows, and carried on his pastoral work in full sympathy with the advanced representatives of the Reformation. He was an ardent champion of German nationality, and was the first to substitute German for Latin in the liturgy. He stood in close touch with Carlstadt and shared the latter's iconoclastic ideas. In time he developed a fanatic mysticism whose chief tenet was the validity of inner revelation, and he attacked as 'new papists' those reformers who set up the Gospel above personal justification. His ideas partook also of a political and social nature; he preached the speedy coming of God's kingdom on earth, and sought to organize the peasants and the artisans of the towns into secret associations looking, it is asserted, to the destruction of all authority and the establishment of communal property. In August, 1524, he was expelled from Allstedt and betook himself to Mühlhausen, where he joined forces with Heinrich Pfeifer, a renegade monk, who had succeeded in gaining great influence over the lower classes. Together they were driven from the city in September, and Münzer wandered through Southern Germany and Switzerland, forming close relations with the Anabaptist leaders and hastening in no small degree the peasant uprising in those regions. He returned to Mühlhausen in December, and with Pfeifer, who had likewise reëntered the city, assumed leadership of the discontented masses. The old council was overthrown, and a new council was installed under the control of Münzer. Mühlhausen speedily became the centre of a violent agitation. The opposition of the nobles was ineffectual; but at Frankenhausen, on May 15, 1525, Münzer's peasant mob was almost annihilated by the force of Philip of Hesse, the Elector of Saxony, and the Duke of Brunswick. (See PEASANT WAR.) Münzer escaped from the battlefield, but was captured at Frankenhausen and taken to the Castle of Heldrungen, where he was put to the torture. On May 25th he was decapitated at Mühlhausen, together with Pfeifer and twenty-four other leaders of the peasants. Fanatic though he undoubtedly was, there is nothing to disprove Münzer's warm love for the common people, whose cause he upheld against Luther, accusing the latter of fawning on the German princes while seeking to appease the peasants with empty words about the responsibility of rulers to God. Consult: Strobel, *Leben, Schriften und Lehren Thomas Münzers* (Nuremberg and Altdorf, 1795); Seidemann, *Thomas Münzer* (Dresden and Leipzig, 1842).

MUNZINGER, mụn'tsĭng-ẽr, WERNER (1832-75). A Swiss traveler and linguist. He was born at Olten, was educated at Bern, Munich, and Paris, and in 1853 joined a mercantile establishment at Alexandria, Egypt. He was attached to the expedition of Von Heuglin in 1861, but quitted it when it reached North Abyssinia, and in company with Kinzelbach explored an unknown territory. In 1862 he was placed at the head of the German exploring expedition, succeeding Heuglin, but was unable to penetrate farther than Kordofan. In 1864 he was appointed British consul at Massowah and in the Anglo-Abyssinian War acted as a guide to the English forces, after whose withdrawal he remained at Massowah as consul in the French service. In 1870 he made a journey to Southeast Arabia, and was appointed by the Khedive Governor of Massowah. In 1872 he was made Pasha and Governor-General of the Eastern Sudan, and in 1875 was mortally wounded while leading an expedition against Abyssinia. He published: *Sitten und Recht der Bogos* (1859); *Ostafrikanische Studien* (1864); *Vocabulaire de la langue Tigré* (1865).

MUONGS, mo͞o'ŏngz. A people who, together with the Thos, also dwelling in Northeastern Tongking and Annam and the adjoining parts of China, constitute, in the opinion of some leading anthropologists, one of the four chief groups of the Thai stock, of which the Siamese are the best-known members. The Farther Indian Muongs inhabit the basin of the Black River, and the Thos that of the Claire, while the great mass of the primitive population of the Chinese provinces of Kwang-si, Southern Kwei-chow, Northwestern Kwang-tung, Eastern Yun-nan, and perhaps also the Le of the island of Hainan, belong in this group of primitive Thai peoples. The Pueun and Pu-thai of Annamese Laos closely resemble in physical characteristics and language the Muongs of Tongking. A number of the Thos-Muongs tribes have methods of writing of their own resembling those of the Laotians, and apparently not derived from Chinese, even in the case of the tribes of this group resident in China. Like some others of the primitive population of this part of the world, they impress one as being rather non-Mongolian in physical characters. Consult: Colquhoun, *Across Chryse* (London, 1883); Baber, *Travels in Inland and Western China* (ib., 1882-86); Bourne, *Journey in Southwestern China* (ib., 1888); Henry, *Ling-Nam* (ib., 1886); Hosie, *Three Years in Western China* (ib., 1890); Garcin, *Un an chez les Muongs au Tonkin* (Paris, 1891).

MURA, mōō′rȧ. A populous but inferior tribe of Tupian stock (q.v.), residing along the Amazon River, Brazil, from the confluence of the Madeira as far as the Purûs. They were formerly very formidable and hostile to the Portuguese, but were completely crushed by the Mundurucû (q.v.) in 1788. Since that time some of them have come into the Portuguese settlements for protection and have acquired a rudimentary civilization; but those of the interior and upon the Purûs are still in their original savage condition. Their houses, grouped in small villages, are mere roofs supported upon poles, without walls. They do not cultivate the ground, but live upon fish, game, and wild fruits, using bows six feet long, spears, and well-made canoes. They are much addicted to a sort of narcotic snuff prepared from the seeds of a species of mimosa. They were formerly naked, but those near the settlements now wear clothing. They carry on a trade with the Brazilians in sarsaparilla, turtle oil, and Brazil nuts, in exchange for cotton cloth, knives, spear and arrow heads. They are described as lazy, drunken, dishonest, and quarrelsome, and are among the lowest of all the Amazonian tribes.

MURAD, mōō′rȧd. The name of five Turkish sultans. See AMURATH.

MURADABAD, mōō′rŭd-ȧ-bäd′, or **MORADABAD.** The capital of a district of the United Provinces, British India, on an elevation on the right bank of the Ramganga, and on the Oudh-Rohilkand Railway, 50 miles northwest of Bareilly (Map: India, C 3). It has two mosques, dating respectively from 1628 and 1636, an American Methodist mission church, built in 1874, and the Anglican Church of Saint Paul. The cantonment and civil administrative offices are on the northwest. Muradabad is noted for its engraved metal ware, and has cotton factories and several printing establishments. There is an extensive trade in the agricultural and other products of the district. The town is administered by a municipal council of twenty-three members, eighteen of whom are elected. Muradabad was founded by Rustam Khan in 1625. The ruins of his fort, with brick walls from four to six feet in thickness, overlook the river. Population, in 1891, 72,921; in 1901, 75,128.

MURÆNA, mû-rē′nȧ. A fish. See MORAY.

MURAL CIRCLE. An astronomical instrument formerly used for measuring the declinations of stars. The principle of its construction was somewhat similar to that now used for the meridian circle, by which it has been replaced. See MERIDIAN CIRCLE.

MURAL CROWN. In heraldry, a crown in the form of the top of a circular tower, masoned and embattled.

MURAL DECORATION (from Lat. *muralis*, relating to a wall, from *murus*, OLat. *mœrus*, wall). Art applied to the adornment of wall surfaces. Wall painting in fresco, in oils, in encaustic; figured sculpture in low relief, colored or plain, in stone, marble, terra-cotta, or stucco; mosaic compositions, marble incrustations, and sectile work, and wainscoting in carved and paneled woodwork, are the principal modes used for the purpose. The term is commonly made to include also, by extension, the decorative treatment of vaults and ceilings, as well as walls. For details, consult the special articles, such as FRESCO, MOSAIC, BYZANTINE ART, and others of this kind.

EGYPT. In ancient Egypt flat undecorated walls were avoided; the internal surfaces of the temples and the external surfaces of pylons and walls were converted into large grouped pictures, deeply incised, and with flat tints, graded according to the light, being delicate in the well-illuminated parts, heavier in the darker apartments. See EGYPTIAN ART.

ASIA. Babylonia and Assyria had greater variety of method. The walls were often divided horizontally into zones—a lower dado of sculpture, an upper one of painting. The sculpture was either of fine stone partly colored (not entirely, as in Egypt), or of glazed tiles in relief, strongly colored. Though the tones were still flat, more relief was given than in Egypt by the accentuation of outlines and details by heavy dark lines. Gold and other metals and rich hangings increased the strength of the color scheme. The exterior walls were often faced with flat glazed tiles in massed colors, with the same result. See BABYLONIAN ART and ASSYRIAN ART.

GREECE. The pre-Hellenic Greeks seem to have used gypsum and plaster reliefs and wall paintings in similar fashion to the Assyrians, and the Greeks of the historic period at first show signs of Oriental influence in the violent colors applied to gable, frieze, and metope sculptures, without the Oriental appreciation of color harmony. The polychromy of Greek architecture and sculpture gradually, however, gave way to the use of plain sculpture and to a reliance on the play of light and shade by means of projecting moldings and members in place of pure surface decoration. Simplicity of method, reticence of style, plasticity of composition, and delicacy of coloring were their characteristics. Color was subordinated to form, and the decorated surfaces were broken up usually into small units. The predominance of external over internal effects helped to minimize the importance of Greek mural decoration.

ROME. The Romans returned, with different methods and a different style, to the Oriental and Egyptian idea of colored instead of plastic mural adornment, which received great importance from their development of vast interiors. They adopted three principal media, with increasing heaviness as the Empire advanced—wall painting in fresco, mosaic painting, and marble incrustations. The molding of decorations in low relief in the stucco covering of walls and ceilings may be considered chiefly as an adjunct to the painted decoration. The most characteristic of these three treatments was the use of rich Oriental and African marbles. The interior walls of temples, Imperial thermæ and palaces, basilicas, and other buildings were covered to a considerable height in this way, while private houses were generally confined to fresco work. (See Plate of Pompeian Mural Decoration, under DECORATIVE ART.) Mural decoration on stucco was often microscopic in scale, small compartments, and small scenes being juxtaposed without much central interest, and by attempts at perspective effects and different planes the effort was made to counteract the confining effect of the walls of a room; to substitute pictures one could look *into* for flat decorated surfaces. See ROMAN ART.

EARLY CHRISTIAN. In early Christian and Byzantine mural decoration one school adopted as its main medium the new method of mosaic wall pictures (see MOSAIC), which gave a richer mural color scheme than had ever been known in any style. Casting aside the Roman picturesqueness, this school returned to the Oriental flat effects; but with the addition of glowing gold grounds and the depth given by the colored glass cubes an entire wall often became a single picture instead of an agglomeration of units. The advantage of Byzantine decoration was that the eye was received by and sank into its rich mosaic surfaces instead of being thrown back by shallow fresco coloring. The other school preferred plain or frescoed surfaces; this treatment was common in most of Syria, Asia Minor, North Africa, and Europe. Mural decoration in these regions for long after the decline of Rome was practically extinct where Byzantine influence did not exist. Even in Byzantine art fresco painting tended in many places to displace mosaic. See CHRISTIAN ART; BYZANTINE ART.

MOHAMMEDAN. The earliest special development of mediæval decoration was in the Mohammedan world, and it was one of great interest. It used color very generously, but also sculpture in low relief; its effects were mainly those of tapestry and other stuffs, even when design was in the form of colorless carvings on the outside surface of a dome. Geometric patterns were most prominent; floral forms, and very rarely human figures, characterize Persian art. Glazed tiles were specialties in Persia, geometric mosaics in Egypt, colored stuccoes in Spain. There was but little composition, grouping, or subdivision; the main plan was to cover the surfaces completely with more or less uniformity. There were practically no plain surfaces and no heavy projections. Such necessary projections as pendentives were broken up into minute stalactites. The effects were rich and restful, often even hypnotic. The Oriental races always retained the faculty of harmonious coloring, and used it to the full in mural decoration. Though related to the Byzantine type, this style was far more intricate and less well composed. See MOHAMMEDAN ART.

MEDIÆVAL. The mediæval decorative mural work in Europe did not begin to take shape until the close of the eleventh century; its usual media were extremely simple, merely fresco painting and sculpture in stone. The multiplicity of styles makes any unity of characterization such as was possible in other previous styles, quite impossible. In some parts of Europe there was practically no attempt at mural decoration till the Gothic period, as in parts of Germany and England. In Central and Southern France the entire exterior façades were often compositions in sculpture; in Tuscany and Northern Italy effects of color on the exterior were given by the use of marbles, terra-cotta, and brickwork in patterns or courses. In certain regions, such as Sicily, Rome, and Venice, the Byzantine and Oriental rich color scheme, especially in the form of mosaic work, prevailed. (See ROMANESQUE ART.) When, however, European art became thoroughly nationalized and indigenous in the Gothic period, Italy took a decided lead in the development of painted mural decoration in fresco which superseded all other methods. The reason for this was that the more logical Gothic art of the North, under French leadership, practically suppressed wall surfaces, and consequently mural decoration, in favor of detached ornamentation in stone, stained glass, and the like, due to the framework system of Gothic architecture. Italy, almost alone, did not abolish wall surfaces; consequently her painters, like Cimabue and Giotto and their contemporaries and successors, could develop the primitive fresco-work of the Romanesque type into a really artistic scheme of mural decoration such as we see at Assisi, Florence, and Siena. Grand figured compositions, harmoniously grouped, were the characteristic of this Italian school. Rich borders sometimes followed, sometimes contrasted with the architectural lines. Above all the coloring was light and clear and the effects flat and symbolic, the figures being rather like silhouettes on a flat ground. (See GOTHIC ART.) Sometimes there were also grand exterior effects both of color and form, as at Orvieto.

RENAISSANCE. The Renaissance saw Italy still easily leading in mural decoration from Masaccio to Raphael; the media were even simpler than before, for mosaics were entirely discarded and effects of sculpture and architectural memberment less frequent. The climax in the Sistine Chapel and Raphael's Stanze was reached by a perfectly consistent series of steps, some advantageous, such as the abandonment of the heavy architectural frameworks of the Giottesque period for simpler borders; some were disadvantageous, such as the attempts to do away with flat effects by the introduction of perspective and a variety of planes in both environment and figures. The juggling with perspective and anatomical difficulties indulged in during the fifteenth century by Paolo Uccello, Melozzo, and Mantegna led, in later days, to the extravagances of Correggio, Paolo Veronese, and Tiepolo. It became the main object of painters of the sixteenth century to change the subdivisions of flat mural decoration into a series of realistic framed vistas, and this mistaken realism was emphasized by the use of oil instead of fresco colors, giving effects of atmospheric perspective besides the previously acquired linear perspective. See RENAISSANCE ART.

MODERN. During the first half of the nineteenth century mural decoration declined to very low estate. In France, however, the influence of the national school of fine arts and the Government patronage of the arts preserved it from extinction, and the domination of classicalism and tradition began toward 1840 to yield to a new and fresher spirit, exemplified in the works of Hippolyte Flandrin. The decorative sense is more highly developed in France than elsewhere, and there has risen in France a remarkable school of mural painting, whose influence has been felt throughout the modern world. Modern French decorative painting rejects the flatness and conventional composition of the Italian fourteenth-century artists, inclining rather to the pictorial realism of the developed Renaissance schools; but it recognizes the difference between an easel picture applied to a wall or ceiling, and a decorative painting composed specially for an architectural setting. Paul Baudry (Grand Opera) and the late Puvis de Chavannes (Panthéon) are the most noted exponents of this school; but J. P. Laurens, O. Merson, Galland, and others stand high in this art; and all French public buildings are rich in the works of such men.

While Germany did much early in the century to study and revive mural painting, classical tradition tended to stifle originality, and no really great masters of the art have appeared. Cornelius (1783-1867) and Kaulbach (1805-74) made efforts to revive monumental mural painting, especially at Munich and Berlin, but their works lack the real decorative spirit. In England there is almost nothing to show in the way of mural painting, the preference there being usually for decoration by architectonic means and conventional ornament. In Spain the eccentric but powerful genius of Goya (1746-1828) asserted itself in the first third of the last century in ceiling paintings of great merit in Madrid, but he had no successors, and Spain and Italy are equally in arrears in this branch of art. Until lately the same was true of the United States, but recent progress in American art has in nothing been more noteworthy than in the rapid advance of skill in mural painting. This has been stimulated by the influence of the Chicago Columbian Exhibition and others. Many great public buildings recently erected have been adorned with mural paintings by first-rate artists (e.g. Boston Public Library, Congressional Library of Washington, Appellate Court and Mendelssohn Concert Hall at New York, etc.); and American artists, though generally trained in France, have shown independence and originality. Among the leaders in this revival may be named W. M. Hunt, Maynard, Kenyon Cox, Blashfield, Blum, Abbey, and Sargent.

Modern mural decoration has generally abandoned fresco painting in favor of oil painting on canvas, attached to the wall with white lead. Fresco, tempera, encaustic, and water-glass painting are rarely attempted. Other forms of decoration have been revived and are largely used, wainscoting, marble incrustration, mosaic, and inlay and stucco relief, and wall-hangings in paper, tapestry, stamped leather, and other materials, besides other more purely architectonic methods of adornment, being widely used and with conspicuous success.

BIBLIOGRAPHY. No special works have been written upon the general subject, except practical manuals for the use of painters, such as Thomas, *Mural Decorations* (London, 1869); Crowninshield, *Mural Painting* (Boston, 1887). Consult also the bibliographies of MOSAIC and the other articles referred to.

MURANO, mo͞o-rä′nô. A town in the Province of Venice, Italy, on an island, one and a half miles north of Venice. It has the Cathedral of San Donato, completed in the tenth century, the Basilica of San Pietro Martire, and a museum with exhibits of glass products. The town has been, since the thirteenth century, the seat of the Venetian glass industry. Population (commune), in 1881, 3629; in 1901, 5150.

MURAT, mṳ′rȧ′, JOACHIM (1767-1815). A celebrated French cavalry leader, King of Naples from 1808 to 1815. He was born March 25, 1767, being the son of a well-to-do innkeeper at La-Bastide-Fortunière, near Cahors, in France. He was intended for the priesthood and commenced the study of theology and canon law at Toulouse, but soon enlisted in a cavalry regiment. Being dismissed for insubordination after two years of service, he returned to his home, and later proceeded to Paris, where he obtained admission into the constitutional guard of Louis XVI. through the good offices of a friendly Deputy, M. Cavignac. On the outbreak of the Revolution he was made a sub-lieutenant in a cavalry regiment, and a little later aide-de-camp to General Hué. His gallantry and his extreme Republicanism soon won him the rank of colonel. He attached himself closely to Bonaparte in 1795-96, and later served under him in Italy and in Egypt, signalizing himself in many battles. He finally rose to be general of division (1799), and having returned with Bonaparte from Egypt to France, he rendered most important assistance on the 18th of Brumaire, by dispersing the Council of Five Hundred at Saint Cloud. Bonaparte now intrusted him with the command of the Consular Guard, and gave him his youngest sister, Caroline, in marriage (January 20, 1800). The same year Murat commanded the cavalry at Marengo, and expelled the Neapolitans from the Papal States. In 1803 he was a member of the *Corps Législatif*, and in 1804 Governor of Paris. On the establishment of the Empire he was loaded with honors, being made a marshal of the Empire (1804), and a prince and Grand Admiral (1805). He continued to command the cavalry in the armies led by the Emperor, contributed to the triumph of the French at Austerlitz, and to other victories. In 1806 the newly erected Grand Duchy of Berg (q.v.) was bestowed upon him. After the battle of Jena, in 1806, he led in the pursuit of the Prussians, and in 1807 he participated in the battles of Eylau and Friedland. In 1808 Napoleon placed him in command of the army in Spain, where in May he suppressed the insurrection in Madrid. Joseph Bonaparte having exchanged the throne of Naples for that of Spain, Murat was made his successor, and on August 1, 1808, was proclaimed King of Naples under the title of Joachim I. Napoleon. He immediately took possession of the Kingdom of Naples, but the Bourbons, through the support of Great Britain, retained Sicily. Murat instituted a number of wise and beneficent reforms, but had to endure the yoke of Napoleon, who left him little but the outward show of royalty. In the Russian campaign of 1812 he commanded the cavalry, but after sharing in the disaster which befell the French army returned to Naples anxious and discontented. He joined the French army again in 1813, and distinguished himself at Dresden, but after the battle of Leipzig withdrew to his own dominions and concluded a treaty with Great Britain and Austria in January, 1814, by which he was guaranteed the possession of his throne on condition of joining the coalition against Napoleon and contributing 30,000 troops to the allied armies. After a pretense of attacking Eugène Beauharnais in Italy, Murat withdrew to Naples and entered into private communications with Napoleon at Elba. On the Emperor's return to France, Murat placed himself at the head of an army of 40,000 men and commenced a war against Austria. He was defeated by the Austrians at Tolentino, May 2d-3d. Naples was evacuated May 19th, and Murat fled to the island of Ischia, and finally found his way to France, while his wife and children took refuge with the British fleet. Napoleon declined to treat with his brother-in-law on any terms and forbade his presence in Paris. Murat then found a refuge near London, and after Waterloo hé fled to Corsica. Declining Metternich's offer of an asylum in Austria, he proceeded in a foolhardy manner with a few followers to the coast of Naples and proclaimed himself King and liberator, but was presently taken prisoner, and after trial by a court-martial, was shot in a hall of the Castle of Pizzo, October 13, 1815.

Consult: Helfert, *Joachim Murat, seine letzten Kämpfe und sein Ende* (Vienna, 1878); Gallois, *Histoire de Joachim Murat* (Paris, 1838); Guardione, *Gioachimo Murat in Italia* (Palermo, 1899). See NAPOLEON I.

MURAT, NAPOLÉON ACHILLE (1801-47). Eldest son of Joachim Murat, King of Naples. He was born in Paris, and for a time bore the title of the Prince Royal of the Two Sicilies; but after the overthrow of his father, in 1815, he sought refuge with his mother in Lower Austria, where he received an excellent education. In 1821 he emigrated to the United States, and after a tour of the country settled near Tallahassee, Fla., where he bought a large estate and built an elegant mansion. When Lafayette revisited the United States in 1825, Murat traveled much with him, and was by him introduced to a grandniece of Washington, Miss Catharina Dudley, whom he married in 1826. Murat declined numerous offers of a political career, and devoted himself to farming, literary pursuits, and philanthropic undertakings. His literary works include: *Lettres d'un citoyen des Etats-Unis à un de ses amis d'Europe* (1830); *Esquisse morale et politique des Etats-Unis* (1832); *Exposition des principes du gouvernement républicain tel qu'il a été perfectionné en Amérique* (1833). These works attracted great attention in Europe. Consult MacConnell, "The Prince and Princess Achille Murat in Florida," in the *Century Magazine* (1893).

MURAT, NAPOLÉON LUCIEN CHARLES (1803-78). The second son of Joachim Murat, King of Naples. He was born in Milan, and after the overthrow of his father in 1815 lived for several years with his mother in Lower Austria. He went to Boston in 1825, and soon after his arrival in the United States he joined his uncle Joseph, who was then living in Philadelphia under the title of the Count of Survilliers. In 1827 he married Miss Frazer, an heiress, of Bordentown, N. J. His wife later established there a fashionable school for young women. Unlike his brother, Napoléon Achille, he did not give up the idea of recovering his father's throne, and in 1839 and 1844 made trips to France with that purpose in view, but was permitted to remain in France only a short time. After the February Revolution of 1848 he returned to France and was elected a Deputy to the Constituent Assembly. He was Minister Plenipotentiary to Turin in 1849-50. After the coup d'état of December 2, 1851, he received a seat in the Senate, and was recognized by Napoleon III. as a prince of the Imperial family, which brought to him an annual pension of 150,000 francs and secured the payment of two millions of debts. In 1861 he advanced claims to the throne of Naples, but his pretensions were officially disavowed by the French Government and came to naught.

MURATORI, mo͞o′rȧ-tō′rė, LODOVICO ANTONIO (1672-1750). A celebrated Italian antiquary and historian. He was born at Vignola, near Modena, October 21, 1672. He studied theology and history in the University of Modena, and early attracted the attention and won the friendship of Father Bacchini, the librarian at the ducal palace, who fostered in him a taste for historical and antiquarian research. In 1688 Muratori took minor orders, and in 1694 obtained the degree of doctor in canon and civil law. The same year he was appointed to the staff of the Ambrosian Library at Milan. While there he published his two collections of previously unedited Greek and Latin fragments entitled *Anecdota Græca* and *Anecdota Latina*. In 1700 he returned to Modena at the invitation of the Duke, in order to become keeper of the ducal archives and librarian of the Este Library, Father Bacchini having resigned this last post. For fifty years Muratori toiled unceasingly, collecting and editing mediæval chronicles and Italian historical records. His enemies, chiefly the Jesuits, accused him of publishing and teaching heretical doctrines; but, appealing to Pope Benedict XIV., the learned antiquary and historian received full protection against such attacks. He was one of the foremost scholars of his day and had a European reputation. He died on January 23, 1750. His works fill forty-six folio volumes, the most important ones being as follows: *Rerum Italicarum Scriptores* (25 vols., 1723-51), the standard collection of documents relating to Italian history; *Antiquitates Italicæ Medii Ævi* (6 vols., 1738-42); *Annali d'Italia* (12 vols., 1744-49); and *Antichità estensi* (2 vols., 1717-40). Consult the biography by his nephew, G. F. Muratori, *Vita del celebre Lodovico Antonio Muratori* (Venice, 1756); Troya, *Studi intorno agli annali d'Italia del Muratori* (Naples, 1877; new ed. 1901 et seq.).

MU′RATO′RIAN FRAGMENT, or CANON OF MURATORI. A fragment of a treatise upon the Bible canon commenting upon the several books and so giving a very important list of the books accepted as canonical at the time of its composition, which probably was the latter half of the second century. In the list are the Gospel of Luke, which it calls the third (the fragment begins at this point, so doubtless Matthew and Mark had been mentioned in the part now lost); John, Acts, the Epistles of Paul to the Corinthians, Ephesians, Philippians, Colossians, Galatians, Thessalonians, Romans, Philemon, Titus, and Timothy; Revelation of John; Jude; two Epistles of John; Wisdom of Solomon; and, as doubtful, the Revelation of Peter, but omits the Epistles of James and of Peter and the Epistle to the Hebrews. The fragment was discovered in the Ambrosian library at Milan (1740) by Lodovico Antonio Muratori (q.v.), from whom it receives its name. It is translated in the *Ante-Nicene Fathers*, vol. v.

MURAVIEFF, mōō′rȧ-vyĕf′. An ancient and distinguished Russian family, originally of Moscow, which in 1488 was presented by Czar Ivan Vasilievitch I. with large estates in the Province of Novgorod. The best known members of the family are: Mikhail Nikititch (1757-1807). Catharine II. made him the tutor of her grandchildren, Alexander and Konstantin, for whom he composed works in prose and poetry, which are still classics in Russian literature. He also occupied various important administrative posts. His works were published in three volumes (Moscow, 1810).—Nikolai Nikolaievitch (1768-1840). He studied at Strassburg, and thereafter served for some time in the army and navy. In 1797 he founded a private institution for officers of the general staff. During the war of 1812-14 against Napoleon he served as colonel. His school became a State institution in 1816, and he continued to superintend it until 1823, after which he devoted himself to agriculture.—Alexander Nikolaievitch (1792-1864). He was the eldest son of the preceding, and was prominent in the Decembrist uprising, which broke out in 1825 at the accession of Nicholas I. In consideration of his father's services his life was spared and he was exiled to Siberia. Later he was permitted to return, and during the Crimean War he entered the army and became a major-general. —Nikolai Nikolaievitch (c.1794-1866). The brother of the preceding. He entered the army in 1810 and took part in the campaigns of 1812-14 against the French. After the end of the war he remained in the army, and traveled extensively in Asia. He served during the Persian War and was made a major-general. In 1830 the Polish Rebellion broke out, and Muravieff was called in to aid in suppressing the revolt. In 1832 he was sent to Egypt to treat with Mehemet Ali for the conclusion of peace with Turkey. He then took charge of the Russian forces dispatched to the Bosporus to aid the Sultan against Mehemet Ali. In 1838 he fell into disgrace and retired from the army, remaining inactive until 1848. During the Crimean War he rendered valuable service to Russia in the Caucasus. The capture of Kars, in November, 1855, earned for Muravieff the title of prince and other great honors.—Mikhail Nikolaievitch (c.1796-1866). A brother of the preceding. He entered the army and participated in the campaigns against France of 1812-13. He occupied many important administrative positions, and opposed vehemently the emancipation of the serfs. During the Polish Rebellion of 1863 he was sent to Vilna, and acted with such relentless rigor that in a few months the entire insurrection was suppressed. His acts of cruelty made his name infamous throughout Europe.—Mikhail Nikolaievitch, Count (1845-1900). A grandson of the preceding. He was born April 19, 1845, studied in Heidelberg, and in 1864 entered the service of the Ministry of Foreign Affairs. He was attached to various Russian embassies in Europe, and on the death of Prince Lobanoff in 1897 he became Minister of Foreign Affairs. He advanced Russian interests in the Far East and put forth the Czar's note for the Hague Peace Conference in 1898. He died June 21, 1900.

About 1730 a member of the Muravieff family married a daughter of Apostol, the Ataman of the Cossacks, whose name was added to his own. Of this branch of the family the best known is Sergei Muravieff-Apostol (1796-1826). He participated in the Decembrist uprising of 1825; proclaimed Grand Duke Konstantin as Emperor, and seized the town of Vasilkov. Troops were sent against him and he was captured, taken to Saint Petersburg, and hanged July 25, 1826.

Nikolai Nikolaievitch, Count (c.1809-81), belonged to another branch of this family. He entered the army while young, and served in the Caucasus, where he attained the rank of major-general. In 1848 he was appointed Governor-General of Eastern Siberia, and gained for Russia the entire territory of the Amur, and concluded the Treaty of Aigun, May 28, 1858, by which this country was definitely ceded by China. His services were rewarded by the title of Count, and he received the name Amurski. In the summer of 1859 he went with twelve ships to Yedo, and concluded a favorable treaty with Japan. He resigned his Governorship in 1861, and was made a member of the Imperial Council.

MURCHISON, mûr′chĭ-son, Charles (1830-79). A Scotch physician, born in the island of Jamaica. He was educated at the universities of Aberdeen, Edinburgh, Dublin, and Paris. In 1853 he entered the East India Company's military service, but soon after reaching India was appointed professor of chemistry at the Calcutta Medical College. In 1855 he published two valuable papers on *The Climate and Diseases of Burmah*. The same year he returned to Europe, and settled in London, where he was connected with a number of the leading hospitals. He published the important *Treatise on the Continued Fevers of Great Britain* (1862).

MURCHISON, Sir Roderick Impey (1792-1871). A British geologist, born in Tarradale, Ross. After studying at the military college of Marlow, he entered the army and served as an officer in the Peninsular War under Wellington. Through the advice of Sir Humphry Davy he was induced to take up the study of science, and in 1825 became a fellow of the Geological Society of London, before which he read a paper entitled "Geological Sketch of the Northwestern Extremity of Sussex and the Adjoining Parts of Hants and Surrey." Returning from a geological tour through France, which he made in the company of Sir Charles Lyell, he undertook a systematic exploration and study of the lower fossiliferous strata of England and Wales. This work engaged his attention for many years and resulted in a reclassification of the Paleozoic rocks, with the introduction of a new system to which, in 1835, he gave the name Silurian. He was soon after employed by Emperor Nicholas in a geological survey of Russia, being associated with De Verneuil and Keyserling; during the years 1840-44 he explored a large part of Southern Russia and introduced a second new system—the Permian—into the geological time scale. From his knowledge of the geological structure of the Ural Mountains and the Australian systems, he was led to believe that gold occurred in the latter, and as early as 1844 predicted its discovery. Murchison was elected president of the British Association for the Advancement of Science in 1846, president of the Royal Geographical Society in 1844, 1845, and 1857, and in 1855, upon the death of Sir H. T. De la Beche, became director of the British Geological Survey. He was knighted in 1846, made Knight Commander of the Bath in 1853, and a baronet in 1863. From the Emperor of Russia he received the grand cross of Saint Anna and that of Saint Stanislas. The greater portion of his contributions to science were published in the society journals. Among his principal works are: *Geology of Cheltenham* (1834); *The Silurian System* (1839); *On the Geological Structure of the Northern and Central Regions of Russia in Europe* (1841); and *Geology of Russia in Europe and the Ural Mountains* (1845). Consult Geikie, *Life of Sir Roderick I. Murchison* (London, 1875).

MUR'CHISO'NIA (Neo-Lat., named in honor of Sir R. I. Murchison). An extinct gastropod of the family Pleurotomariidæ, found in rocks of Ordovician to Triassic age, and especially common in the Devonian and Carboniferous formations. The shell has a more or less pointed spire consisting of numerous coils or whorls. The aperture has in its outer lip a slit like that of Pleurotomaria, and a corresponding slit-band that forms a more or less pronounced ridge on the outside of the whorls all the way from the aperture to the apex of the shell. The earlier species as a rule have smooth surfaced shells; the later species are more frequently ornamented by nodes and transverse ridges. A subgenus, Hormotoma, with rounded whorls, is represented by Murchisonia gracilis, a very common species in the Trenton limestone of the United States and Canada. Loxoplocus, another very peculiar genus, with the coils of the spire unrolled and somewhat carinate in section, lived in the cavities of the corals that made up the Guelph beds of Canada and western New York. See PLEUROTOMARIA.

MURCIA, mo͞or'thē̇-ȧ. A former division and an old Moorish kingdom of Spain, situated in the southeastern part of the country, and bounded on the north by New Castile, on the east by the former Kingdom of Valencia, on the south by the Mediterranean Sea, and on the west by the former kingdoms of Granada and Jaén and by New Castile (Map: Spain, E 4). The division comprised the modern Province of Murcia, the greater part of Albacete, and small portions of Jaén and Alicante, with a total area of about 10,000 square miles.

The surface of Murcia partakes of the general character of the whole peninsula—the interior plateau, the rapid and mountainous slope toward the sea, and the low coastal region. The last is a sandy semi-arid belt from 10 to 20 miles wide, and broken by several coast lagoons, of which the Mar Menor is the largest. The mountainous belt occupies the greater part of the division, and consists of an irregular system of ranges whose nucleus and highest point is the Sierra de Espuña, with an altitude of 5193 feet. North of the mountains the interior plateau forms a part of La Mancha (q.v.), a deforested and almost arid plain. The principal water system is the Segura River with its tributaries, which are used only for irrigation, and are subject to great variations in volume, being at some seasons almost dry, and at other times subject to disastrous inundations. The climate is subtropical near the coast and temperate on the slopes and plateaus. The winters are mild, the sky nearly always clear, and the climate is pleasant and healthful; but the rainfall is insufficient for the needs of agriculture. The whole region has been almost entirely deforested, and agriculture can be carried on only in the valleys by means of irrigation. Many of the valleys, however, are well cultivated, especially the Huerta or 'Garden' of Murcia, which is one of the most beautiful places in Spain. The chief agricultural products are wheat, barley, and flax. Oranges, lemons, olives, grapes, and hemp are grown in the south. Mining is an important industry, producing iron, lead, zinc, copper, and sulphur. The production of zinc has increased fourfold within the last ten years, being 46,000 tons in 1900. The output of iron has decreased from 430,000 tons in 1890 to 370,000 tons in 1900. Other industries are silk manufactures and the plaiting of articles of esparto grass. The population in 1887 was 708,828, and in 1900, 815,864. The chief city is Murcia (q.v.).

Murcia was the centre of the Carthaginian colonies in Spain. It was conquered by the Saracens early in the eighth century and by them called Todmir. It formed a province of the Caliphate of Cordova, after whose dissolution, in the early part of the eleventh century, it became an independent Moorish kingdom. About the middle of the thirteenth century it was conquered by Castile.

MURCIA. The capital of the Province of Murcia, in Southeastern Spain. It lies on both banks of the Segura River, in the beautiful valley known as the Huerta or 'Garden' of Murcia (Map: Spain, E 4). This valley rivals in the luxuriance of its vegetation the famous Vega of Granada. It was carefully irrigated by the Moors, and is covered with vineyards and groves of mulberry, olive, and fig trees. The city itself has narrow streets, but a clean and generally neat appearance. Several promenades and pleasure grounds have been laid out along the embankments of the river, and the Paseo de Floridablanca is a wide avenue with fine rows of plane trees. Though the city still retains some of its old Moorish atmosphere, it has preserved but few objects of interest. The only building which attracts considerable notice is the cathedral, a Gothic-Romanesque structure begun in the fourteenth century. Its façade in the baroque style dates from the eighteenth century, and its tower, the most interesting feature, was begun in 1522 and completed in 1766. Other prominent buildings are the imposing bishop's palace, the city hall, with a monumental façade, the Colegio de San Fulgencio, two theatres, a bull ring, and the large and well-built silk factories. There are a provincial museum, two normal schools, and a secondary school. The industries are largely derived from the surrounding huerta, the chief being the silk industry, which, with grain and fruit, furnishes the principal articles of trade. There are also manufactures of woolen goods, gunpowder, soap, leather, hats, and musical instruments. The population in 1887 was 98,538, and in 1900, 111,693.

MURDER (AS. *morþor*, *morþur*, from *morþ*, OHG. *mord*, Ger. *Mord*, death; connected with Welsh *marw*, Lith. *smertis*, Lat. *mors*, death, Gk. *βροτός*, *brotos*, mortal, Skt. *mar*, to die). The unlawful killing of a human being with malice aforethought. The term appears to have been limited in early English law to a homicide committed in secret, or accompanied by concealment of the body. During the Norman period, this *morth* (or secret) slaying of Saxon times became the *murdrum*—the homicide of the very worst kind, and was distinguished by Glanville from a mere *homicidium*, or open killing. For a considerable time, *murdrum* signified the fine imposed by the Crown on any hundred in which a man was slain, as well as the killing itself. This fine—originally 46 marks, of which 40 went to the King and 6 to the kinsfolk of the deceased—could be avoided by the production of the slayer, or by proof that the slain man was an Englishman and not of Franco-Norman race. Furnishing such proof was known as Englishry. From the time that Englishry was abolished in 1348, murder bears the single meaning of unlawful homicide of the worst species, which subjects the slayer to capital punishment.

The next step in the history of murder as a term of English law, according to the best authorities, "consists in the adoption of the expression 'malice aforethought,' as the characteristic specific distinction of murder as distinguished from other kinds of homicide." This came about from the forms of the special findings of the jury in prosecutions for homicide. In order to entitle the slayer to a pardon under the Statute of Gloucester (6 Ed. I., c. 9, A.D. 1278), it was necessary for the jury to find that he acted "in self-defense and not by felony or of malice aforethought." During the next two centuries and a half, the modern distinction between willful murder and manslaughter (q.v.) was developed, as appears by a statute of 1531 (23 H. VIII., c. 1, § 3), which takes away the benefit of clergy (q.v.) in cases of "willful murder of malice prepense." The first element in the crime is unlawfulness, as distinguished from the killing which is justifiable or excusable homicide. (See HOMICIDE and JUSTIFIABLE HOMICIDE.) Not only must the killing be unlawful, but the person killed must be a "reasonable creature in being." Accordingly, the killing of an unborn child is not murder at common law, but is abortion (q.v.).

The other essential element in murder is the malice aforethought with which the killing is done. This requires, first of all, sanity and discretion on the part of the slayer. An idiot, a lunatic (q.v.), or an infant (q.v.) below the age of discretion cannot commit murder. While malice aforethought is essential to the crime of murder, the law does not require the lapse of any prescribed time between the formation of the intention to kill and the killing. It is sufficient that the murderous intention precedes and accompanies the act of homicide. If the will accompanies the act a moment antecedent to the act itself which causes death, this makes the offense murder as certainly as if a day intervened between the willing and the doing. The malice in case of murder must be actual, or, as it is sometimes said, express, in contradistinction to implied malice. This does not mean, however, that the slayer must actually have intended to kill his victim, nor that he bore toward him a settled and malignant ill-will. Hence if one shoots at A, and misses him, but kills B, this is murder, because of the previous felonious intent, which the law transfers from one to the other. So if one lays poison for A, and B, against whom the poisoner had no felonious intent, takes it, and is killed, this is murder. In short, the idea of malice aforethought is not spite or malevolence to the deceased in particular, but evil design in general; not premeditated personal hatred or revenge toward the person killed, so much as a deliberately unlawful purpose which, if persevered in, must produce mischief. At the common law the procuring of a person to commit suicide (q.v.) is murder if the suicide is accomplished. So it is said in the books that if two persons agree to commit suicide, and attempt to carry their design into execution, but only one dies, the survivor is guilty of murder if he were present at the commission of the suicide; otherwise he is an accessory before the fact.

The common law knew nothing of degrees of murder. If the homicide was committed unlawfully and with malice aforethought, the slayer was a murderer, and, upon conviction, liable to capital punishment. This penalty has been thought too severe for some kinds of murder, and a number of our States have divided the offense into two degrees, continuing capital punishment for the first degree, and punishing the second degree with imprisonment. While these statutes differ in detail, they agree in limiting the definition of murder in the first degree to those cases where the killing was done in a willful, deliberate, premeditated, or particularly cruel manner, or while engaged in the commission of some heinous felony, such as arson, and in some States rape and burglary. Consult: Bishop, *New Criminal Law* (Chicago, 1892); Stephen, *History of the Criminal Law of England* (London, 1883); Wharton, *Criminal Law* (Philadelphia, 1896); Clark and Marshall, *Law of Crimes* (Saint Paul, 1900); and authorities referred to under CRIMINAL LAW.

MURDERS IN THE RUE MORGUE, THE. A tale by Edgar A. Poe, which appeared in *Graham's Magazine* in 1841, and became a model for later detective stories. The story opens with newspaper accounts of a horrible murder in Paris of an old lady and her daughter. The writer and a friend visit the house, and the friend ascertains from the appearance of the room that the murderer was an orang-outang escaped from its keeper.

MUR'DOCH, JAMES EDWARD (1811-93). An American actor, born in Philadelphia. His first appearance on the stage was in his native city in 1829. In 1833 he acted with Fanny Kemble during her tour in America, and in 1856 played with some success at the Haymarket Theatre in London. During the Civil War in America he devoted himself to caring for sick and wounded soldiers, and gave popular readings for the benefit of the United States Sanitary Commission. Subsequently he was professor of elocution in the Cincinnati College of Music. Joseph Jefferson characterizes his acting as "not only extremely versatile, but entirely original." His greatest successes were in comedy and lighter tragedy. With William Russell he published *Orthophony, or Culture of the Voice* (1845); and *The Stage* (1880).

MURDOCK, JAMES (1776-1856). An American scholar, born in Westbrook, Conn., and educated at Yale, class of 1797. He taught school in New Haven and at Oneida Academy, now Hamilton College, studied for the ministry, was licensed in 1801, preached for thirteen years in the Congregational Church of Princeton, Mass., and was professor of ancient languages in the University of Vermont from 1815 until 1819, when he went to Andover Theological Seminary. There he taught sacred rhetoric and Church history until 1829, and then he removed to New Haven, where he devoted his last years to private study. He wrote versions of Munscher's *Elements of Dogmatic History* (1830), of Mosheim's *Institutes of Ecclesiastical History* (1832), and of Mosheim's *Affairs of the Christians Before the Time of Constantine the Great* (1852), a *Literal Translation of the Whole New Testament from the Ancient Syriac Version* (1851), and *Sketches of Modern Philosophy* (1842).

MURDOCK, William (1754-1839). An English engineer, who was the first to employ coal gas as an illuminant. He was born at Bellow Mill, in Ayrshire. In 1784 he had begun to experiment on a high pressure locomotive. From these unsuccessful attempts, about 1792 he turned his attention to lighting by coal gas. (See Gas, Illuminating.) The actual perfection of the invention was probably two or three years afterwards, and in 1802 gas was used in the illumination of Soho, after the news of the Peace of Amiens. Murdock made several improvements on Watt's steam-engine and invented an independent or 'ball-crank' engine and various apparatus by which compressed air might be used.

MURE, Sir William (1594-1657). A Scottish poet, born probably in Ayrshire, where the Rowallan estate, which he inherited, was situated. In 1643 he was a member of Parliament in Edinburgh, and he was wounded the next year at Marston Moor. His principal effort' is his clever but somewhat heavy *True Crucifixe for True Catholikes*, which appeared in 1629. His other writings are a poetical translation (1628) of *Hecatombe Christiana*, a Latin poem by Boyd of Trochrig, many miscellaneous poems, and a paraphrase of the Psalms (1639).

MURE, mūr, William (1799-1860). An English classical scholar, born at Caldwell, Ayrshire, Scotland. After studying at Westminster School and at Edinburgh, he spent several years at the University of Bonn. His chief work, *A Critical History of the Language and Literature of Ancient Greece* (5 vols., 1850-57), was left unfinished, but the several portions of it on the epic and lyric poets and the historians may be regarded as separate works. His attempt in the first two volumes to prove the essential unity of the *Iliad* and *Odyssey*, and the identity of their authorship, won him a wide reputation among European scholars. In addition to numerous contributions to the *Edinburgh Review*, his publications include: *Brief Remarks on the Chronology of the Egyptian Dynasties* (1829); *A Dissertation on the Calendar and Zodiac of Ancient Egypt* (1832); and his *Journal of a Tour in Greece and the Ionian Islands* (1842). He sat in Parliament for Renfrewshire in 1846-55, and was lord rector of the University of Glasgow in 1847-48.

MURET, mu̦'rȧ', or **MURE'TUS,** Marc Antoine (1526-85). A French humanist. He was born at Muret, became a proficient scholar in Greek and Latin, and when but eighteen lectured in the College of Auch. At the invitation of Cardinal Ippolito d'Este, he took up his residence in Rome, where he won fame by his lectures. He took orders in 1576 and in 1584 retired from his professoriate. He wrote *Orationes* and *Epistolæ*, and his *Variarum Lectionum Libri XIX* is still valuable. His reputation rests chiefly, however, upon the classic Latinity of his style. The best edition of his collected works is that of Frotscher and Koch (Leipzig, 1834-41).

MUREX (Lat., purple-fish). A genus of tropical shells, large, heavy, and variously armed with stout spines, processes, or knobs. These are to protect and strengthen the shells, for the animals live on exposed coasts. One species (*Murex pomum*) is found along the American coast from Cape Hatteras to Texas. It is from two to three inches in length, but not so conspicuously spiny as some more tropical forms. Allied to Murex is the oyster-drill (*Urosalpinx cinerea*), which bores into oyster shells by means of its lingual ribbon. (See Drill.) *Murex fortispina* of New Caledonia is furnished with a powerful tooth at the lower part of its outer lip. Its favorite food is *Arca pilosa*, a species of bivalve allied to the 'Noah's ark' (see Ark Shell), which lives half buried in coral refuse. Many of the tropical species are gayly colored, and some yield, when the animal is crushed, a rich violet-purple liquid which will act as a permanent stain, and which furnished to the ancients their 'royal-purple' dyes. Other shells yield this or a similar color. See Purple-Shell; also Colored Plate of Gastropods.

MUREX'ID (from Lat. *murex*, purple-fish), Purpurate of Ammonia, or Roman Purple, $C_8H_4N_5O_6.NH_4 + H_2O$. A beautiful coloring matter similar to the Tyrian purple of the ancients, which was made from a species of Murex—hence its name. Murexid may be prepared from uric acid, and as this exists in abundance in guano, that material has been found one of the best sources from which to obtain it. One process used to produce murexid is to dissolve uric acid in dilute nitric acid, and after evaporating for some time at a temperature a little short of boiling, while still hot, to add a slight excess of ammonia. Two compounds are formed by this process, alloxan and alloxantin, and their reaction on each other results in the formation of the beautiful minute green metallic-lustred crystals of murexid, which, in combination with some of the compounds of lead and mercury, yield most brilliant red and purple dyes. The use of murexid was becoming extensive until the discovery of the aniline colors, the greater brilliancy of which has checked its employment. The acid combined in murexid, viz. purpuric acid, $C_8H_4N_5O_6H$, is not known in the free state. Its ammonium salt, murexid, was first obtained in 1839 by Liebig and Wöhler. See Uric Acid.

MURFREE, mûr'frē̇, Mary Noailles (1850—). An American authoress, born in Murfreesboro, Tennessee, best known by the pseudonym of Charles Egbert Craddock. Unable because of lameness to enjoy the usual play of young people, she devoted herself, almost from childhood, to reading and the study of the native types of the Tennessee mountains, where she passed her summers. Her novels began to appear in 1884. The chief titles are: *In the Tennessee Mountains* (1884); *The Prophet of the Great Smoky Mountains* (1885); *In the Stranger People's Country* (1891); *The Phantoms of the Foot-Bridge* (1895); *The Mystery of White-Face*

Mountain, and Other Stories (1895); *The Young Mountaineers* (1887); *The Bushwhackers, and Other Stories* (1899); *A Spectre of Power* (1903).

MUR′FREESBORO. A city and the county-seat of Rutherford County, Tenn., 32 miles southeast of Nashville; on the Nashville, Chattanooga and Saint Louis Railroad (Map: Tennessee, E 5). It is the seat of Soule Female College (Methodist Episcopal, South), opened in 1852, and of the Mooney School, established in 1901. The city is the centre of an agricultural region largely interested in cotton and fruit growing, and has manufactures of flour, lumber, cedar ware, leather, carriages, cotton gins, machine shop products, etc. Near the city is the Stone River battlefield (see STONE RIVER, BATTLE OF), the site of a national cemetery with 6150 graves, 2333 of unknown dead. Murfreesboro was first settled in 1811, and was incorporated in 1817. From 1819 to 1825 it was the State capital. Population, in 1890, 3739; in 1900, 3999.

MURFREESBORO, BATTLE OF. See STONE RIVER, BATTLE OF.

MURGER, mụr′zhā′, HENRI (1822-61). A French novelist and poet, born in Paris, March 24, 1822, who made attractive to his readers the irresponsible life of artists and students in Paris. Among his works are: *Scènes de la vie de Bohême* (1848); *Scènes de la vie de jeunesse* (1851); *Les buveurs d'eau* (1854); *Madame Olympe* (1859); other prose tales; and the poems *Les nuits d'hiver* (1861). To Murger, if to any one writer, literature perhaps owes the word 'Bohemia,' signifying not a geographical spot, but a moral condition. Murger left some classic tales and songs of dissolute thriftlessness and literary impecuniosity that have deluded a generation into looking back with dreamy regret on the sordid follies of their student days. The first Romantic generation, that of Gautier, had real enthusiasm, the ardor and fervor of renascence, for which Murger's whimsical hysteria of merriment and his vicious sentimentality are but a poor substitute. Murger was trained for the law, became for a time secretary of Count Leo Tolstoy, but like that earlier Bohemian, Villon, he chose dissipation rather than decency. He died in a charity hospital in Paris, January 28, 1861. A monument was recently erected to his memory, not without protest. Several of Murger's songs are translated by Andrew Lang in *Ballads and Lyrics of Old France* (London, 1872). 'Estimates' of Murger by fellow-Bohemians may be found in *Les nuits d'hiver* (Paris, 1862).

MURGHAB, mōōr-gäb′. A river of Central Asia, rising in the Paropamisus Mountains, on the northern boundary of Afghanistan (Map: Afghanistan, J 3). It flows northwest into Russian Turkestan, irrigates the Merv Oasis, and after a course of 366 miles is lost in the sands and marshes of the desert about 150 miles below Merv.

MURIATIC ACID. See HYDROCHLORIC ACID.

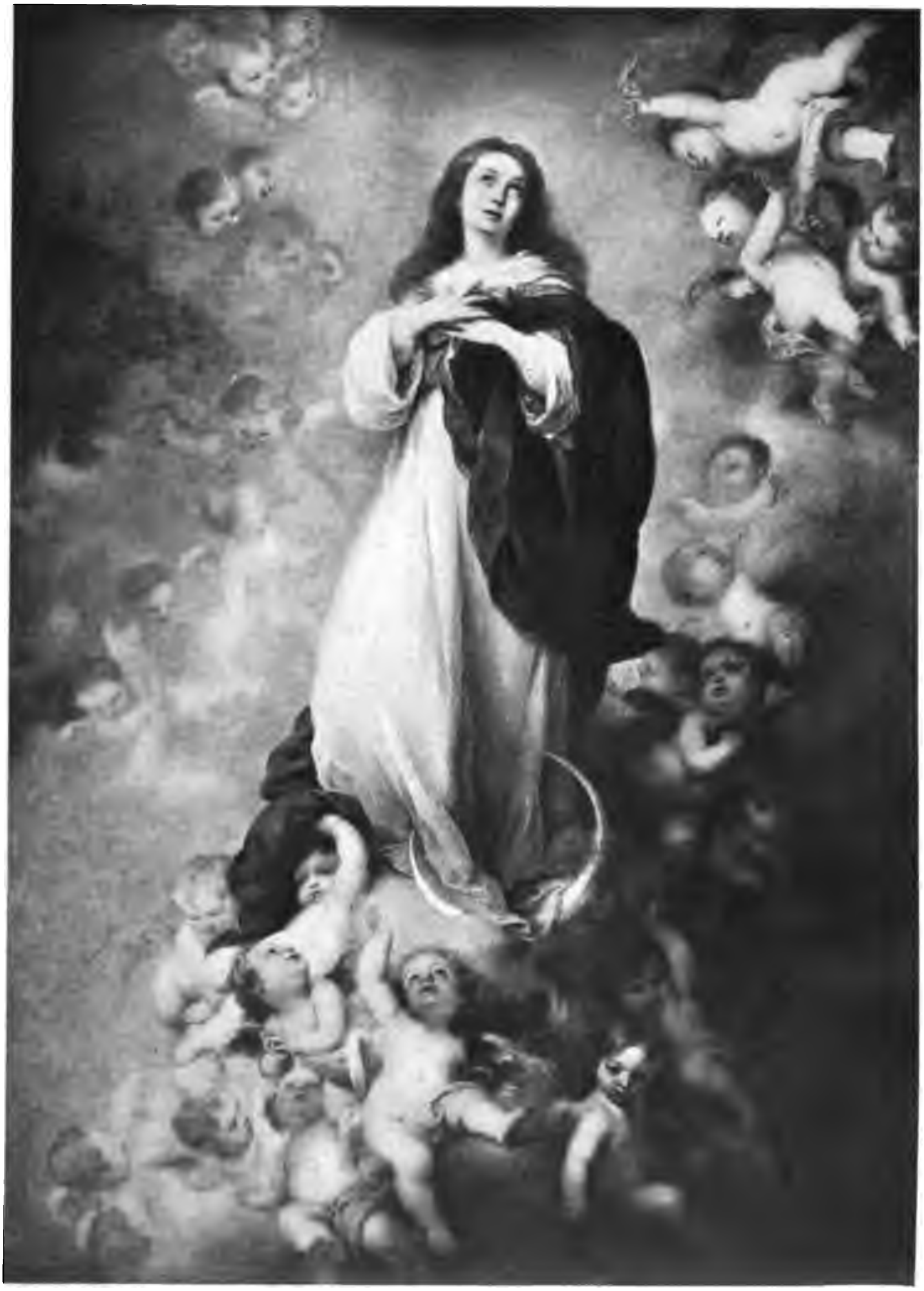
MU′RIDÆ (Neo-Lat. nom. pl., from Lat. *mus*, Gk. *μῦς*, *mys*, mouse). The family of rats and mice, typified by the house-mouse (*Mus musculus*). It embraces in its seventy-six genera (Thomas) more than a third of all the rodents, is world-wide in its distribution, and includes many species of great importance to man, as pests or otherwise. The family has been most fully monographed by O. Thomas in the *Proceedings of the Zoölogical Society of London* (1881), p. 528. Consult also authorities cited under RODENTIA; and see MOUSE, RAT, GERBIL, HAMSTER, WATER-RAT, VOLE, MUSKRAT, and similar titles.•

MURILLO, mōō-rēl′yō, BARTOLOMÉ ESTEBAN (1617-82). A Spanish religious and genre painter of the school of Seville. He was, after Velazquez, the greatest figure in Spanish art, and unquestionably the most important religious painter of Spain. He was born in Seville, probably December 31, 1617. Very little is known of his early life. When quite young he was apprenticed to his uncle, Juan del Castillo, from whom he learned the rudiments of painting; but upon the departure of the latter to Cadiz in 1640, Murillo was left without means, and for the succeeding two years he supported himself by painting rough, brilliantly colored pictures for the *Feria*, a weekly market. His close contact with the beggars and print-sellers gave him unusual opportunity for studying their characteristics, and his reproductions of them upon canvas exhibit a sympathy and realism alike notable. These earlier works may be cited as representing the artist's first period, during which he attained results intensely individualized and at the same time expressive of the type.

The example of Moya, a fellow pupil in the studio of Castillo, made Murillo discontented with his position at Seville, and he resolved to visit Rome, but, not having the means for the longer journey, set out on foot for Madrid. Velazquez gave him shelter in his own house and access to the royal galleries, where, with untiring zeal, he copied Ribera, Titian, Rubens, Van Dyck, Velazquez, and other masters. This course of practice, extending from 1642 to 1645, gave him a much freer style and greater control of color—the chief characteristics of his second period. This era, generally known as his 'warm [calido] style,' was characterized by the execution of works exhibiting especially a masterly control of color contrasts. The series of pictures upon which the painter was employed from 1645 to 1648 for the small Franciscan convent near Casa del Ayuntamiento typify the early works of this second period, and through their success he received many commissions.

In 1648 Murillo married a wealthy and noble wife, and his house became the resort for the distinguished people of Seville. In 1650, upon the death of Pacheco, he became the acknowledged head of the Seville school and the president of the academy founded in 1660. During these years he was continually improving in style, becoming more idealistic in conception and individual in technique. The result of this transitional epoch was the third period or last phase, known as *el vaporoso*, from a certain vaporous or misty effect produced. A favorite subject of this era was the "Immaculate Conception," which he painted no fewer than twenty times, the most famous example being in the Louvre, Paris. It was taken from Spain by Marshal Soult, and bought by the French Government at the Soult sale, in 1852, for 586,000 francs.

Murillo is very popular with the general public, but less so with the artists, who, while acknowledging his facility and charm, find his work lacking in technique, force, and originality. His work is highly subjective; so much so that



MURILLO

"THE IMMACULATE CONCEPTION," FROM THE PAINTING IN THE LOUVRE, PARIS

the attention of the beholder is attracted to the personality and technique of the artist rather than to the subject represented. Murillo's chief importance consists in the wonderful manner in which he employed the medium of Spanish realistic forms to express ideal religious conceptions.

Much of the work of the artist was taken from Spain during the Peninsular campaign, a fact that accounts for the number of fine examples to be found in the galleries of Europe; the various collections of London possess 105 of his paintings, and those of Paris 21. Among his principal works were eight large pictures painted for the Hospital of Saint George (1661-74), of which three—viz. "Moses Striking the Rock," the "Miracle of the Loaves and Fishes," and "San Juan de Dios Attending the Sick"—remain in their original places.

The Cathedral of Seville is rich in his works, among which are: "Saints Leander and Isidore;" the "Vision of Saint Anthony" (1656); and "La Purissima" (1668). In the museum are seventeen of the twenty-six pictures painted for the Capuchin monastery at Seville, among which are four "Immaculate Conceptions." In the Prado Museum (Madrid) are the beautiful "Children of the Shell" (the infants Jesus and John), the "Adoration of the Shepherds," the "Education of the Virgin," and "Saint Elizabeth of Hungary Healing a Leper." Other famous works are: "The Birth of Mary" (1655) and "The Holy Family, with Saint Elizabeth" (1670), in the Louvre; "The Vision of Saint Anthony," in the Berlin Museum. The best examples of Murillo's Madonnas are in the galleries of Dresden, Madrid, Seville, Florence (Pitti Palace), and Rome (Corsini Palace). Of his admirable series of genre subjects representing children in the action of eating, throwing dice, and selling fruit and flowers, the best-known examples are in the national collections of Munich, Paris (Louvre), London, and Saint Petersburg. Murillo's last work was the altarpiece of Saint Catharine, painted at Cadiz for the Church of the Capuchins. The picture was never completed, owing to a fall, which compelled his return to Seville, where he died shortly afterwards, April 3, 1682. He was buried, by his own request, in the Cathedral of Seville, before Pedro de Campagna's picture of the "Deposition from the Cross." Consult the biographies of Murillo by Tubino (Seville, 1864); Stromer (Berlin, 1879); Lücke, in Dohme, *Kunst und Künstler*, vol. iii. (Leipzig, 1880); Minor, in "Great Artists Series" (London, 1882); Alfonso (Barcelona, 1886); Justi (Leipzig, 1892); Knackfuss (Bielefeld, 1896). See, also, Curtis, *Velasquez and Murillo* (London, 1883); Lefort, *Murillo et ses élèves* (Paris, 1892); Stirling-Maxwell, *Annals of the Artists of Spain* (London, 1848).

MUR′ISON, Alexander Falconer (1847—). An English jurist and historian, born in Aberdeenshire and educated at the University of Aberdeen. In 1883 he was appointed professor of Roman law, and in 1901 of jurisprudence in University College, London. He was editor of *The Educational Times* (1902), and wrote: *The External History of Roman Law* (1885), and, in the "Famous Scots Series," *Sir William Wallace* (1898) and *King Robert the Bruce* (1899).

MURMEL′LIUS, Johannes (c.1480-1517). A Dutch humanist, born in Roermond, Gelderland, and educated at Deventer, at Cologne, and at Münster. In the last city he taught for some time, and then at Deventer and Alkmaar. One of the foremost humanists of the day, he introduced the study of Greek almost single-handed, and published many excellent school books. His *Scoparius in Barbariei Propugnatores et Osores Humanitatis* (1514) and his defense of Reuchlin are important documents. Consult the biography by Reichling (Freiburg, 1880) and the selections from his poems, edited by Reichling (ib., 1881).

MURNER, mụr′nẽr, Thomas (1475-1537). A German priest, famous mostly for attacking Luther and the Reformation. Murner taught and preached in Freiburg, Paris, Cracow, and Strassburg. After voyages to Italy and England he settled in Strassburg, whence in 1525 he was frightened away by the Reformation. Murner was highly enough prized for his religious poems to be made laureate by Maximilian I. in 1505. In 1506 he took his doctorate in theology; in 1513 he became guardian of the Franciscan cloister at Strassburg. In 1519 he became a doctor of jurisprudence at Basel. After a stormy life Murner died at his birthplace, Oberenheim, near Strassburg, in 1537. In his *Gäuchmatt* and his *Narrenbeschwörung*, Murner shows some realistic humor. He translated the *Æneid* in 1515; whether he wrote the High German version of the *Eulenspiegel*, a kind of chap-book, originally in Low German, is not known. His selected works were published in Kürschner's *Deutsche Nationallitteratur* (Stuttgart, 1890 et seq.). Consult: Kawerau, *Murner und die Kirche des Mittelalters* (Halle, 1890); *Murner und die deutsche Reformation* (Halle, 1891).

MUROM, mōō′rŏm. One of the oldest towns of Russia, situated in the Government of Vladimir, on the left bank of the Oka, 84 miles southeast of Vladimir (Map: Russia, F 3). It has an old cathedral, a gymnasium, two monasteries, and a convent. The town is noted for the vegetables raised in the vicinity. It manufactures tallow and soap, and has trade in grain. Murom is believed to have existed before the time of Ruric, and had rulers of its own, who were subjugated by the princes of Moscow at the end of the fourteenth century. Population, in 1897, 12,589.

MUR′PHEY, Archibald De Bow (1777-1832). An American jurist, born in Caswell County, N. C. He was educated at the University of North Carolina. He served as a tutor and then as professor of ancient languages until 1802, when he was admitted to the bar. From 1812 to 1818 he was a member of the State Senate. While in this body he was a member of the committee appointed in 1816 to consider the establishment of a system of public schools, and at the session of 1817 submitted an elaborate plan which, while not adopted, formed the groundwork for the later attempts. In 1818 he was elected judge of the Superior Courts and was designated to sit on the Supreme bench during three terms in 1819-20. He was interested in internal improvements, and persuaded the State to attempt an elaborate system of canals and harbor improvements. In 1822 he secured a share of the Tennessee land warrants for the University of North Carolina, and thus saved that institution from ruin.

MUR′PHY, Arthur (1727-1805). A British actor and playwright, born at Clomquin, Roscommon, Ireland, December 27, 1727. Having studied at the English college at Saint Omer in France (1738-47), he became a clerk to a merchant in Cork (1747-49), and worked in a London banking house (1749-51). Turning to literature, he started the *Gray's Inn Journal* (1752-54) in imitation of Addison's *Spectator.* In 1754 he appeared at Covent Garden as Othello. In this and other parts he was moderately successful. Beginning with *The Apprentice* (1756), he wrote many farces and clever satires, mostly adapted from the French, and tried his hand at several tragedies. Among his many miscellaneous works are an edition of Fielding with a memoir (1762), an essay on Dr. Johnson (1792), a translation of Tacitus (1793), and a *Life* of Garrick (1801). He died June 18, 1805, at Knightsbridge. His plays and early essays were collected (8 vols., London, 1786), and his life was written by J. Foot (ib., 1811).

MURPHY, Francis (1836—). An American temperance evangelist, born in Wexford, Ireland. He served in the Federal army during the Civil War. Beginning in 1870 at Portland, Me., he started temperance reform clubs throughout that State, and was their first president. His headquarters were in Pittsburg, Pa., and after his first addresses there in 1876, 45,000 people signed the pledge, a number that was soon increased to 10,000,000, as a result of his ministrations in different parts of the United States. He labored also in England, and he acted as chaplain in the Spanish-American War.

MURPHY, Henry Cruse (1810-82). An American politician and historian, born in Brooklyn, N. Y. He graduated at Columbia College in 1830, studied law, and was admitted to the bar in Brooklyn, where he became city attorney and, in 1842, Mayor. The next year he became a member of Congress. At the expiration of his term he was elected a delegate to the New York State Constitutional Convention of 1846. In 1847 he was again sent to Congress, and in 1852 was a prominent candidate for the Democratic nomination for President. In 1857 President Buchanan appointed him Minister to Holland, where he remained until 1861. He was for a time an editor of the *Brooklyn Eagle,* but he is perhaps best known for his researches in the early colonial history of New York, which led to the discovery and publication of many interesting and important documents. Probably the most valuable of these is De Vries's *Voyages from Holland to America, 1632 to 1644* (1853), which he translated from the Dutch. During his residence at The Hague as American Minister he printed for private distribution two monographs, *Henry Hudson in Holland: Origin and Objects of the Voyage Which Led to the Discovery of the Hudson River* (1859); and *Jacob Steendam, Noch Vasater. A Memoir of the First Poet in New Netherland, with His Poems, Descriptive of the Colony* (1861). The latter of these was reprinted in his *Anthology of New Netherland; or, Translations from the Early Dutch Poets of New York, with Memoirs of Their Lives,* issued by the Bradford Club in 1875.

MURPHY, James Gracey (1808—). An Irish Presbyterian clergyman, born at Ballyaltikilikan, County Down. He graduated at Trinity College, Dublin, in 1833, was appointed minister at Ballyshannon in 1836, became classical headmaster at the Royal Belfast Academical Institution in 1841, and professor of Hebrew at the Presbyterian College of Belfast in 1841. He published a number of volumes, among them a *Latin Grammar* (1847); a *Hebrew Grammar* (1857); *The Human Mind* (1873); and commentaries on (1864) Genesis, (1866) Exodus, (1872) Leviticus, (1875) the Psalms, and (1882) Revelation.

MURPHY, John Francis (1853—). An American landscape painter. He was born in Oswego, N. Y., studied art by himself, and first exhibited in 1876 at the National Academy, of which he was elected an associate and later an Academician. Murphy worked both in oils and water colors. Among his paintings are: "Sultry Season" (1884); "The Yellow Leaf" (1885); and "Sundown" (1886). His work is exceptional for the beauty of its coloring.

MUR′PHYSBORO. A city and the county-seat of Jackson County, Ill., 86 miles southeast of Saint Louis, Mo.; on the Big Muddy River and on the Illinois Central, the Mobile and Ohio, and the Saint Louis Valley railroads (Map: Illinois, C 6). It is the centre of a farming district that has considerable mineral wealth, particularly deposits of coal, and carries on a trade of some importance. There are manufactures of flour, lumber, beer, foundry and machine-shop products, brick, etc. Population, in 1890, 3880; in 1900, 6463.

MURRAIN, mŭr′rĭn (OF. *morine,* from Lat. *mori,* Skt. *mar,* to die). A general term loosely used to designate a variety of diseases of domestic animals, but more correctly restricted to the vesicular epizoötic, popularly known as foot-and-mouth disease. 'Bloody murrain' is sometimes used referring to anthrax, and 'dry murrain' is similarly applied to Texas fever.

MUR′RAY, Alexander (1755-1821). An American naval officer, born at Chestertown, Md. At the outbreak of the Revolution he received a commission in the navy, but while waiting for a ship served, during 1776-77, as lieutenant and captain in the First Maryland Regiment, and participated in the operations around New York. In the latter part of 1777 he commanded the *Revenge* with letters of marque to prey on British commerce. He was captured, but after exchange served on board the *Trumbull,* and was again captured. When exchanged again he commanded a privateer and afterwards served on the *Alliance.* When the navy was reorganized in 1798 he was one of the first six captains appointed, and commanded the *Montezuma* during the troubles with France. He was transferred to the *Constellation* and saw some service in the Mediterranean during the war with Tripoli.

MURRAY, Alexander (1775-1813). A linguist, son of a shepherd, born at Dunkitterick, Kirkcudbrightshire, October 22, 1775. Murray taught himself French, Latin, Greek, and Hebrew; made his way through Edinburgh University, became parish minister of Urr in his native shire (1808), and professor of Oriental languages in Edinburgh University (1812). He died April 15, 1813. Murray edited in a thorough manner Bruce's *Travels* (1805; new ed. 1813); wrote for his students *Outlines of Orien-*

tal Philology (1812); and contributed to the *Edinburgh Review*. After his death appeared his chief work, *History of the European Languages*, with a memoir and the fragment of an autobiography (2 vols., Edinburgh, 1823).

MURRAY, Alexander Stuart (1841-1904). A distinguished English archæologist, born near Arbroath. He was educated at the University of Edinburgh and in Berlin. In 1867 he was appointed assistant in the department of Greek and Roman antiquities of the British Museum, and in 1886 keeper of the same. He published a *History of Greek Sculpture* (London, 1890); *Handbook of Greek Archæology* (London, 1892); *Designs from Greek Vases* (London, 1894); *Terra-Cotta Sarcophagi* (London, 1898); and edited many official publications of the British Museum.

MURRAY, David (1830-1905). An American educator. He was born at Bovina, Delaware County, N. Y., where his parents had immigrated from Scotland in 1816. He graduated from Union College in 1852. The following year he became assistant in the Albany Academy, and in 1857 was advanced to the principalship. In 1863 he accepted the chair of mathematics and physics in Rutgers College. Having assisted the Japanese Embassy in 1872 in their labor of investigating the educational systems of this and other countries and preparing statistics thereon, he was invited by Japan to assume the supervision of its educational affairs. He removed to that country and was occupied for six years in these duties. At the time of his return to America in 1879 he was decorated by the Emperor with the Order of the Rising Sun. In 1880 he became secretary of the Regents of the University of the State of New York, and held this post nine years. He published several addresses, and is the author of *Manual of Land Surveying* (1872); an introductory chapter to *Outlines of the History of Japanese Education* (1876); *The Story of Japan* (1894); *History of Education in New Jersey* (1899).

MURRAY, David Christie (1847—). An English novelist, born at West Bromwich, in Staffordshire, April 13, 1847. He was educated at a private school. He began his career as a reporter on the Birmingham *Morning News*, and in 1873 went to London, where he joined the staffs of the *Daily News* and the *World*. In 1879 he published in *Chambers's Journal* his first long novel, *A Life of Atonement*. Other books are: *Joseph's Coat* (1881); *Val Strange* (1882); *Time's Revenge* (1893); *In Direst Peril* (1894); *A Rogue's Conscience* (1896); *Tales in Prose and Verse* (1898); *A Race for Millions* (1898); many other novels; and the interesting essay, *My Contemporaries in Fiction* (1897).

MURRAY, Lord George (c.1700-60). A Scottish Jacobite general, son of the first Duke of Athol. His father was loyal to the House of Hanover, but Lord George followed his elder brother, the Marquis of Tullibardine, into the Jacobite uprising of 1715, commanded a battalion at Sheriffmuir, and made his escape to France the following year. He was living in Scotland at the time of the rebellion of 1745, and was the most capable of Prince Charles's generals. To Lord George Murray's personal bravery, sound judgment, and skill in handling undisciplined troops must be attributed the chief credit for the Jacobite victories at Prestonpans and Falkirk, as well as for the Highlanders' safe retreat from England after the raid to Derby. Murray escaped to the Continent when the cause was lost and died in Holland.

MURRAY, George Henry (1861—). A Canadian statesman of Scottish parentage, born at Grand Narrows, Nova Scotia. He began his education in his native place, finished it at Boston University, was called to the bar in 1883 and practiced his profession at North Sydney, N. S. He was elected to the local House in 1889, and after being a member of the Nova Scotia Cabinet (1891) he became Premier and Secretary for his native province (1896). In 1897 he was sent to the Dominion Parliament as Liberal member for Victoria County.

MURRAY, Grenville (1824-81). An English journalist, the illegitimate son of Richard Grenville, second Duke of Buckingham. After studying at Magdalen College, Oxford, and at the Inner Temple, he entered the diplomatic service, and held various posts at Vienna, Hanover, Constantinople, and Odessa. Returning to England in 1868, he founded *The Queen's Messenger* (1869), the first of the English satirical society papers. Driven from England, he settled in Paris, where he figured as the Comte de Rethel d'Aragon, borrowing the title of his Spanish wife. He was one of the pioneers in the gossip and scandal of modern journalism. Among his separate publications are: *The Roving Englishman* (1854); *Round About France* (1878); and *Side Lights on English Society* (1881), containing a mock dedication to the Queen.

MURRAY, Hugh (1779-1846). A Scottish geographer, born at North Berwick. After 1816, when he became a fellow of the Royal Society of Edinburgh, he applied himself to the study of geography. He was chiefly noted for his share in the *Encyclopædia of Geography* (1834). He also compiled historical or geographical works upon *The Southern Seas* (1826); *Polar Seas* (1830); *Africa* (1830); *British India* (1832); *China* (1836); *British America* (1839); and *The United States* (1844).

MURRAY, James (c.1725-94). A Scotch soldier, and the first British Governor of Canada. He was the fifth son of Alexander, fourth Lord Elibank, and entered the army about 1740. In 1757 he was sent with his regiment to America, where he commanded a brigade in the siege of Louisburg in 1758, and led the left wing of Wolfe's army in the battle on the Heights of Abraham, September 13, 1759. The next year he successfully defended Quebec against an attack by a superior French force under De Lévis, and later in the same year assisted General Amherst in reducing Montreal. He was appointed Governor of Quebec in October, 1760, and of all Canada in 1763, and continued in that position until 1766. He became Governor of Minorca in 1774, was besieged in Fort Saint Philip in 1781 by the French and Spanish under the Duc de Crillon, and after a desperate defense was forced in 1782 to capitulate. Upon his return to England he was tried by a court-martial, but was acquitted. He became a full general in 1783, and died near Battle, in Sussex. For an account of his career in America, consult Parkman's *Montcalm and Wolfe* (Boston, 1884; new ed. 1898).

MURRAY, James Augustus Henry (1837—). A distinguished English lexicographer, born at Denholm, Roxburghshire, Scotland, in 1837. After his elementary studies at home and in Edinburgh, he continued his work at London University. Having taught at Hawick, he became master of Mill Hill School, near London, a position which he retained for fifteen years (1870-85). Already distinguished as a scholar, he had been twice elected president of the Philological Society (1878-80, 1882-84). For that society he assumed, in 1879, the editorship of the *New English Dictionary on Historical Principles*, the most exhaustive work in lexicography ever attempted in any language. In 1885 Dr. Murray moved from Mill Hill to Oxford, where his Scriptorium is a notable feature of the city. Before beginning this work, he had published many valuable monographs, and edited for the Early English Text Society the *Minor Poems of Sir David Lyndesay* (1871); the *Complaynt of Scotland* (1874); and the *Romance and Prophecies of Thomas Erceldoune* (1875). In 1884 he received a civil list pension of £270. He has also been honored by degrees from English, Scotch, and German universities. A full account of the beginning of the dictionary and of its making is to be found in Dr. Murray's address to the Philological Society (1879). See Dictionary.

MURRAY, or **MORAY,** James Stuart, Earl of (1531?-1570). A Scotch statesman. He was the natural son of James V., of Scotland, and half-brother of Mary, Queen of Scots. Destined for an ecclesiastical life, he was educated from 1541 to 1544 at Saint Andrews, and early received ecclesiastical benefices. He accompanied his sister Mary to France in 1548, returning the following year to gain as a youth military experience and renown by driving a strong party of English from the coast with great loss. It is probable that he began to sympathize with Protestants as early as 1552, and it is certain that he was an attendant on Knox's lectures in 1555, and joined with others in urging his return from Geneva the following year. From 1556 on he was the consistent leader of the Scotch reformers, and after 1558 till his death he was the most powerful single factor in Scotch politics. He was present at Mary's marriage to the Dauphin of France, afterwards Francis II., and was sent to France in 1561 to invite the widowed Mary, after the death of the Queen Regent, to return to Scotland as its Queen. For a few years Lord James Stuart, as Mary's chief minister and adviser, seemed to subordinate his own ambition to the good of Scotland, the preservation of his religion, the future union of England and Scotland, and the success of his sister's reign. In 1562 Mary created him Earl of Mar, and shortly after Earl of Murray. When it became evident that she would not be acknowledged by Elizabeth as her successor, Mary turned to a Catholic alliance, which forced Murray to break with his sister, and a series of intrigues and counter-intrigues began. At first, inclined to favor the marriage of Mary with Darnley, he soon saw that it meant Catholic supremacy, hence he opposed it finally by an appeal to arms, but was defeated and forced to take refuge in England (1565). In 1566, after intriguing with Bothwell, professing at the same time friendship for Darnley, and being cognizant, at least, of the plan to murder Rizzio, Murray returned to Edinburgh to regain his power. For the moment outwardly reconciled to his sister, he went to France, but returned shortly at the request of the lords, who had taken arms, to become Regent of the Kingdom. After Mary's escape from prison, he defeated her forces at Langside, near Glasgow, 1568, and on her flight to England he became one of the commissioners sent to that country to conduct the negotiations against her. Later, however, he urged Elizabeth to permit Mary to return to Scotland, but was assassinated in 1570 by Hamilton of Bothwellhaugh, before his plans had matured. He was a cold, ambitious man, endowed with great abilities, personally moral, but in politics without scruples. Consult authorities cited under Mary Stuart.

MURRAY, John (1741-1815). The founder of the Universalist body in America. He was born at Alton, England, December 10, 1741. At the age of eleven his parents removed to Cork, Ireland. He became a Methodist under the preaching of Wesley and Whitefield. Having read a book by James Relly, a Universalist, he was led to adopt his views, and for this was excommunicated at Whitefield's Tabernacle, London. Persecution for opinion, pecuniary embarrassment, and grief for the loss of his wife, caused him to seek retirement in America. He preached his first sermon in America September 30, 1770, in a small church, in an obscure place in New Jersey, called 'Good Luck.' Believing fully in the doctrine of universal salvation, he gave himself to earnest labor, first in New Jersey and New York, afterwards in Newport, Providence, Boston, Portsmouth, Norwich, and other places in New England. In 1774 he fixed his residence in Gloucester, Mass., where he was represented as a Papist, and a secret emissary of Lord North in the interest of the English Ministry. He was abused, and by a vote ordered to leave the town, but the interference of powerful friends saved him, and he was allowed to remain. In 1775 he was appointed chaplain of a Rhode Island brigade encamped near Boston. Ill health compelled him to leave the army, and he returned to Gloucester, where he was settled over a society of Universalists. He was instrumental in the organization of a convention of his sect, which met at Oxford, Mass., September, 1785, and took the name of Independent Christian Universalists. In 1793 he was installed pastor of a society of Universalists in Boston, where he remained till his death, September 3, 1815. He published *Letters, and Sketches of Sermons*, 3 vols., and an autobiography (1813), continued by his wife (9th ed. by Demorest, 1870).

MURRAY, originally **MACMURRAY,** John (1745-93). The first of four great English publishers, John MacMurray, of the stock of the Murrays of Athol, was born in Edinburgh. Having served as lieutenant of marine (1762-68), he retired on half pay and began to publish and sell books in London. John MacMurray purchased the bookselling business of Paul Sandby, opposite Saint Dunstan's Church, London, and, dropping the Scottish prefix, became a bookseller and purchaser at '32 Fleet Street.' He brought out the *English Review*, and published the first two volumes of the elder Disraeli's *Curiosities of Literature*, etc. He died November 16, 1793, and was succeeded in due time by his son John (1778-1843). One of the earliest hits of John the second was Mrs. Rundall's *Domestic Cookery* (1808), which had been through sixty-five editions by 1841. With the coöperation of Scott, Canning, and others, he founded the *Quarterly Review*, a Tory organ, in opposition to the Whig *Edinburgh Review*, then at the height of its influence. The first number was published February 1, 1809, under the editorship of William Gifford. The new periodical was completely successful, and brought Murray into communication not only with the chief writers, but also with the conservative statesmen of the time. A still more fortunate acquaintance was that with Lord Byron, whose *Childe Harold* (first two cantos) was published by Murray in 1812. Murray now removed from Fleet Street to Albemarle Street, where the business is still carried on. Almost all the literary magnates of the day were four o'clock visitors in Albemarle Street. Murray paid Byron nearly £20,000 for his works, and his dealings with Crabbe, Moore, Campbell, and Irving were princely. The second John Murray died in 1843, and was succeeded by his son, John Murray the third, who was born in 1808. He was educated first at the Charter House, and afterwards at Edinburgh University. Many great works in history, biography, travel, art, and science were issued by the third Murray. Among his successes were Livingstone's *Travels and Last Journals*; Smiles's *Life of George Stephenson;* and Darwin's *Origin of Species by Natural Selection*. At his death (April 2, 1892) he was succeeded by his son, the fourth John Murray (born in 1851). Consult Smiles, *A Publisher and His Friends* (London, 1891).

MURRAY, Sir John (1841—). An English naturalist and oceanographer. He was born at Coburg, Ontario, studied at Victoria College there and at the University of Edinburgh, and devoted himself to natural science. In 1868 he went through the Arctic regions on a whaler studying fauna and flora; from 1872 to 1876 was a naturalist of the *Challenger* expedition; and after six years' service as assistant became editor of the scientific reports of the *Challenger* voyage. He contributed to the *Narrative of the Cruise of H.M.S. Challenger* (1882-85) and wrote the *Challenger Report on Deep-Sea Deposits*, with Renard (1890). Murray was knighted in 1898.

MURRAY, John Clark (1836—). A writer on philosophy and ethics, born at Paisley, Scotland, March 19, 1836. He studied at Glasgow, Edinburgh, Göttingen, and Heidelberg. In 1862 he became professor of mental and moral philosophy in Queen's University, Kingston, Canada, and in 1872 he was called to a similar chair in McGill University, Montreal. He is author of *An Outline of Sir William Hamilton's Philosophy* (1870); the *Ballads and Songs of Scotland* (1874); *Memoir of David Murray* (1881); *Handbook of Psychology* (1885); *Solomon Maimon, an Autobiography*, translated from the German (1888); and an *Introduction to Ethics* (1891).

MURRAY, Lindley (1745-1826). An English grammarian, born at Swatara, Lancaster County, Pa., April 22, 1745. He was educated at an academy of the Society of Friends, and, on his father's removal to New York, was placed in a counting-house, from which he escaped to a school in New Jersey. He afterwards studied law and had a good practice in New York. During the Revolutionary War he engaged in trade with such success as to accumulate a handsome fortune. His health failing, he went to England and purchased an estate at Holdgate, near York, where he devoted himself to literary pursuits and botany. His garden rivaled the Royal Gardens at Kew. In 1787 he published his *Power of Religion on the Mind*, which passed through twenty editions. His *Grammar of the English Language* was issued in 1795, and was followed by *English Exercises*, the *Key*, the *English Reader, Introduction and Sequel*, and a *Spelling Book*, which went through some fifty editions. Murray died February 16, 1826. Consult the *Memoir of Murray*, containing an autobiography by Frank (York, 1826), and *Life* by Egle (New York, 1885).

MURRAY, or **MORAY,** Sir Robert (?-1673). A Scotch statesman. He was educated at Saint Andrews University, entered the French army, and, through the influence of Richelieu, rose to the rank of colonel. He was chosen secret envoy to negotiate a treaty between Scotland and France, and while at Newcastle in December, 1646, formed a plan for the escape of Charles I., which came to nothing through the King's irresolution. In 1651 he was appointed justice-clerk, and soon afterwards was made a Privy Councilor and a Lord of the Session, but never took his seat upon the bench. After the Restoration as Lord of Exchequer and Deputy Secretary he was one of the triumvirate, the other two members of which were Lauderdale and the King, that ruled Scotland from 1663 till 1670. He was one of the founders of the Royal Society, the oldest scientific society in Great Britain. As a chemist and musician he had considerable reputation in his time.

MURRAY, William, first Earl of Mansfield. An English jurist. See Mansfield, William Murray, First Earl of.

MURRAY, William Henry Harrison (1840-1904). An American clergyman, lecturer, and man of business. He was born at Guilford, Conn., and was graduated from Yale College in 1862. From 1868 to 1872 he was pastor of the Park Street Church, Boston, and during his incumbency he gave several series of popular sermons, or Sunday evening lectures, before large audiences in Music Hall, and later published these discourses in two volumes, *Music Hall Sermons* (1870-73). He subsequently withdrew from the ministry, and later followed a varied career in business, lecturing, and writing. In addition to several volumes of sermons and tales, he wrote *Adventures in the Wilderness, or Camp Life in the Adirondack Mountains* (1868); *The Perfect Horse* (1873); *Adirondack Tales* (1877); and other stories.

MURRAY, William Vans (1762-1803). An American diplomat, born in Cambridge, Somerset County, Md. He received a classical academic education in America, and in 1783 went to London, where he studied law for two years in the Inner Temple. Returning to Maryland in 1785, he was admitted to the bar, and began the practice of his profession, in which he soon attained prominence. From 1791 to 1797 he was a Federalist member of Congress. In 1797 he was appointed by President Washington United States Minister to the Netherlands, and in 1799, with

Oliver Ellsworth and William R. Davie, was sent to Paris to negotiate a treaty which should adjust the difficulties that had brought France and the United States to the verge of war. The successful negotiation of the convention signed at Paris, September 30, 1800, was said to be largely the work of Murray. He was the author of a valuable brief treatise on *The Constitution and Laws of the United States.*

MURRAY BAY, or **MALBAIE.** A summer resort of Charlevoix County, Quebec, Canada, on the left bank of the Saint Lawrence River, 90 miles east of Quebec, with which it has steamboat communication (Map: Quebec, F 3). Picturesquely situated on the Murray estuary which forms the bay, it is the principal watering place on the north shore of the Saint Lawrence, and is much frequented for its romantic scenery, invigorating air, bracing though cold bathing, its boating, and fishing. The town, of which lumber mills constitute the chief industry, is at the mouth of the Murray River, the dependent summer colonies being at Pointe à Pic (population, in 1901, 537) and Cap à l'Aigle, the extremities of the bay, three miles distant. It was one of the stations for United States prisoners of war in 1776. Population, in 1901, 826.

MURRAY RIVER. The principal river of Australia, draining, together with the Darling, practically the whole southeastern quarter of the continent. It rises in the Australian Alps near the eastern boundary of Victoria, and flows for two-thirds of its course northwestward, forming the boundary between Victoria and New South Wales (Map: Australia, G 5). After entering South Australia, it makes an abrupt turn to the south, and enters the Indian Ocean through Encounter Bay, 40 miles southeast of Adelaide. Its length is about 1500 miles. For the first 60 miles of its course it passes between precipitous rocky cliffs, in one place, known as the Murray Gates, reaching an enormous height, while some of the highest peaks of the continent are close to either shore. After passing through the Gates the hills become gradually lower, and finally the river enters the immense Australian Plains. Here the Murray is sluggish, with numerous windings, and flanked by lagoons. It receives here scarcely any tributaries except a few very large ones coming from the mountains. Among these are the Murrumbidgee (q.v.), which is longer than the main stream from the point of confluence, and the Darling (q.v.), whose length exceeds that of the entire main stream. During the dry season the river shrinks even in its lower course to a width of less than 300 feet, but in winter its volume increases enormously, and great inundations occur. In the wet season it is navigable for small steamers for the greater part of its course as far as Albury, but its mouth, owing to sand bars, is inaccessible for large vessels. There are a number of ports on its shores, whose total shipping probably amounts to more than one and a half million tons annually.

MUR′RAYSHIRE. A maritime county of Scotland. See ELGINSHIRE.

MURRE (also *marre*, of uncertain etymology). Any of several species of guillemot (q.v.).

MURRELET, mûr′lĕt (diminutive of murre). Any of several small murre-like birds confined to the North Pacific Ocean. The black-throated murrelet (*Synthliborhamphus antiquus*) is a handsome black and white bird, about ten inches long. It breeds from Sitka northward, and is found as far south as Oregon in winter. A Japanese murrelet is closely allied to it. The remaining four species represent another genus (*Brachyrhamphus*) chiefly distinguished by a more slender and less compressed bill. Two of the species are Arctic forms, one coming south to southern California in winter, while the other two occur in southern and Lower California.

MUR′RELL, WILLIAM (1853—). An English physician. He was educated at University College, London, where he was scholar and demonstrator (1875-78). Having received the title of *lauréat* from the French Medical Academy in 1881, he served as medical examiner at Edinburgh (1882-87), and in the Royal College of Physicians in London (1886-90), and became physician and lecturer at Westminster Hospital. He wrote: *Angina Pectoris* (1880; medal from the French Academy); *Bronchitis* (1890); *Materia Medica* (1900); and *Forensic Medicine and Toxicology* (1902).

MURRUMBIDGEE, mŭr′rŭm-bĭj′ē. A river of New South Wales, the second largest tributary of the Murray. It rises on the northeast slope of the Australian Alps, in the southeastern corner of the State, within 40 miles of the Pacific coast (Map: Australia, H 5). It flows first northward through a hilly country, then westward through the great plains till it enters the Murray 90 miles, in a straight line, southeast of the mouth of the Darling. Its length is 1350 miles, but, though it is longer than the Murray from the point of confluence, it is not of great commercial importance, owing to its shallowness. During the wet season it is navigable 500 miles for light-draught steamers. Its principal affluent is the Lachlan (q.v.).

MURSA. The Roman name for Eszék (q.v.).

MURSHIDABAD, mōōr′shē-dȧ-bäd′. The capital of a district of Bengal, British India, on the left bank of the Bhaghirathi, a branch of the Ganges, 115 miles north of Calcutta (Map: India, E 4). Azimganj, on the opposite side of the river, with ferry communication, is usually reckoned part of Murshidabad. The town covers a great area, several miles in length and breadth. The buildings are for the most part of mud, but there are several brick structures—mosques and tombs—along the river bank; and centrally situated is the Nizamat Kila or Nawab's palace, a building of great beauty, completed in 1840. The town is on the most frequented water route from Calcutta to the United Provinces. Its trade was formerly of great importance. Its banking connections are still considerable, Jain merchants here being among the wealthiest in India. The rearing of silkworms and the weaving of silk are the chief of many industries, which include ivory carving, the manufacture of gold and silver lace, of hookah pipes, musical instruments, etc. Murshidabad was the last Mohammedan capital of Bengal, and after the British annexation remained the capital until 1790, when the administrative seat was settled at Calcutta. Population, in 1891, of Murshidabad and Azimganj, 35,756; in 1901, of Murshidabad 15,168, of Azimganj 13,383, total 28,551.

MURU′MURÚ PALM. See ASTROCARYUM.

MURVIEDRO, mōōr-vyä′drō. A small town of Spain, in the Province of Valencia, occupying the site of the ancient Saguntum (q.v.) (Map: Spain, E 3). Population, in 1900, 6784.

MURZUK, mōōr-zōōk′ or **MOURZOUK.** The capital of Fezzan (q.v.), North Africa, situated in an unhealthful region in latitude 25° 50′ N., and longitude 14° 10′ E. (Map: Africa, F 2). It is surrounded by a wall and has an extensive palace. The inhabitants manufacture leather and textiles. The population is estimated at 6500.

MUSACEÆ, mū-zā′sē-ē (Neo-Lat. nom. pl., from *Musa*, from Ar. *mauz*, banana-tree), THE BANANA FAMILY. A natural order of generally stemless monocotyledonous plants, which resemble trees in appearance, and sometimes rival palms in stateliness. The long sheathing bases of the leafstalks combine to form a false stem. From the midrib to the margin of the leaf blade are many fine parallel veins. Hence the wind tears the tissue between them and makes the leaves very ragged. The flowers are borne on spadices in cymes or racemes often with bright colored bracts which are protected by spathes. The fruit is either fleshy or a three-valved capsule. The species (about 60) are widely distributed in warm climates, and are of great value, the fruit of some, particularly of the genus Musa, being much used for food, the fibres of the leaves of others for cordage and for textile purposes. A very interesting species is the traveler's tree (q.v.) of Madagascar. The principal genera are Musa, Strelitzia, Ravenala, and Heliconia. The species of the first three are found almost wholly in the Old World, those of the last named in the New. See PLANTAIN; BANANA; HEMP, MANILA.

MUSÆ′US (Lat., from Gk. *Μουσαῖος*, *Mousaios*). A legendary Greek poet, and personification of the powers of the Muses. His parents were said to be Eumolpus or Antiphemus and Selene, and in story he was closely connected with Orpheus, of whom he is variously called teacher, son, and pupil. He is especially associated with the Eleusinian mysteries, which he was said to have founded, and many poems apparently connected with this worship, or oracular, were attributed to him. He had no existence outside of legend. A later Musæus, who probably flourished about the end of the sixth century of the Christian Era, was the author of a very pleasing amatory poem, in Greek, entitled *Hero and Leander*, discovered in the thirteenth century, of which the first edition was published by Aldus Manutius about 1494; critical edition by Dilthey (Bonn, 1874). See HERO.

MUSA IBN NOSEYR, mōō′sȧ ĭb′′n nō-sīr′ (c.660-713). An Arab governor of Northern Africa, who gave permission to Tarik (q.v.) in 711 to make an expedition into Spain, which led to the Moorish conquest of the Peninsula. Musa, jealous of the success of his subordinate, crossed himself in 712 with an army of eighteen or twenty thousand men. He made conquest after conquest, but was checked in 713 by an order of the Caliph to repair at once to Damascus. He left immediately, his son Abdul Aziz taking command. When Musa arrived at Damascus he was deprived of his command, disgraced, and killed, while his son met his death in his palace at Seville, at the hands of a messenger from Damascus. Consult Burke, *History of Spain*, vol. i. (London, 1895).

MUSÄUS, mu̧-zā′u̧s, JOHANN KARL AUGUST (1735-87). A German writer, best known for his *Volksmärchen der Deutschen* (1782-86), a collection of tales blending genial humor, quaint fancy, and common sense. Musäus was born in Jena, March 29, 1735. He studied theology, became in 1763 tutor of pages at the Court of Weimar, and in 1770 professor at the Weimar Gymnasium. His literary career began (1760) with a successful parody of Richardson's *Grandison*. Then, after eighteen years' silence, he satirized Lavater's whimsical theories in *Physiognomische Reisen*. His sprightly and genial *Freund Heins Erscheinungen in Holbeins Manier* (1785) are interesting because they show the rising influence of Wieland. He died at Weimar, October 28, 1787, before completing *Straussfedern*, a series of tales. In 1788 appeared the clever skits *Moralische Kinderklapper*. Other posthumous writings were gathered in 1791 with a notice of Musäus by his pupil and relative, Aug. von Kotzebue (Leipzig, 1791). There is a *Life* by Müller (Jena, 1867).

MUSCÆ VOLITANTES, mŭs′sē vŏl′ĭ-tăn′tēz (Lat., flying flies). The term applied to floating grayish spots before the eyes. Whoever will look through a minute pin-hole in a card at the clear sky may see floating before his sight a number of translucent tubes or fibres, and many little beads, of which some are separate, some attached to the tubes, and some apparently within them. Some of the tubes or fibres are straight, others looped or twisted, and others again forked. All these objects are bright in the middle, and bounded by fine black lines. The doublings and crossings of the loops or knots in the twisted fibres appear as black points. Though the eye be fixed, these bodies change their position with greater or less rapidity. Now, in ordinary light and vision these objects are usually unobserved, though some persons can easily see them, especially when looking at a bright surface. They are caused by shadows cast upon the retina by cells which occur normally in the vitreous humor. They occur most often with errors of refraction and disturbances of digestion. They are of no importance whatever. After a sudden movement of the eyes they appear to settle downward. Fixed black spots, not moving at all while the eyes are motionless, are suggestive of actual disease and demand an ophthalmoscopic examination.

MUS′CARDINE (Fr. *muscardine*, *muscadin*, It. *moscardino*, *moscadino*, musk lozenge, from *moscato*, ML. *muscatum*, musk, from Lat. *muscus*, musk), or SILKWORM ROT (*Botrytis bassiana*). A serious fungous disease of silkworms. It consists of erect branching threads, with clusters of spores at the ends of short lateral branches. The spores germinate on healthy silkworms, especially those in the last stage before spinning their cocoons. They germinate also on the caterpillars of other lepidopterous insects, and on the common house-fly. Diseased worms die suddenly, become discolored, and are soon hard and dry. Within twenty-four to thirty-six hours their bodies may be covered with a whitish powder, the spores of the fungus. For the prevention of this disease absolute cleanliness in the breeding house is necessary; rooms should be cleansed and fumigated after an outbreak to prevent infection of the new brood.

MUSCAT, mŭs-kăt′. An old name for the Arabian State of Oman (q.v.).

MUSCAT, MUSKAT, or **MASKAT,** mŭs-kăt′. The capital of Oman, in Southeastern Arabia, situated on the Gulf of Oman (Map: Turkey in Asia (Arabia), T 11). It is fortified and has a good harbor, which makes it one of the most important commercial centres in Arabia, and the port for almost all the trade of Oman, amounting to over $5,000,000 annually. Though situated amid beautiful surroundings, it is poorly built and unclean, and its climate is very hot and unhealthful. The population is estimated at 40,000. Muscat is the seat of a British Resident and has been declared to be under British influence. In the sixteenth century Muscat was captured by the Portuguese, but was restored to the ruler of Oman in the seventeenth century.

MUS′CATEL (also *muscadel*, OF. *muscadel*, *muscadet*, Fr. *muscadet*, from ML. *muscatellum*, muscatel wine, diminutive of *muscatum*, musky odor, from Lat. *muscus*, musk). The name given to many kinds of sweet and strong French and Italian wines, whether white or red. Among the finest are the white Rivesalt and red Bagnol wines from Roussillon, the Lunel from the Pyrenees, and the Lacrymæ Christi and Carigliano of Naples. See WINE.

MUSCATINE, mŭs′kȧ-tēn′. A city and the county-seat of Muscatine County, Iowa, 210 miles west of Chicago; on the Mississippi River, and on the Chicago, Rock Island and Pacific, the Burlington, Cedar Rapids and Northern, and the Iowa Central railroads (Map: Iowa, F 3). It is built on high bluffs at a bend of the river; and among noteworthy features are the Musser Library (public), a soldiers' monument, and a high bridge across the river. The city carries on considerable trade in lumber and agricultural produce, being known especially for the watermelons grown on Muscatine Island, just below the city. It is an important industrial centre, its establishments including flour and oatmeal mills, pickle works, foundries and machine shops, rolling mills, sheet iron, boiler, and engine works, manufactories of various lumber products, lead works, potteries, button factories, box and packing case factories, brick and tile works, carriage and wagon shops, etc. Settled in 1833, Muscatine was incorporated first in 1839. The government, under a charter of 1851, subsequently amended by State special charter laws, is vested in a mayor, elected every two years, and a unicameral council, which controls important powers of confirmation and election in administrative offices. The police judge, treasurer, wharf master, assessor, and school board are chosen by popular vote. The city owns and operates the water-works. Population, in 1890, 11,454; in 1900, 14,073.

MUSCHELKALK, mụsh′el-kȧlk (Ger. shell-lime). The middle member of the Triassic or New Red Sandstone period in Continental Europe. In Germany the formation consists chiefly of limestones, which abound in the remains of mollusca; hence the name muschelkalk. The beds are of much economic importance, containing salt, marl, and gypsum.

MUSCI, mŭs′sī (Lat., mosses). The technical name of the group of plants known as mosses, one of the two subdivisions of bryophytes, the other being the Hepaticæ (liverworts). Mosses are adapted to all conditions, from submerged to very dry, and are most abundantly displayed in temperate and Arctic regions. They have great power of vegetative multiplication, new leafy shoots putting out from old ones, thus forming thick carpets and cushions. Bog mosses often completely fill up bogs or small ponds and lakes with a dense growth which dies below and continues to grow above. These quaking bogs or 'mosses' furnish very treacherous footing. In their depths the dead moss plants become slowly modified into peat.

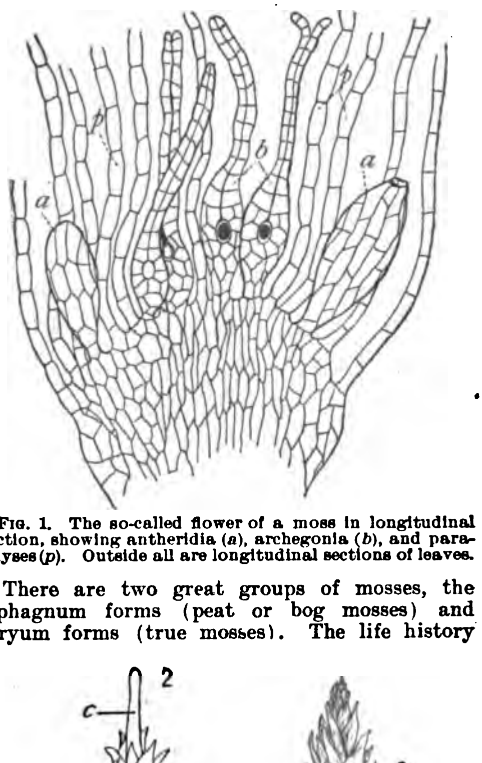


FIG. 1. The so-called flower of a moss in longitudinal section, showing antheridia (*a*), archegonia (*b*), and paraphyses (*p*). Outside all are longitudinal sections of leaves.

There are two great groups of mosses, the Sphagnum forms (peat or bog mosses) and Bryum forms (true mosses). The life history of a true moss shows a distinct alternation of generations (q.v.). When a spore germinates, there is first developed a small, green, thready

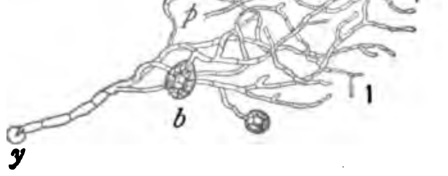
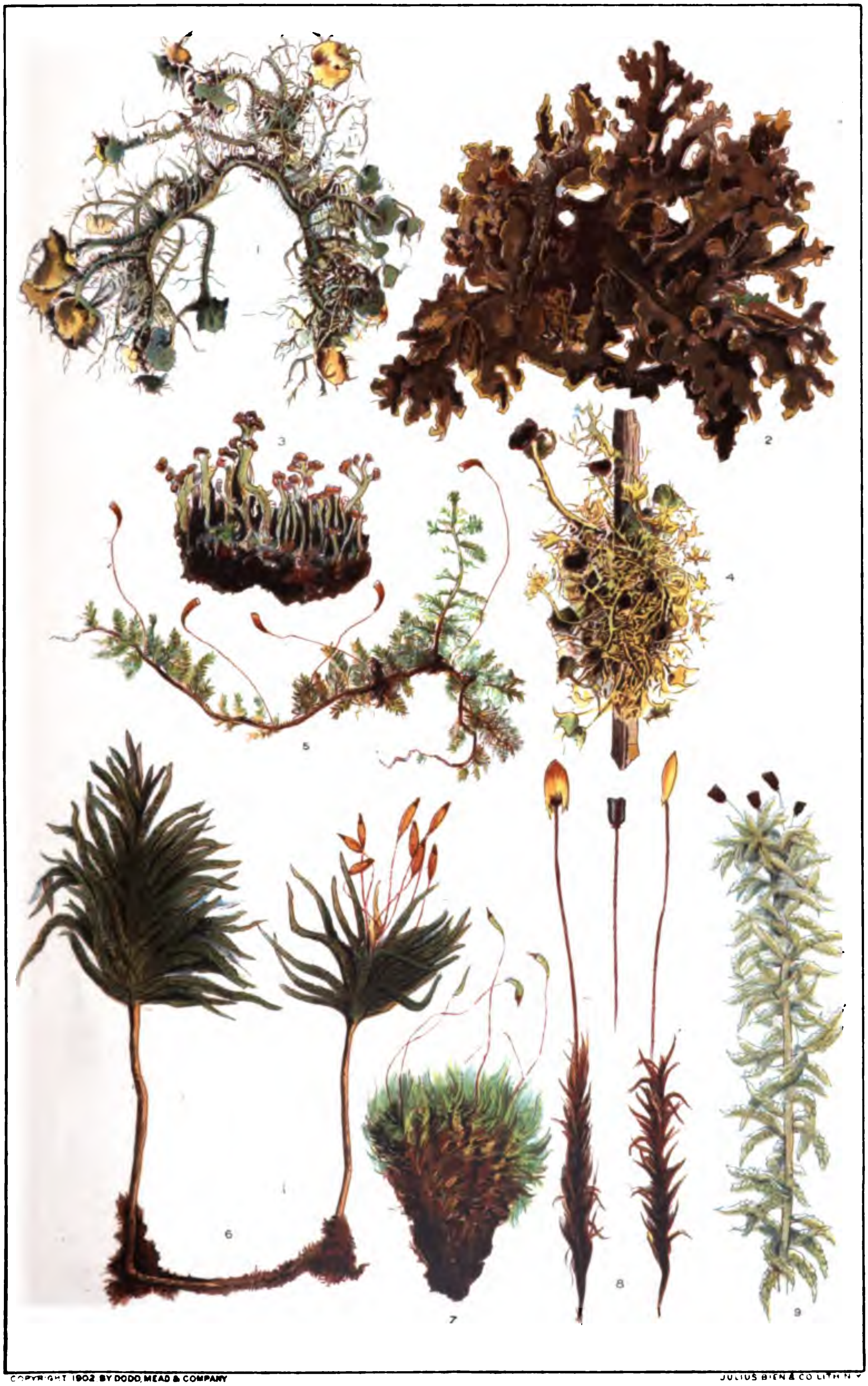


FIG. 2. 1, gametophyte, showing original spore (*y*), protonema (*p*), buds (*b*) which develop the leafy branches (*s*). 2, a young sporophyte (*c*) emerging from the leafy plant (*s*).

MOSSES AND LICHENS



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1 BEARD MOSS - USNEA BARBATA
2 SAFFRON-COLORED STICTA - STICTA CROCATA
3 CRESTED CLADONIA - CLADONIA CRISTATELLA
4 YELLOW EVERNIA - EVERNIA VULPINA
5 FERN MOSS - THUIDIUM RECOGNITUM
6 TREE MOSS - CLIMACIUM AMERICANUM
7 BROOM MOSS - DICRANUM SCOPARIUM
8 HAIR-CAP MOSS - POLYTRICHUM COMMUNE
9 PEAT MOSS - SPHAGNUM SQUARROSUM

body (protonema), upon which appear buds that give rise to the ordinary leafy moss plant. Upon this leafy plant the sex organs (antheridia and archegonia) are borne (Fig. 1), and hence it is the sexual phase (gametophyte) in the alternating generations. The sex organs produce a fertilized egg, which upon germination does not reproduce a leafy moss plant, but a structure of totally different character, namely a stalked spore-case (sporogonium), full of asexual spores, commonly called the moss 'fruit.' Since this sporogonium has no sex organs, it is the sexless phase (sporophyte) in the alternation. When these spores germinate they produce leafy moss plants (gametophytes) again, and so alternation continues. (See Fig. 2.) The spore-case (capsule) of an ordinary moss, generally pendent from a slender stalk (seta), is a very complicated structure. It is usually somewhat urn-shaped, with a little conical or flattish lid (operculum), which is thrown off when the spores are to be discharged. Often also the mouth of the urn is guarded by beautiful hair-like or tooth-like structures which converge toward the centre, and are collectively known as the peristome (around the mouth). Through the centre of the capsule there runs an axis of sterile tissue, called the columella; while capping the top of the capsule like a loose hood is the calyptra, which is the dead and ruptured female sex organ (archegonium) that has been carried up by the elongating sporogonium (Fig. 3). See BRYOPHYTES.

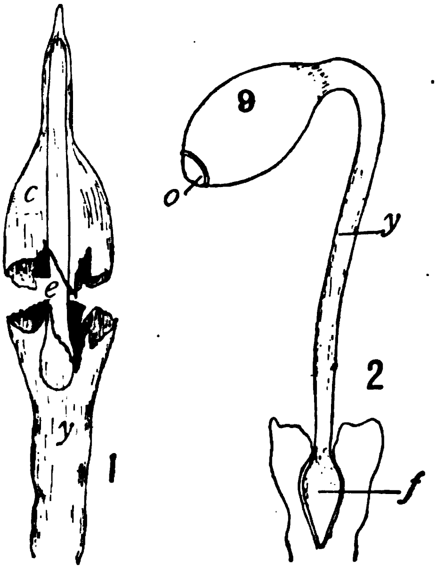
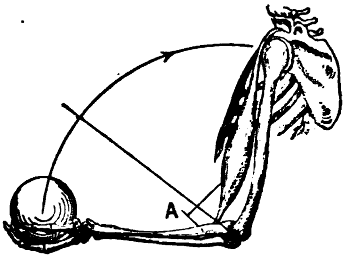


FIG. 3. 1, the young sporophyte (*e*) rupturing the bladdery archegonium and carrying up the upper portion (*c*) as a hood (calyptra). 2, mature sporophyte (sporogonium), showing foot (*f*), seta (*s*), capsule (*c*), and operculum (*o*). Both diagrammatic.

FOSSIL MOSSES. The earliest fossil mosses, Muscites, allied to the modern genus Polytrichum, are found in the Carboniferous rocks of Commentry, France. Throughout the Mesozoic formations fossil mosses are rare, though their existence during the Liassic is inferred from the presence in rocks of that age of a beetle of the genus Birrhus, which at the present time is known to live in mosses only. Fossil mosses are quite common in the Tertiary rocks and especially so in the amber.

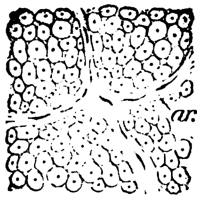
MUS'CIDÆ (Neo-Lat. nom. pl., from Lat. *musca*, fly). A family of dipterous insects comprising the typical or true flies. The bristle of the antennæ is feathery and the abdomen is smooth except for a certain number of bristles near the tip. The larvæ as a rule feed upon decaying animal or vegetable matter, more abundantly upon the former. The group comprises many species, and includes some of the most common and abundant forms, such as the house-fly, the horn-fly, and the stable-fly (qq.v.).

MUSCLE AND MUSCULAR TISSUE. While contractility is a property of all active, living protoplasm, it is in muscular tissue that this property reaches its highest development, the ability to contract along certain definite lines being the peculiar function of this tissue. Muscle tissue occurs in three different forms: (1) *Striated Voluntary Muscle.* This form of muscle is found in all those muscles which are under the control of the will, in fact all those which in the common use of the term are called 'muscles,' such, e.g. as the biceps, triceps, etc. (2) *Non-striated Involuntary Muscle.* This form of muscle occurs in the muscles which are not under the control of the will, those which carry on the automatic functions of life, such as the muscles of the intestine, which control its peristaltic action, or the muscles of the arteries and veins, which govern their contractility. (3) *Striated Involuntary Muscle* or *Cardiac Muscle.* This is a peculiar form of muscular tissue found only in the heart. It appears to occupy a sort of intermediate position between the other two forms.



A. BICEPS MUSCLE.

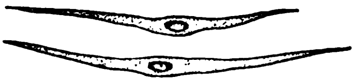
INVOLUNTARY MUSCLE IN LONGITUDINAL SECTION.



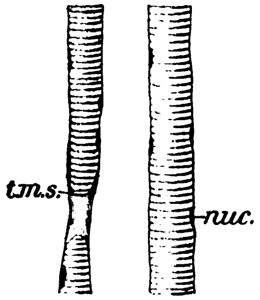
INVOLUNTARY MUSCLE IN TRANSVERSE SECTION.
Ar.t., areolar tissue.

(1) *Non-striated Involuntary Muscle.* This form of muscular tissue, while not occurring in any such large masses as does the voluntary muscle, has an extremely wide distribution. It forms the muscularis mucosæ and muscular coats of the gastro-intestinal canal, the muscular walls

of the arteries and veins, of the trachea and bronchi, of the larger ducts of glands, and occurs in the urinary tract, and in the male and female generative organs, etc. It consists of long, slender, spindle-shaped cells from .075 to .230 millimeter in length and from .004 to .010 millimeter broad. Its substance shows fine longitudinal markings. A delicate sheath or cell wall has been described and within this is the semi-fluid granular protoplasm of the cell body. In the centre of the latter lies a long rod-shaped nucleus toward each end of which a few fine granules are found. These cells are arranged in bundles, the individual cells being held together by a cement substance, the bundles being surrounded by more or less connective tissue. Blood-vessels ramify in this connective tissue where they break up into capillaries which form a network among the muscle cells. Nerves, mainly of the sympathetic system, pass to the individual muscle cells.

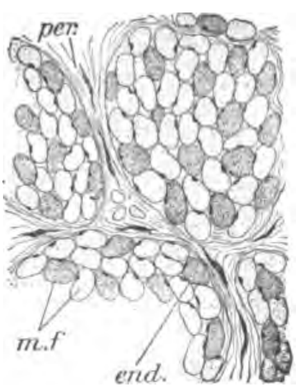


VOLUNTARY MUSCLE.
Smooth muscle fibres from the small intestine of a frog.

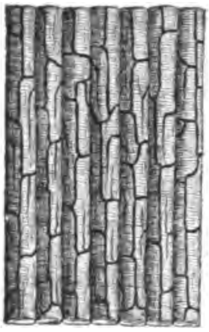


VOLUNTARY MUSCLE.
nuc., nuclei; *t.m.s.*, termination of muscular substance.

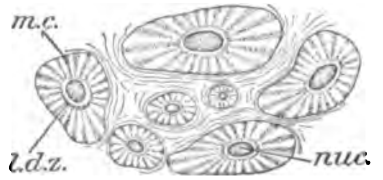
(2) *Striated Voluntary Muscle.* This form of muscular tissue constitutes the ordinary voluntary muscles of the skeletal system, and occurs in the pharynx, larynx, diaphragm, generative organs, etc. It is composed of long cylindrical fibres, each one of which represents a highly specialized development of a single cell. The muscle fibre consists of the muscle substance proper, the muscle nuclei, and an external sheath or sarcolemma. The muscle substance of a fibre shows a longitudinal striation which indicates its division into ultimate fibrillæ, while transversely it consists of alternate light and dark bands or disks. The light disk is crossed by a delicate dark line, the line or membrane of Krause. A light line across the dark disk (Hensen's line) has also been described, but is probably an artefact. The minute bit of muscular tissue separated off by Krause's line at either end and by the dividing line between the fibrillæ on each side is known as the 'sarcous element of Bowman,' while the appearance presented by the cross-cut ends of the fibrillæ composing a single fibre is called 'Cohnheim's field.' Each fibre is inclosed in a transparent, very delicate, but tough and elastic sheath, which cannot always be readily seen, but often shows distinctly, stretching between the separated fragments of a fibre which has been broken within it, its toughness and elasticity allowing it to resist a force sufficient to rupture its more brittle contents. This sheath is known as the sarcolemma or myolemma, the former term being derived from the Greek words *sarx* (flesh) and *lemma* (skin or husk), the latter from the Greek words *mus* (muscle) and *lemma.* Just beneath the sarcolemma, in the muscle protoplasm, lie the muscle nuclei. They are oval or spindle in shape, their long axes corresponding to those of the fibre. The individual muscle fibres are held together by a delicate connective tissue called the endomysium. The muscle fibres are bound together into bundles or fascicles by a coarser connective tissue, the perimysium, while the entire muscle is surrounded by a connective tissue sheath, the epimysium. In short muscles single fibres may extend the entire length of the muscle. In longer muscles the single fibres do not extend the entire length of the muscle, averaging 25 to 50 millimeters in length. Very long fibres, 100 to 120 millimeters long, are sometimes found. The fibres taper somewhat at their ends and terminate, if in the middle of the muscle, by a blending of the sarcolemma with the endomysium of the neighboring fibres; if in tendon, periosteum, or perichondrium, by union of the sarcolemma with the connective tissue. Striated muscle is extremely vascular. The larger vessels run in the perimysium, where they branch, and these smaller branches give off capillaries which form a rectangular meshed network among the individual fibres. The larger nerve trunks run in the perimysium, where they subdivide and send branches to the muscle fibres. Here they terminate in special 'end plates.' See NERVOUS SYSTEM.



VOLUNTARY MUSCLE IN TRANSVERSE SECTION.
m.f., muscle fibres; *end.* endomysium; *per.* perimysium.



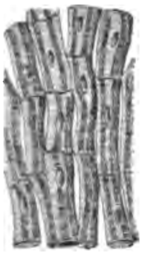
INJECTED VOLUNTARY MUSCLE.



SECTION OF CARDIAC OR HEART MUSCLE (striated involuntary muscle).
m.c., muscle columns; *l.d.z.*, zone of less differentiated sarcoplasm; *nuc.*, nucleus.

(3) *Cardiac* or *Heart Muscle* (*Striated Involuntary Muscle*). This is a type of muscular

tissue peculiar to the heart. It resembles the smooth involuntary muscle in being composed of nucleated cells. These cells are, however, much larger and broader than the smooth muscle cells, are more or less rectangular in shape, and send off lateral branches which join similar branches of neighboring cells, with which they are connected by cement substance. The cell protoplasm shows both longitudinal and transverse striations, but much less marked than in striated voluntary muscle. A cross-section of a cell gives somewhat the appearance of Cohnheim's field, but the fibrillæ show a more or less radial arrangement about the circumference. The nucleus is round or slightly oval in shape and is situated near the centre of the cell.


HEART MUSCLE.

DEVELOPMENT. Muscle is developed from the mesoderm or middle layer of the embryo. Smooth muscle cells are produced by a differentiation of mesodermal cells. Voluntary striated muscle is developed by a still further specialization of these mesodermal cells, the cell nuclei proliferating and longitudinal and transverse striations appearing in the protoplasm. In this way the cells become gradually transformed into the fibres of voluntary muscle. Heart muscle has the same derivation, and represents an intermediate stage of development between the more primitive smooth muscle cells and the more highly specialized striated muscle fibres.

MUSCLE-READING. The intuition of a person's thought by physical contact. Every complete mental process tends to 'issue' or 'express itself' in movement; the psychophysical organism is essentially a motor organism. In many cases these expressive or concomitant movements are involuntary, and unknown to their performer. It is often possible, by close attention to them, to get an inkling of the object or direction of the agent's thought. Some persons, indeed, have a peculiar aptitude for this 'muscle-reading,' or (as it has been wrongly termed) 'mind-reading,' so that they are able, by taking into account all the objective indications presented by the agent, to reproduce in somewhat surprising detail the course of his thought.

Muscle-reading was much in vogue a few years since as a drawing-room game. On the stage, it is customary for the 'mind-reader' to lay the hand of the subject upon his forehead, or to take the subject's hand in his own. By minute observation of the subject's involuntary movements, of his tremor or flush of excitement, etc., it is possible for the reader to guess, in many instances, the number of a watch, the place and character of a hidden object, etc.; the subject being completely unaware that he is giving any suggestion, and the suggestions themselves being unnoticeable to the audience. With the most successful mind-readers the process of observation has become habitual and therefore partly unconscious, so that they are unable to explain their *modus operandi*, even if they desire to do so. Their extreme fatigue, at the conclusion of a performance, indicates, however, that their attention has been under great strain.

This appreciation of unconscious movements and of vasomotor changes in the subject is sufficient to explain all the feats of mind-reading that are on record, surprising as some of these may appear. Consult: Jastrow, *Fact and Fable in Psychology* (New York, 1900); Preyer, *Die Erklärung des Gedankenlesens* (1886); and *Nineteenth Century*, xx. 867; *Forum*, xi. 192; *Popular Science Monthly*, x. 459, xxi. 634.

MUSCLE SENSE. A term used, in a wider signification, to mean "the sum total of the sensations which inform us of the condition of our motor organs" (Henri). This usage has its root in the theory that our chief reliance, in perceptions of the movements of our limbs, is upon the sensations set up in the voluntary muscles. Goldscheider has, however, conclusively proved that the perception of movement is mediated, not by sense-organs in the muscles, but by the sensory nerve-endings of the joints (articular sensations). Moreover, the definition proposed by Henri must include (or must tacitly ignore) visual sensations; for we undoubtedly derive a good part of our knowledge of movement by seeing our limbs move. There seems, then, to be no justification for retaining the term 'muscle sense' in the meaning indicated. If we wish to group together the sensations concerned in movement, to emphasize their functional conjunction, we may take Bastian's word 'kinæsthetic' sensations. The kinæsthetic "group of senses furnishes us with data for the perception of the positions and motions of our members and of the body as a whole, and plays a leading part in the perception of space. It includes some senses whose existence or efficiency is disputed (innervation sense and muscle sense), and others whose independence has only of late been generally recognized (joint sense and tendon sense). All are closely united with one another and with pressure and contact, and some are hardly ever dissociated except by disease" (Sanford).

The specific sensation of the voluntary muscle, 'muscular sensation' in the narrower sense, although it is of little functional import (except, perhaps, as the chief sense-basis of the feeling of muscular fatigue), is easily isolated by laboratory procedure. If the position of the arm be kept constant, so that there is no change of articular sensation, the cutaneous sensations ruled out by etherization, and an induction current passed through the body of a muscle, we get a dull, diffuse, vague sensation, which is localized in the substance of the arm. With high degrees of muscular contraction, the sensation takes on a dragging or grinding character, and presently verges on pain (q.v.). It is unquestionably a specific sense-quality, best described as a dull, dead pressure, and most nearly akin to (though by no means identical with) the pressure sensations obtained by lightly pressing a blunt object upon the cutaneous surface. When once known to introspection, it can be reproduced by mechanical stimulation (heavy pressure) as well as by electric current.

There is also a special tendinous sensation, mediated by the tendons which attach the voluntary muscles to the bones. This is the sensation of strain, which appears, e.g., when the
ar for a considerable time, when the
fi ched, etc. It is radically dif-
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m pressure (seemingly
id pressure) that comes

from the articular surfaces. It plays a large part in the perceptions of weight, resistance, etc., enters into the fatigue-complex of exhausting bodily exercise, and occurs in muscular cramp. Its variations do not necessarily run parallel to the variations of the muscular sensation, for very different degrees of muscular contraction are, obviously, compatible with one and the same amount of pull upon the tendons. Consult: Goldscheider, *Gesammelte Abhandlungen*, vol. ii. (Leipzig, 1898); Bastian, *The Brain as an Organ of Mind* (London, 1885); Henri, in *Année psychologique*, vol. v. (Paris, 1899); Titchener, *Experimental Psychology*, vol. i. (New York, 1901).

MUSCOGEE, mŭs-kō′jē. A town of the Creek Nation, Indian Territory, 154 miles north by east of Fort Worth, Tex., on the Missouri, Kansas and Texas Railroad (Map: Indian Territory, H 3). It is the seat of the Henry Kendall College (Presbyterian), opened in 1894, and is the headquarters of the United States agent for the Indians. The town is the commercial centre for extensive agricultural and stock-raising districts. Population, in 1900, 4254.

MUS′COVITE. A mineral aluminum-potassium silicate that crystallizes in the monoclinic system, and is the most common member of the mica group. Its usual color ranges from gray to brown, but it also occurs in different shades of green, violet, yellow, and sometimes rose-red. It has a vitreous lustre that is more or less pearly or silky, and its specific gravity is from 2.76 to 3. Muscovite is one of the essential constituents of granite, gneiss, mica-schist, and certain other rocks. It is widely distributed in nature, occurring most abundantly in Tyrol, Styria, on the Saint Gotthard, and elsewhere in Switzerland, as well as at Paris, Me., Grafton, N. H., Chesterfield, Mass., and numerous localities of North Carolina, in the United States. The fact that it has a cleavage parallel to the base, and is easily separated, forming thin elastic plates which are transparent to translucent, led to its use as the material for window-panes in Russia, whence its name of *Muscovy glass*, and to its extensive and similar use in stoves under the name of 'isinglass.' It is also employed commercially in wall paper, as a filler, in electrical machines as an insulator, and to a certain extent as a paint. See MICA.

MUS′COVY. A name formerly applied to Russia, whose capital down to the beginning of the eighteenth century was Moscow. The word is still used in ornate style.

MUSCOVY DUCK (corrupted from *musk-duck*). A large South American duck (*Cairina moschata*) in which the male is much larger than the female, and has fleshy wattles on the forehead and lores, and a crest of long feathers. This duck has long been domesticated in Brazil and in Europe, where it is especially in favor in Germany. In this country they are less esteemed, because of their quarrelsome nature and ability to harm one another or their companions in the poultry yard. Two varieties are recognized, 'colored' and 'white,' which are thus described in Howard's *Farmers' Bulletin*, *No. 64*, of the United States Department of Agriculture (Washington, 1897): The head of the colored muscovy is glossy black and white; the bill is dark-horn in color; eyes, brown; the back in color of plumage is lustrous blue black, which is sometimes broken with white; the color of the breast and body is the same as that of the back. The wing coverts are rich, lustrous green black, and the tail feathers may be either black or white, the latter being preferred. The thighs, like the tail feathers, may be either black or white, white being preferred; the shanks, toes, and webs vary in color from yellow to dark lead or black. The white muscovy in color of plumage is pure white throughout; feathers of any other color will disqualify the bird for show purposes. The eyes in the white variety are of a leaden-blue or gray color, while those of the colored are brown. The shanks, toes, and webs are of a pale-orange or yellow color. The standard weight of the adult drake is ten pounds; adult duck, eight pounds. The flesh is good and loses in cooking the musky odor of the living bird.

MUSCULAR FORCE, ORIGIN OF. This subject has occupied the attention of physiologists for many years, and numerous theories have been offered to explain the phenomena of muscular energy. The older observers, represented by Liebig, held that nitrogenous food went to build up and maintain muscular tissue and that energy was evolved in the splitting up (or oxidation) of this class of food, the waste being represented in the excreted urea. The non-nitrogenous foods (carbohydrates or starches, and fats), on the other hand, were supposed to be entirely devoted to the production of heat. Muscular work should therefore cause a distinct increase in the elimination of urea. But this theory is invalidated by the fact that the excretion of urea does not keep pace with the production of energy. Later observers have taken the opposite view, that force is generated by the oxidation of non-nitrogenous substances, and that the nitrogen constituents of muscle are rather to be looked upon as forming a part of the machine in which the former substances are burned than as constituting the fuel themselves.

It has been suggested by Herman that muscular activity depends upon the splitting up and subsequent re-formation of a complex nitrogenous body which he calls *inogen*. From the decomposition of this body there result carbon dioxide, sarcolactic acid, and a gelatino-albuminous body. Of these the carbon dioxide is carried away by the blood, and the acid and the albuminous substance, at least in part, go to rebuild the inogen. The other materials of which the inogen is formed are supplied by the blood. Of these materials oxygen and some carbohydrate substance form a part. The decomposition takes place both in resting and active muscle, but is much greater in the latter. This theory explains certain known facts of muscular metabolism; first, that muscle absorbs oxygen and gives off carbon dioxide during both rest and activity, and that increased exchange of these gases takes place during the latter condition; that this process is attended by the production of heat; and that muscle during rest produces nitrogenous crystallizable substances such as kreatin from the metabolism going on constantly during life.

For a full discussion of this subject, see Foster, *Textbook of Physiology* (New York, 1900), and Kirke, *Handbook of Physiology* (Philadelphia, 1902). See also article PHYSIOLOGY.

MUSCULAR SYSTEM, Evolution of. The muscular system comprises those tissues or masses of tissue which have the property of contractility and whose function it is to accomplish the movements of the parts or of the whole of the animal body. Contractility is one of the properties of simple protoplasm. Thus, the amœba progresses by the extension of some portion and the contraction of other parts of its body. The cortical layer of Paramœcium is a specially contractile region in the protoplasm. In the Stentor and the stalk of Vorticella there are protoplasmic differentiations that resemble muscle fibres.

Many of the outer-lying ectoderm cells of Hydra show considerable differentiation; they are conical in shape with the broad surface outward. On this external surface a thin, cuticle-like layer has been demonstrated. Internally the cell ends in a contractile basal portion or process which lies parallel to the long axis of the body of the hydra and between the ectoderm and entoderm. The whole of these cells are contractile, but the long processes are specially so. These processes were formerly known as 'neuro-muscular,' but with the discovery of special nerve cells, the muscular function alone must be conceded to them. Like the muscle cells of vertebrates they contract when properly stimulated. Here then are ectodermic muscle cells, the entire protoplasm of which, like that of the amœba, is irritable and contractile, but with a portion of the cell more clearly set apart to perform the contractile function than in any protozoan. In the jelly-fishes, such as Aurelia, a muscle cell is likewise composed of two parts: a contractile portion (which shows cross striations), and, attached to the striated portion, a protoplasmic, non-differentiated, non-contractile portion which may bear cilia on its external surface. This muscle-bearing epithelium is arranged in a bundle or ring around the edge of the sub-umbrella. It is the contraction of this muscular zone that propels the jellyfish through the water. In the tentacles and about the lips unstriated muscle-fibres occur. The contraction and extension of the body of the sea-anemone, as well as of its gullet and mesenteries, and its ability to move slowly from the point of attachment, are accomplished by means of a well-developed muscular system. This consists of bands of longitudinal muscle fibres which run on the mesenteries from the base to the disk; of parietal muscles which pass obliquely across the lower and outer angle of the mesentery; and of a thin sheet of transverse muscles. The contraction of the longitudinal muscles draws the animal toward the base, and that of the transverse muscles causes the contracted animal to extend again. A band of circular muscles at the junction of column and disk causes the disk and contracted tentacles to be inclosed within the body of the anemone. In addition to the bands of muscles, scattered fibres occur both in the body wall and in the gullet, which consist partly of spindle-shaped, nucleated fibres, and partly of such striated muscle processes as occur in Hydra. The latter are mostly found in the transverse muscles of the body and the tentacles, and are of entodermal origin, as also are the muscle bands of the mesenteries. Other longitudinal muscles are of ectodermic origin. Some of the muscles, however, sink so far down into the middle layer or mesoglea as to seem to belong to it alone. This is significant because all the musculature of animals above the cœlenterates lies between the ectoderm and entoderm.

The musculature of flatworms falls under two groups: (1) the dermal musculature, and (2) the dorso-ventral musculature. The dermal musculature lies either under the basal membrane of the epidermis or under the cuticle. It is composed of distinct layers. In each layer all the fibres run in one and the same direction. There are longitudinal muscles, transverse and diagonal muscles. The musculature is stronger on the ventral creeping surface. In cestodes the diagonal layer is replaced by a second circular layer. The dorso-ventral musculature runs from the dorsal to the ventral surface, and is much displaced at sexual maturity by the male and female germ-glands. Below the cuticular layer of roundworms there is a well-developed muscular layer in the form of a tube, and composed of outer circular fibres and inner longitudinal ones. This muscular tube effects the writhings and undulations of the body. As in the cœlenterates, the muscle element is composed of a single cell, made up of a protoplasmic (often glandular) portion and a fibrillar part. The fibrillæ rarely show any evidence of cross striation, the lateral lines are free from muscle fibres, and the longitudinal sheet is thus broken up into bands.

The muscular system of mollusks is also well developed. The muscle fibres, both of bivalves and gastropods, are all of the unstriated sort, because of the slow movements of the animals. These fibres occur usually in distinct bands or sheets, and frequently are combined for greater power to form very large muscles, such as the two abductors of Anodonta, which close the shell. Other important muscles are those of the foot, including two protractors and one retractor; and in the snail those that work the radula of the mouth, the retractors of the horns and penis, and those that pull the head into the shell. The muscles are fastened to the shell, upon which they make certain distinct markings at the points of attachment, called 'scars.'

The musculature of segmented worms, like that of the roundworms, is composed of a dermo-musculature tube which is composed of an outer circular and an inner longitudinal layer of fibres. The fibres are in the form of bands. The pharynx, mouth, gut, parapodia, and septæ have special muscle fibres. In leeches, in addition to the circular and longitudinal bands of muscle fibres, there are bands reaching diagonally from the dorsal to the ventral surface of the body.

Among arthropods the musculature of the Crustacea is well developed and very complex, but there is little evidence remaining of the dermo-muscular tube of worms. It is assumed that the dorsal and ventral pair of longitudinal muscles correspond to the four similarly situated bands of muscle in the Polychæta. Perhaps traces of the circular musculature of annelids are found in the muscles that are attached to the basal parts of the appendages on the one hand, and to the integument of the body on the other. Certainly the firmer exoskeleton makes greater localization of the musculature possible. In the limb-bearing portion of the abdomen and the thorax there are paired dorsal and ventral muscle bands. In the limbless part of the abdomen there is a thick layer or tube of longitudinal muscle fibres, interrupted at each septum by the connective tissue that separates the myomeres. Thus the muscle itself is separated into myomeres. The abdomen is bent upward, downward, or sidewise by the contraction of the muscle fibres in the corresponding portion of the body. The appendages are moved by muscles that pass out into them from the trunk. The muscles are either attached to the cuticular outer covering or to inward projecting parts of it, and often terminate in sinewy pieces that are white and are composed of bundles of cross-striated fibres—the kind of fibre that characterizes all rapidly moving muscle. In Peripatus, however, the muscles are unstripped, save those which work the jaws. In insects, the thorax and metathorax, as in the case of the grasshopper, are crowded with leg and wing muscles. In the cockroach, where the wings are little used, the wing muscles are poorly developed.

The musculature of Amphioxus, like that of the abdomen of Crustacea, is divided into metameres. Of these muscular segments or myomeres there are about sixty, V-shaped on surface view, with the apex of the V extending forward. The myomeres are composed of striated muscle fibres which extend longitudinally and are attached to the septæ immediately in front and behind them. The myomeres of the two sides alternate. The musculature of the dorsal wall is the thicker.

In cyclostomes, as well as in Amphioxus, the muscles of any myomere are attached to the anterior and posterior myocomata of that segment. In selachians a significant change has occurred—the first step toward the complicated conditions of higher vertebrates. Certain of the ventral lateral muscles on either side of the median line become differentiated from the others, in that their fibres move out from the general level in correspondence with their greater functional activity. Thus while the dorsal trunk muscles retain their primitive character, the ventral muscles have become separated into two masses: a pair of strong mid-ventral ones which are known together as the rectus abdominis, and the remaining muscular mass. We next find that in this latter mass the direction of the muscle fibres, which in Amphioxus and cyclostomes is horizontal, has become in selachians oblique; so that, from the mid-ventral line, they pass dorso-posteriorly. The remaining less differentiated portion of the ventral musculature is known as obliquus abdominis, or oblique abdominal muscle. Two kinds of changes have now occurred in the vertebrate musculature: (1) There is the functional differentiation of parts of muscles by which they become cut off from the remainder, and (2) changes in the direction of muscle fibres by which originally axial muscles have become oblique. In the lowest vertebrates the anterior and posterior ends of muscles are attached to the adjacent myocomata. With the development of ribs from the fibrous tissue of the myocomata, muscular attachment has, in part, fallen upon them. The derma, indeed, is differentiated from the same tissue as the myocomata; hence it is not surprising that, in the migrations on the ends of muscles to adapt themselves to the new conditions, we find that some muscles are attached to the derma. Finally, some muscles, whose ends come thus to lie outside of the myomeres, may extend alongside of several somites without signs of metamerism. Thus, by these simple modifications, we gain the complex musculature of the higher vertebrates, where there are trunk muscles of different sizes and lengths, often without metamerism and attached to bony parts such as ribs, or to the skin. In Amphioxus the myomeres are arranged with reference to the sagittal plane from which they extend obliquely outward and backward. In cyclostomes the obliquity is so great that the myomeres overlap each other like the shingles on a roof, so that a cross-section of the body may cut three or four myocomata on each side. In many fishes the free edge of the myocomata, as it appears at the surface, is not merely bowed, but is zigzag.

The most typical condition of the amphibian musculature is shown in Urodela. The dorsal lateral muscles retain most nearly the fish-like condition and lie in metameres. When the ribs and transverse processes of the vertebræ become developed some of the muscles gain attachment to them, and thus give rise to the intercostal and intertransversal muscles. The ventral lateral muscles of fishes are disposed in two regions. In Amphibia they comprise four regions, derived from a migration and splitting of the two lateral muscles of fishes. In addition, lying under the internal oblique, there is a muscle that probably has no representative in fishes. It is unsegmented and lies deeper than the skeleton and immediately within the peritoneal lining of the body cavity. The Anura differ from the Urodela chiefly in the absence of the transversal abdominis, and in the diminution or disappearance of myocomata in the adult.

In reptiles, as in Amphibia, the dorsal musculature retains more nearly the primitive condition. With the ossification of the skeletogenous tissue and the consequent attachment of the muscles to the bone, has come about the differentiation of the so-called interspinales, semispinales, intertransversals, longissimus dorsi, and others. The last-named muscle is to be regarded as a part of the dorsal musculature that has lost its metamerism, and now passes from the pelvic girdle to several of the spines of the thoracic vertebræ. The ventral musculature has become still more complicated, due, according to Wiedersheim, to the changed rhythmic method of respiration, controlled through the more and more greatly developed lungs. To meet the needs of respiration the ribs must be moved. The muscles which perform this function have become more powerful in that the ribs have become buried in them. The musculature of successive myomeres, which projects outside or inside the ribs, becomes united into a single sheet. With the disappearance of the ribs in the lumbar region of reptiles a modification of the intercostals must take place. A continuous muscle is developed between the last rib and the pelvis.

The phylogeny of many of the muscles of mammals is not known. The more important muscles resemble those of reptiles.

Two kinds of muscular fibres are found in the vertebrate body. All the quickly moving voluntary muscles are composed of striated fibres. The involuntary muscles are unstriated. The muscle fibre of vertebrate muscle, like that of invertebrates, is formed by the differentiation of a muscle cell. Only in the muscle cell of the lower invertebrates a much smaller portion of the cell is transformed into fibre structure than is the case in vertebrate muscle fibre. The differentiated portion of vertebrate muscle fibre is composed of fibrillæ and forms the main bulk of the cell. The fibrillæ are imbedded in the undifferentiated

entiated part, which also surrounds them in the form of a sheath and contains the nuclei.

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MUS'CULUS, Wolfgang (properly Müslin) (1497-1563). A German reformer and theologian, born at Dieuze in Lorraine. At fifteen he entered a Benedictine cloister at Lixheim, but left it fifteen years afterwards, having been turned to Protestantism by Luther's writings. In 1531 he became pastor at Augsburg, and for seventeen years was prominent in that city. Musculus was long an eager partisan of union between the Lutheran and Reformed churches and took part in the Wittenberg Agreement (1536), and in the colloquies of Worms and Ratisbon (1540-41). At the time of the Augsburg Interim (1548) he went to Switzerland, and in 1549 became professor of theology at Bern. His views were more strongly Calvinistic in his later years, and with Calvin and Vermigli he may be reckoned as a leader of the sixteenth-century Reformation. Consult Grote, *W. Musculus* (Hamburg, 1855).

MUSÉE SOCIAL, mụ'zā' sō'syȧl' (Fr., Social Museum), The. An organization whose object is to furnish the public with information regarding movements having for their aim the improvement of the moral and material situation of the laboring classes. It resulted from the interest in the social science exhibition at the Paris Exposition of 1889, but was not formally inaugurated until March 25, 1895. The Comte de Chambrun has given the institution an endowment of over 2,000,000 francs. Special collections of all matters pertaining to labor, trades unions, old-age pensions, housing reform, etc., are made and indexed for ready reference. Studies of labor conditions in various countries have been undertaken, and the results published in monographs. Although young, the Musée has proved of great usefulness. It was very active in preparing the excellent exhibit of social economy in the Exposition of 1900. The more important publications of the Musée are contained in the *Bibliothèque du Musée Social*. It issues a small monthly 'circulaire' containing general matter pertaining to labor.

MUSES (Lat. *Musa*, Gk. Μοῦσα, *Mousa;* connected with μανία, *mania*, madness). In Greek mythology, the inspirers of song and music. In the Homeric epic their personality and number are vague, the poet now invoking but one Muse, now a number; only in a very late passage in the Odyssey are nine mentioned. In the *Theogony* of Hesiod the canonical number, nine, and names appear. Originally probably nymphs of fountains on Mount Olympus, they seem to have been worshiped first in Pieria, whence the cult spread southward and established itself on Mount Helicon at Ascra, and in Thespiæ. We also hear of shrines at Delphi and at Athens, both on the Ilissus and on the Museum Hill, which thus obtained its name. There are grounds for believing that, like the Charites and Horæ, the Muses were originally three, but nine was their number on Helicon, and this became universally accepted, as well as the tradition that they were the daughters of Zeus and Mnemosyne (Memory). In art the Muses are frequently represented. On the François vase, an Attic work of the early sixth century B.C., they appear at the marriage of Peleus and Thetis, with Calliope playing on a Pan's pipe at the head. Later artists used them freely, especially in connection with Apollo, or the mythical poets Orpheus and Thamyris. On the basis by Praxiteles at Mantinea they are represented as present at the contest between Apollo and Marsyas. It is to be noted, however, that while there is a tendency to develop definite artistic types for some of the figures, the division of the several branches of poetic art among the Muses and the adoption of fixed attributes to distinguish them is a product of a comparatively late period in the Roman Empire. Even the Hesiodic names did not designate the functions of the Muses, and in the popular usage seem to have been but little employed. The functions of the Hesiodic Muses were thus assigned in the later writers: Clio, history; Calliope, epic poetry; Polyhymnia, the pantomime; Euterpe, music of the flute; Terpsichore, melic poetry and the dance; Erato, the choral lyric; Melpomene, tragedy; Thalia, comedy; Urania, astronomy. Some variations in this classification are found. Consult: Deiters, *Ueber die Verehrung der Musen bei den Griechen* (Bonn, 1868); Bie, *Die Musen in der antiken Kunst* (Berlin, 1887). See also the articles on the individual Muses.

MUSES' LOOKING-GLASS, The. A play by Thomas Randolph published in *Poems with Muses' Looking-Glass and Amyntas*, 1638. It was performed some time earlier at Cambridge, and is mentioned by Sir Aston Cokain as the "Entertainment." It consists of witty dialogues between personifications of the vices and virtues in the presence of two Puritans, and shows the influence of Ben Jonson on the author. An altered version, entitled the *Mirrour*, appeared in 1758.

MUSEUM (Lat. *museum*, from Gk. μουσεῖον, *mouseion*, temple of the Muses, place for study, museum, from Μοῦσα, *Mousa*, Muse). An institution for the preservation, study, and exhibition of objects of art or those of natural origin. The term was originally applied to a place or temple sacred to the Muses, but a little later was bestowed on institutions for the pursuit of the higher branches of learning, such as art and philosophy, the first recorded use of the word for this purpose being the famous *Museum* of Ptolemy Soter at Alexandria. The application of the word to institutions for the preservation and exhibition of works of art or specimens of natural history is comparatively recent, as are the institutions themselves, and seems to have come into vogue with the systematic gathering of objects for public exhibition. Such collections were originally known as cabinets; and while the term was to some extent restricted to small private collections, it was also given to many of very considerable size, such as the State Cabinet of Natural History at Albany, N. Y.

The germ of the modern museum has been thought by some to lie in votive offerings placed in pagan temples or deposited in churches, and in objects of sacred or historical interest preserved in churches and monasteries. And it may be said that one of the earliest references to the preservation of specimens of natural history is the account of the skins of what are now supposed to have been gorillas brought home by Hanno and presented by him to the Temple of Astarte in Carthage. Museums of art and of natural history had their origin in collections made by the rich and powerful without at first a more definite purpose than to gratify their own pleasure or curiosity. Somewhat later men of science gathered material to further their own special lines of research, and many of these private collections eventually developed into public museums. Thus some of the national museums of Europe had their beginnings in collections made by former sovereigns, while the British Museum grew out of the cabinet and library of Sir Hans Sloane. The Ashmolean Museum, at Oxford, England, was the result of the labors of Elias Ashmole, who began collecting in 1667, while the Museum of the Royal College of Surgeons, London, is based on the anatomical material gathered by the famous surgeon John Hunter, and the Hunterian Museum of the University of Glasgow was founded by his brother, William Hunter. It may be of interest to note that the exploration of America did much to promote the growth of museums and that the cabinets of Sloane and Ashmole, particularly the latter, comprised many specimens from the New World. Incidentally, too, public houses may be credited with some slight share in the development of museums; for, in England at least, they formed small collections of curiosities to attract visitors, and Artedi, in his work on fishes, mentions three taverns where he had seen specimens of American fishes. Directly related to these, and representing another stage in the development of museums, was the establishment of miscellaneous collections, more or less scientific in their nature, to which visitors were admitted upon the payment of a fee. President Adams mentions a collection of this sort in Norwalk, Conn., formed by a Mr. Arnold prior to the Revolution, but the best of the type in this country were those of the Peales in Philadelphia and Baltimore. Two noteworthy foreign collections were those formed by Sir Ashton Lever, at Manchester, in 1775, and by William Bullock somewhat later at Liverpool. These were eventually taken to London, where they flourished at different periods, and their importance may be inferred from the fact that when these collections were sold various foreign museums sent representatives to attend the sale. Such large private establishments were the immediate precursors of our present State or governmental institutions. These represent the general acknowledgment of the value of museums, and are held to mark a stage in the progress of civilization beyond that of the art gallery or library, since the development of science is far later than that of art or literature.

Great public museums are of comparatively recent date, for while Bacon in his *New Atlantis* outlines such an institution, the establishment of the British Museum in 1753 was the first realization of this idea. In 1789 France transformed a royal into a national collection by opening the Louvre to the public, but the United States did not formally establish a national museum until 1876, although it practically came into existence in 1846, when the Smithsonian Institution was made the custodian of the national collections. The influence of the many expositions held during the latter half of the nineteenth century on museums has been very great; the construction of a building for the United States National Museum was a direct result of the Centennial Exposition of 1876, and the Field Columbian Museum, Chicago, owes its origin to the exhibition of 1893. The South Kensington Museum in London, the Ethnological Museum of the Trocadero in Paris, and the Glasgow Art Gallery and Museum are largely due to similar causes.

The development of museums has not merely been in their size and number, but in their scope and functions as well. Originally the specimens exhibited, especially in museums of natural history, comprised the greater or more important portion of the collections, and were mainly for the benefit of men of science. The modern plan is to restrict the number of pieces on exhibition and to select for this purpose those of the greatest educational value; the bulk of material is placed in the reserve series, and is kept thus not merely for study, but for its better preservation, since light is one of the greatest enemies of museum specimens. The constantly increasing size of collections has had something to do in shaping this policy, but it is largely the result of a recognition of the fact that, so far as the general public was concerned, the educational influence of museums depended more on the quality of the things exhibited than on quantity. This has led to careful study of the best methods of arranging and labeling objects on exhibition and so displaying them that they may attract and interest even the casual visitor. No man probably had more to do with bringing about this state of affairs than the late Sir William Flower, Director of the Museum of the Royal College of Surgeons, and subsequently of the British Museum, while in the United States Dr. G. Brown Goode (q.v.) stands preëminent among those who have been most instrumental in making museums instructive to the public. There has been a corresponding evolution in the publications issued by museums, in making them of interest to the general public and not restricting them to papers of a technical nature. We have seen that private collections were formed not only for the preservation of material, but for its study, and this led to the publication of information thus acquired. The germ of museum publications, however, is to be found in the illustrated descriptive catalogue of small private 'cabinets.' The oldest of these works is that issued by Gesner in 1565, describing one of the first systematic collections, that of Johann Kentmann of Dresden. Public museums have followed the same path as private collectors; and while, like individuals, their publication was at first through the medium of scientific societies, the tendency is for museums to become their own publishers. As the transfer of great collections from private to public ownership made them accessible to a greater number of students than before, this in turn has led to the issuing of memoirs by other than regular members of their staff. Many museums also issue guide-books, hand-books, or articles of a somewhat popular nature relating to their collections, and in line with this are courses of lectures on topics illustrated in the various departments of the institution. The steady trend of museum development has been in the line of extending their educational influence and making them of value to the many instead of to a favored few. Dr. Goode summed up the objects of museums as record, research, and publication; the preservation of material, its study, and the publication of information in the shape of books, and the spread of knowledge by the display of specimens. In a broad way museums may be divided into museums of natural history and museums of anthropology, the former including all natural objects, the latter man and his works. Following Dr. Goode, they may be classified under the following heads: museums of art, natural history, history, anthropology, technology, and commerce. Or, following the same authority, museums may be classed according to their purposes as national, local, provincial, or city; college, or school; professional, or class museums, and museums of special research.

The collection of art museums in modern times began in Italy, where in the fourteenth century the rulers and the nobility began to make collections of coins and gems. Busts and statues were added later, and it was not until the seventeenth century that pictures and drawings were also introduced. The oldest important collections on record are those brought together by Cosmo de' Medici (1389-1464), which form the basis of the present Florentine collections, of which the most important are the Uffizi and Pitti galleries, and the Museo Nazionale. The Vatican (q.v.) collections trace their origin to Pope Julius II. (1503-13); besides these the principal museums of Rome are the Museo Nazionale and the Museum of the Lateran. Probably the equal of these in the wealth and diversity of its collection is the Louvre (q.v.), the National Museum of France, situated in Paris, which also contains the Musée de Cluny, and the Luxembourg (q.v.). The most important provincial cities of France also have museums, devoted chiefly to painting. In Germany the chief collections are the Royal Museums of Berlin, Dresden, and Munich, and the Germanic Museum at Nuremberg. In England the British Museum (q.v.) is by far of the greatest importance. Austria has the Imperial museums of Vienna. The cities of Italy, notably Venice, Milan, and Naples, have national or municipal museums of importance. The Prado Museum in Madrid is the most important in Spain, which has some provincial museums, notably at Seville. The chief museum in Russia is the Hermitage at Saint Petersburg. In the United States the Metropolitan Museum of Art, New York; the Boston Museum of Fine Arts; and the Corcoran Gallery, Washington, are among the more noteworthy. The United States is perhaps the only great nation without a national gallery.

The museum of natural history covers a wide field and includes many branches, any one of which is capable of separate treatment. Thus there are museums of zoölogy, botany, geology, paleontology and mineralogy, or paleontology may be included as a part of a zoölogical, geological, or anatomical museum. The natural history collections of the British Museum constitute the largest and most celebrated museum of natural history in the world, while other famous collections are those of the Jardin des Plantes, Paris, and those of Vienna, Leyden, and Berlin. The most important museums of natural history in the United States, all of which have been extended beyond the province indicated by the name, are the collections of the Smithsonian Institution at Washington, the American Museum of Natural History in New York, and the Museum of Comparative Zoölogy at Cambridge, Mass.

Historical museums are for the preservation of objects illustrating the history of any country, place, or period, or the development of some special subject, and here it may trespass on the province of the museum of art or of technology. Historical collections form a branch of the United States National Museum, but there are many local collections. The National Museum, Munich, is an example of a general historical museum; the Cluny Museum, Paris, is devoted to a single period; the Naples Museum tells the story of Pompeii; while the Guimet Museum, Paris, illustrates the history of religious ceremonial, and the Museum of Artillery, Paris, traces the development of weapons from the rude axe of the Stone Age to the modern rapid-fire gun. Anthropological museums, in the widest sense, treat of the history of man and his relations to the universe about him. This calls for illustrations of his various activities, so that an anthropological museum may comprise art and historical collections, although these are usually treated separately. The physical characteristics of man, his clothing, weapons, ceremonial objects, household furniture, methods of transportation and of shelter are the subjects most commonly illustrated. Ethnology is that branch of anthropology which deals with the characteristics, occupations, arts, and industries of the races of men as distinguished from one another. Archæology treats of the history of ancient man, and sections of a large museum or an entire museum may be devoted to the illustration of either of these subjects. The Department of Anthropology of the United States National Museum is very extensive, and so is that of the American Museum of Natural History, New York. The Peabody Museum of Archæology and Ethnology, Cambridge, Mass., is particularly rich in American antiquities, and so is the Archæological Museum of the University of Pennsylvania. Abroad there are important anthropological museums in Berlin, Dresden, and Munich; the Trocadero, Paris; and the Pitt Rivers collection at Oxford, the latter being specially arranged to illustrate the development of the arts.

Technological museums deal with various phases of the industrial arts. They display specimens of the raw materials that enter into the composition of a given product, trace the various processes to which these are subjected, show the tools or machinery by which they are manipulated, and finally the finished object or substance. The subjects for technological museums are almost endless; ship-building, spinning and weaving, dyestuffs, drugs, foods, and electric apparatus naturally suggest themselves. The South Kensington Museum (now the Victoria and Albert), London, contains the largest technological collections of any institution. This is now under the charge of the National Board of Education, and its influence is not confined to London, for a part of its work consists in lending carefully selected collections to local museums and technical schools in other portions of Great Britain. In America, the United States National Museum and the Field Columbian Museum, Chicago, have important technological sections, the former having much material illustrating the development of electrical apparatus, while the latter is rich in objects showing the growth of methods of transportation by rail. The Army Medical Museum, Washington, while devoted to the subject of the structure of man, the effects of injuries and diseases, and their treatment, is a technological museum in so far as it traces the development of surgical appliances. Commercial museums are devoted to advancing the interests of trade. They exhibit raw materials and finished products, illustrations of methods of packing and modes of distribution, and gather and furnish information as to prices and character of goods needed in and furnished by different countries. Laboratories for the analysis of various substances and the testing of materials form part of the equipment of such an institution. The Musée de Mille, Ghent, is one of the oldest European commercial museums. The Commercial Museum, Philadelphia, is the sole institution of its kind in the United States.

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MUSEUM PEST. Any one of several species of insects which feed upon the prepared and mounted skins of birds, mammals, reptiles, and upon dried collections of insects and other animals preserved in museums. Perhaps the most abundant and injurious of the museum pests are the beetles of the family Dermestidæ. (See DERMESTID BEETLES; see also BACON BEETLE and CARPET BEETLE.) Others of these insects are the larvæ of small moths of the tineine series. Some of the common clothes moths (q.v.) are museum pests which, possibly originally feeding upon skins, have come to feed upon fabrics made from animal substances, such as wool or hair. One of the most injurious of this group is *Tinea pellionella*, which is one of the case-making clothes moths. Other substances stored or displayed in museums are attacked by other insects: the larva of a little geometrid moth, known as *Carphoxera ptelearia*, feeds on dried plants stored in herbaria; and the allied *Acidalia herbariata*, as its name indicates, has long been known to injure herbarium specimens in Europe, but is on the whole more injurious in herbalists' shops than in museums. Some of the dermestid beetles will even injure the horns of large mammals, and the bones as well, provided they are not thoroughly poisoned. A museum room once thoroughly infested with these creatures can be most readily freed from them by fumigation with bisulphide of carbon or hydrocyanic acid gas.

MUSH, mōōsh. The capital of a Sanjak in the Vilayet of Bitlis, Asiatic Turkey, on the eastern branch of the Euphrates, 80 miles south of Erzerum (Map: Turkey in Asia, J 3). It occupies an elevation at the entrance to a mountain ravine on the south side of a fertile wheat, vine, and tobacco growing plain. The town is noted for its uncleanliness and has few good houses. It is the see of Roman Catholic and Gregorian bishops, and has an American mission with Protestant schools. There is an active trade in the agricultural products of the district, and embroidered caps are manufactured. It has historical reminiscences of Xenophon and of Moses of Khorene, the historian. In the vicinity at Sasun occurred a terrible massacre of Armenians by the Turks in 1894. Population, about 27,000, one-half being Armenian Christians.

MUSHROOM (OF. *mouscheron*, *mouseron*, from OF., Fr. *mousse*, moss, connected with AS. *mēos*, OHG. *mios*, *mos*, Ger. *Mies*, *Moos*, OChurch Slav. *mŭchŭ*, Lat. *muscus*, moss). The popular name of edible fungi of the order Hymenomycetaceæ, especially species of Agaricus and Morchella. The name toadstool is generally applied to species which have an umbrella-shaped cap. The common idea that all such are poisonous is erroneous, because some of the most highly prized species have this habit of growth, and perhaps most of the others are not injurious. The mushroom as it is generally seen is only the fruiting body of the fungus, which arises from a more or less matted mycelium, or 'spawn.' The mycelium or vegetative part consists of numerous slender white threads running in every direction through the soil. Upon these threads small knots develop, increase in size, and finally appear as the ball-like or button-like young mushrooms, which consist of a stalk, terminated by a cap or pileus, bearing upon its under side numerous thin spore-bearing plates or gills radiating from the centre or attachment of the stalk. Near the top of the stalk is a more or less perfect ring (annulus), the remnant of the delicate veil (indusium) that covered the gills during the button stage, but ruptured as the mushroom grew.

The common mushroom (*Agaricus campestris*), one of more than 1000 species of the genus Agaricus, is common in fields and pastures, seldom in woodlands unless open and grassy, growing throughout the summer, but most abundant in the early autumn. It is the most commonly cultivated species, is extensively grown for market, especially near large cities, and is about the only species imported and offered for sale in American markets. This species never attains a very large size; when young the stalk and fleshy cap are white, changing to light brown when older. The stalk is solid and tapers slightly toward the base. The ring is usually conspicuous, the gills pink when young, changing to brownish purple in older specimens. Mushrooms are usually gathered for market when in the ball or button stage before the veil has been broken. They have a pleasant taste and smell, and when the flesh is bruised, turn a reddish brown. The horse mushroom (*Agaricus arvensis*), a close relative, looks very much like the common mushroom, but is much larger and the top of the cap is more shining white. The stalk becomes a little hollow with age; the gills are white at first, changing to brownish purple when comparatively old.

The methods employed in cultivating the common mushroom do not offer any great difficulties. They may be grown out of doors or where the temperature is fairly constant, as in dry cellars or in caves, abandoned mines, and quarries. Beds are made containing at the bottom a deep layer of fresh stable manure, over which is a layer of well-rotted manure. In this the spawn is planted after the temperature of the bed has fallen to about 90° F. The commercial spawn comes in two forms, bricks and flakes, made of horse manure impregnated with the mycelium of the fungus. When planted, both kinds are broken up and distributed through the bed. The beds, which must be kept moist, but not wet, are then well covered with straw or mats to keep the surface moist. After a week or ten days the mulch is removed and the beds covered with good loam to a depth of two inches. They may be again covered with the mulch, which should be removed when the mushrooms, which should be gathered daily, begin to appear.

In addition to the species of Agaricus described above, there are a great many other edible species of mushrooms belonging to other genera. Among them are the horse-tail or maned agaric (*Coprinus comatus*), the ink caps (*Coprinus atramentarius*), and the glistening comatus (*Coprinus micaceus*). These have black spores; the cap does not expand, but remains more like a partly closed umbrella. When old, these species become very watery and dissolve, forming a black, inky fluid. For eating they should be taken only while young. The parasol fungus (*Lepiota procera*) is a white-spored edible mushroom rather abundant in grassy places. It is rather tall on a slender stem. The cap is whitish or light brown and covered with coarse scales. The ring is free and not fastened to the stalk. Another highly prized species is the chanterelle (*Cantharellus cibarius*), an egg-yellow species common in moist woods. The cap has an irregular, crumpled margin, is more or less depressed on the upper surface, and has shallow, blunt gills prolonged down the stalk. The fairy ring fungus (*Marasmius oreades*), common in lawns and meadows, is also edible. There are some species having the same habit of growing in circles, that are reputed poisonous. The edible ones are white-spored, have hollow stalks, and are seldom more than two inches across the pale yellow or drab cap, which is often concave on top and raised in the centre. One class of gill-bearing fungi exude, when broken, a milky juice. The species of this kind belong to the genus Lactarius. Some have a very acrid juice, but one (*Lactarius deliciosus*) is considered very choice by mushroom lovers. It grows in damp woods in mountainous regions, but is not common in lowlands. It cannot be mistaken for any injurious species, as the milk exuded by it is always red with a tinge of orange, and slowly changes color to greenish. The fungus is a little lighter in color than the milk exuded by it.

Boletus is one of the most common genera. The species are rather difficult of identification and should not be eaten by a novice. Some of the Gasteromycetes, for example, the puffballs (*Lycoperdon giganteum* and *Lycoperdon cyathiforme*), are common edible species. The former attains a diameter of ten inches or more; has a smooth, white, kid-like surface when young, with a firm white or pale yellow flesh. The other is six inches in diameter, flattened and tessellated on top, and contracted at the base. In color it varies from white to brown. The puffballs should be taken while young and before the spores are developed. One species (*Scleroderma vulgare*), related to the ones just described, and suspected of being injurious, may be recognized by its tough, hard, yellowish-brown, warty exterior, and purplish-black interior mottled with white. Among the most highly prized of all the edible fungi are the morels and truffles (*Tuber melanosporum*).

Since several species of mushrooms have not yet been proved harmless and since occasional cases of poisoning are still attributed to their use as food, the following rules, formulated by Farlow, are given as guides for the inexperienced collector: "Avoid fungi when in the button or unexpanded stage; also those in which the flesh has begun to decay even if only slightly. Avoid all fungi which have stalks with a swollen base surrounded by a sac-like or scaly envelope, especially if the gills are white. Avoid fungi having a milky juice, unless the milk is reddish." These rules are not absolute, because there are exceptions to them, but are safe for the novice to follow. See FUNGI, EDIBLE AND POISONOUS.

MUSHROOMS AS FOOD. Since mushrooms and other edible fungi are often said to be nutritious food, to contain large quantities of protein, and to rank close to meat as sources of nitrogenous material, extravagant statements have been made concerning them. When fresh, mushrooms have the following percentage composition: Water, 88.1; protein, 3.5; fat, 0.4; nitrogen-free extract, 6.0; crude fibre, 0.8; and ash, 1.2. Other edible fungi closely resemble them so far as analyses have been reported. Like all green vegetables, mushrooms have a high water content in proportion to their bulk, and as regards protein content, they rank about the same as potatoes, to which they are decidedly inferior in food value, since they contain much less carbohydrates, and the nitrogen present is largely in the form of non-albuminoids, which are thought to have little food value. The numerous studies which have been made show that mushrooms are not thoroughly digested. Recent experiments show that 25 to 59 per cent. is indigestible. See Plates of EDIBLE AND POISONOUS FUNGI.

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MUSHROOM GNAT. The name given by mushroom growers to any of the fungus-gnats of the family Mycetophilidæ. (See GNAT.) These are small, mosquito-like creatures with feathered antennæ, and frequent, as a rule, vegetable matter or fungi, upon which their larvæ feed. The larvæ are slender, white, wormlike creatures, with a distinct black head. The larva of one species of the genus Sciara is especially injurious to mushrooms, which it eats into and ruins. In mushroom cellars, fumigation with tobacco or pyrethrum will kill the flies.

MUSIC (OF., Fr. *musique*, from Lat. *musica*, from Gk. *μουσική*, *mousikē*, music, from *μουσικός*, *mousikos*, relating to the Muses, from Μοῦσα, *Mousa*, Muse). ORIGINS. Music is a mode of motion. It is a modification by art of aërial vibrations, whose impact upon the auditory nerve makes mental varying images. Sound, the raw material from which music is fashioned, is produced by motion.

Matter is the stimulus; sensation is the result. "The kind of motion, however, that goes to produce sound is not that of matter precisely, but rather of the molecules or ultimate particles of which matter is composed. When the state of equilibrium of an elastic body is disturbed by a shock or by friction, it tends to regain its condition of equilibrium, but does so only after a greater or less number of vibrations, or oscillating movements, of the molecules of which the mass of the body is composed." Thus J. A. Zahm, a profound investigator in acoustics and a follower of the great Helmholtz, whose masterly tonal researches are set forth in his *Die Lehre von den Tonempfindungen*. The nature of sound, Lord Bacon observes, "in general hath been superficially observed. It is one of the subtilest pieces of Nature." The nineteenth century has endeavored to wipe away Bacon's reproach, for the studies and experimentings of such men as Helmholtz, Rudolf König, and others have lifted into light the darkest problems of acoustics. The latest researches teach us that sound vibrations—vibrations audible to the ear—have a rapidity which ranges from 16 to 36,500 per second. Heat vibrations begin at 134 trillions per second; light vibrations, visible to the eye, at 483 trillions. The gamut of the rainbow has its velocity measurements. Chemical vibrations, "shown only by certain reactions in prepared photographic plates," are beyond our sense perceptions. Sonorous vibrations, then, are really the slowest of all. Dr. William Ramsay asserts in his *Essay on Smell*, that the sense of smell is excited by vibrations of a lower period than light and heat. Sounds of a musical character rarely extend beyond a minimum of 16 and a maximum of 4138 vibrations, respectively the rates of vibration of the lowest tone of an organ with a pipe of thirty-two feet and the top note of a piccolo. The production of sound, its transmission, and its aural perception may all be demonstrated with a long piece of stretched string. In its position of equilibrium it represents a straight line; pluck it and its elasticity will cause it to return. This is a simple vibration. But the string also goes in the opposite direction, and this is a double vibration. Like a pendulum, the vibrations of the string are isochronous, each occupying exactly the same length of time. By shortening the string or increasing its tension we get vibrations of various velocities, and the ear perceives various pitches from 16 vibrations to the second up to 4224 vibrations. Increase the tension beyond this point, shrillness results, below 16 a dull unmusical whirring. The same results acoustically may be produced with pipes of varying lengths. The vibrations are, as in the case with strings, isochronous; they vary in rapidity according to the length of the pipe; subdivide them and harmonics are produced. Nodes and vibrating segments are the crude material of music; pitch, force, or loudness, and timbre or quality of tone. All these qualities depend upon the rapidity of the vibrations. It is demonstrated: that the number of vibrations of strings is inversely proportional to their length; that the number of vibrations of strings is in inverse ratio to their diameter; that experimenting with two wires at tension, but of differing density, we get the rule that the number of vibrations of a string is inversely proportional to the square root of their density; finally, as Helmholtz shows by varying the stretching weight, that the number of vibrations of strings is directly proportional to the square root of their stretching weights. Thus the longer, thicker, heavier a string is, the slower are its vibrations; the deeper is its tone. The shorter, finer, lighter, tenser it is, the more rapid are its vibrations; the higher is its tone. Now the sound produced by a string vibrating its entire length is its fundamental or natural tone. It can produce many other sounds at the same time, subdividing them as it vibrates; there are the overtones or harmonics, partial and concomitant sounds. The series of harmonics theoretically may be divided infinitely, but for musical purposes they are numbered in accordance with the number of vibrating segments or loops. The nodes exceed by one in number the loops—taking the ends of the tense string as nodes. The fundamental vibrating with one loop is the first harmonic of the tone, and the harmonics on the numerical order are constantly nearer and nearer together, the successive intervals being an octave, fifth, fourth, third, second. We are at the very beginnings of the scale. The clay is ready for the musical sculptor. Mersenne's law is that the loudness of sound varies inversely as the square of the distance of the sonorous body from the ear. So the range of audition is over eleven octaves, but this is for an exceptional ear.

Musical sounds differ from each other in loudness, in pitch, in quality. Biot says "all sonorous bodies yield simultaneously an infinite number of sounds of gradually increasing intensity." This phenomenon is similar to that which obtains for the harmonics of strings, but the law for the series of harmonics is different for bodies of various forms. May it not be this difference which produces the particular character of sound, called timbre (*Klangfarbe*, clang-tint), which distinguishes each form of body, and causes the sound of a string and that of a vase to produce in us different sensations? May it not be owing to the diminution of the intensity in harmonics of each series that we find agreeable certain concords that would be intolerable if produced by sounds equally loud? And may not the quality of each particular substance—of wood or metal, for instance—be due to the superior intensity of one or another harmonic?

We have now some dim idea of the natural laws which give us force or loudness, pitch, and quality in music. The whole subject in all its fascinating range and variety is admirably treated in Zahm's *Sound and Music.* Therein may be learned much about the production and transmission of sound, its velocity, reflection, refraction, resonance, and interference. Of pitch it may be only said here that its standard in music is the A string of the violin, which gives the tuning note for orchestras. It corresponds to A_3 above middle C of the pianoforte. A_3 as a vibration number of 435 was chosen in 1859 as a standard pitch. This is called the French pitch and its exact vibrations are really 435.45. It is the standard pitch of our orchestras, and since 1892 for all pianofortes. (See PITCH.) All the modifications of sound made by the ingenuity of man in his inventions of string, wood, brass, pipe—as in the organ—and percussion instruments, from the drum to the piano, give us variety in tonal timbre and are based on the human voice, which with its bass, tenor, alto, and soprano served as a model for the viol family.

Helmholtz has considered the analogies of light and sound, both being modes of vibratory motion. In his psychological optics, he gives the following analogies between the notes of the piano and the colors of the spectrum:

F,♯	**End of the red**
g,	**Red**
g,♯	**Red**
A,	**Red**
A,♯	**Orange-red**
B,	**Orange**
C,	**Yellow**
C,♯	**Green**
d,	**Greenish blue**
d,♯	**Cyanogen blue**
E,	**Indigo blue**
f,	**Violet**
f,♯	**Violet**
g,	**Ultra-violet**
g,♯	**Ultra-violet**
a,	**Ultra-violet**
a,♯	**Ultra-violet**
b,	**End of the solar spectrum.**

Upon this laboratory experiment some imaginative theorists have endeavored to rear a system of musical æsthetics, but unsuccessfully, though we have come to speak naturally of color in music. Tone and color, while related, as are all things mundane, are far asunder in terms of art. As the receptive organ of tone and its transmitter to the brain, the ear plays as important a part as tone itself. Without it there would be no music, paradoxical as it may sound, for it is the eye that perceives, the ear that hears, the hand that feels, which give us our picture of the world. Under this hypothesis the world then is idea, idealists and materialists meeting amicably on the little strip of territory called sensation. The complete apparatus of the ear, the wonderful 'lute of three thousand strings,' called the cortical fibres after their discoverer Corti, should be carefully investigated by the student. We may now truthfully affirm, after briefly studying the production of sound and its modifications by instruments, that music is a mode of motion.

But music as a pleasure-evoking emotion! Whence comes it, what is its psychologic basis? It is purely human, for not the most fanciful of poets or extravagant of psychologists can torture into formal beauty the songs of birds, the growling of the tempest, the sound of the sea. All these things and many more may furnish the starting point, the spring-board of the composer's imaginings, but artistic they are not. There is no real music in nature. As a play impulse, art has been considered and discussed by many modern writers. Schopenhauer, whose intuitions are often superior to other men's logic, calls art "a momentary liberation," and Herbert Spencer develops his idea, linking it with biological conditions. In his *Principles of Psychology* he says that a characteristic of nerve processes is that the superfluous integration of ganglion cells should be accompanied by an inherited readiness to discharge. Thus the 'aimless activity' we call play is the result of a force expended, a force that man as a highly developed animal has more of than is needed for the struggle of existence. In many animals he finds imitation a factor, but Karl Groos in his *Play of Man* believes in impulse and intuition—"the inherited impulse toward prescribed reactions in certain brain-tracts seems to be in itself a sufficient cause for play without the necessary accompaniment of superfluous energy." Schiller calls play a harmless expenditure of exuberant strength which is its own excuse for action. Lazarus is the exponent of the reaction theory. When we are tired of natural or physical labor we play, thus recreating ourselves. Professor Groos, however, finds in both the surplus expenditure and the recreation theories only partial statements of the truth. For him, play is the impulse toward repetition, and this is a physiological reason for playing to the exhaustion point, which we notice so often, even if we are tired at the beginning. "Let us recall first," he writes, "the tremendous significance of involuntary repetition to all animal life, for just as the simplest organisms in alternate expansion and contraction and the higher ones in heart-beats and breathing are pervaded by waves of movements, so also in the sphere of voluntary activity there is a wellnigh irresistible tendency to repletion." Play, too, furnishes distraction from quotidian cares. It is an educational factor of prime importance, elaborating immature capacities and influencing the evolution of hereditary qualities. Schiller declares that man alternates between weak and sensuous pleasures, and his dictum that man is fully human only when he plays has, as Professor Groos declares, "definite biological meaning." Conrad Lange defines art "as the capacity possessed by men of furnishing themselves and others with pleasure based on conscious self-illusion, which by widening and deepening human perception and emotion tends to preserve and improve the race." This is but an amplification of Schiller's remark. And Art is but the play-impulse immeasurably elevated, yet at its roots possessing a sham objective character. The earliest form of musical art, the pantomimic dance, was "an expression of muscular force simulating the acts of life." It was symbolical, it expressed a feeling, a state of mind. In its genesis art was play of a semi-physiological character. Primitive dancing comprised music and poetry in solution; later on they became separate and independent arts. Rhythm, the father of organized music, played a big rôle, for rhythm is cosmic, it is manifested in the heart beat—the unit of measure for all the temporal arts—the tides and the movements of the bodies in the interstellar depths. Dancing accompanied by rudimentary songs—perhaps of only two or three tones—is the first step of the musical art. Emotions were translated in the rough, yet effectively; the pantomime of the savages is always clear, attempting as it does the expression of love, anger, terror, hatred, and happiness. How much the sexual attributes play in the beginnings of art we cannot say, but music in the light of modern researches may no longer be called the Heavenly Maid. Far from it, indeed, for as Havelock Ellis truthfully says: "In music the most indefinite and profound mysteries are revealed and placed outside us as a gracious, marvelous globe; the very secret of the soul is brought forth and set in the audible world. That is why no other art smites us with so powerfully religious an appeal as music; no other art tells us such old forgotten secrets about ourselves. It is in the mightiest of all instincts, the primitive sexual traditions of the races before man was, that music is rooted. . . . The sexual instinct is more poignant and overmastering, more ancient than any as a source of beauty. . . . Beauty is the child of love." Music is an emotion become æsthetic. Human beings, as Ribot says, began by thinking that beautiful which resembled themselves. Primitive art was addressed to the individual of our own species. As it became more disinterested, it exhibited religious qualities, and eventually was transformed into a ritual, a ceremony for the expression of awe or thankfulness to the deity. It had a specific character and one that had but remote affiliations with our modern conceptions of art. The natural extrusion of sympathy, the conquest of nature by the intellect, has given us two of the most modern arts: music and landscape painting. Neither of these had any real existence in the Old-World civilizations; indeed, a feeling for nature in poetry and painting may be said to date from yesterday. The patient flowering of savage, rhythmic cries into the score of a Beethoven symphony is only comparable—to mention purely human processes—to the evolution from a South Sea Islander's simple mud hut to the magnificent complexities of a Gothic cathedral. From the sheltering needs of the body comes the noble art of architecture; from the social needs of intercourse, self-expression, come poetry and music. Both were the irrepressible and the irresponsible exhibition of surplus energy, of the play impulse. And on this side is music purely sensuous.

Kant defines the Beautiful as that which "through the harmony of its form with the faculty of human knowledge awakens a disinterested, universal, and necessary satisfaction." We are now another remove from the utilitarian; for in a certain sense all art is useless, inasmuch as it bestows no material benefits. Its beauty is its excuse for being, and music being the least representative of the arts, copying no material forms, is therefore easily the most ideal of all the arts and the most inutile. Apprehended in time and not in space, it addresses itself to the imagination. And here we are confronted by the *crux* of Hanslick and other æstheticians of the formal. "Definite feelings and emotions are unsusceptible of being embodied in music," he declares. Music does not express emotion, it expresses itself. It is sound-play; it consists of exquisite arabesques; it is a formal pattern of tone, and all the wonderful things attributed to it exist only in the overheated imagination of its hearers. Precisely so, and it is this almost miraculous subjectivizing process that proves the weakness of Hanslick's thesis. No other art attacks so powerfully the emotions. "Music acts like a burn, like cold, heat, or a caressing contact. Music acts on the muscular system, on the circulation, the respiration . . . and is the most dependent on physiological conditions. The primary effect is a physical one." Beauquier says: "Musical vibration is only one particular mode of perceiving the universal vibration. . . . Musical art is the art of sensibility par excellence, since it regulates the great phenomena of vibration into which all external perceptions resolve themselves, and transfers it from the region of the unconscious, in which it was hidden, to that of consciousness." Again Ribot: "While certain arts at once awaken ideas which give a determination to the feelings, music acts inversely. It creates dispositions depending on the organic state and on nervous activity, which we translate by the vague terms—joy, tenderness, serenity, tranquillity, uneasiness. On this canvas the intellect embroiders its designs at pleasure, varying according to individual peculiarities." Let us admit, then, with Hanslick and the formalists that music does not *express* emotion; yet this does not preclude the idea of an emotional content in the listener, who projects his personality into the forms. In music the forms and the subject are identical; we cannot dissociate the pattern of the love theme in *Tristan und Isolde* from its emotional effect. The sound once set in motion, we are at liberty to dream, to thrill, to weep, to sigh with all the moods superinduced by a master. And this playing upon our nerves, our imagination, is intentional. In modern times music has become an instrument of overpowering emotional significance. Eighteenth-century music with its gay scheme of decoration, its pretty recurring patterns, its play of forms, and its freedom from the overwrought, the intense, can well be utilized by Hanslick as an example of music for music's sake. It expressed little in the latter-day connotation of the word; so to modern music, especially Beethoven, we might truthfully give the title of classic, as it fulfills many of the requisites of antique art: its dignity, symmetry, grandeur, and profound emotional quality. The position of the formalist school is based on a half truth. A study of the nature of emotions would have cleared the ground long ago of incumbering verbalisms. Ribot defines the technique of an emotion thus: "First an intellectual state, then organic and motor disturbances, and then the consciousness of these disturbances, which is the psychic state we call emotion." This clear definition of a very complicated process may be applied to the effects of music upon a sympathetic listener—naturally sympathy must be granted, else all music addresses itself to the deaf. A vast mirror of subjectivity, music appeals to each of us according to our temperaments. It paints upon the background of our consciousness enlarged meanings of ourselves. Composed of alternate sound and silence, it reaches our very soul with its rhythmic pulsings and sensuous qualities. It is at once the most impersonal and most personal of all the arts. It traverses the keyboard of our desires and arouses noble ambitions or sensual crises as well. It is an unmoral art; it can be impressed with equal facility in the service of church or tavern. Its very plasticity makes it an agent for evil and nevertheless a powerful aid to worship. It is because of this easily molded nature that music has served in every camp, has gone to the wars, has sounded the psalms of peace, has been the bone of contention between warring schools and factions, has led the bride to the altar, and intoned the grief for the dead one. Music, in some form or other, has always accompanied man on his march through the ages, tracing in spiritual mimicry his evanescent emotional gestures. Captive to his baser senses, a column of smoke by day, this agile protean art has played the pillar of flame, a burning eloquent sign in the darkened skies of revolt, superstition, and misery. A potent symbol, 'a mighty fortress' during the Middle Ages, music served the Church faithfully, and when enfranchised it has as faithfully recorded the great emotions of secular souls. Ariel and Caliban—to what purposes has this versatile art not been put? At first man played upon a reed to his mate; then he grew in love with his tune for its own sake. To-day, after putting the art through all its probable paces, it has been harnessed to the Drama, and, from being the exponent of pure, formal beauty, it is pressed into the service of the Characteristic. The Chinese, thousands of years ago, discovered the charm of ugliness, and it would seem that modern music is striving for that goal. Rosenkranz has written a volume on *Æsthetics of the Ugly*, and in the general hurly-burly, topsy-turveying of the arts, it would not be improbable if music played the part of devil's advocate in the new æsthetic dispensation. The line of demarcation between the beautiful and the ugly is slight, for beauty is a relative quality, and ugliness often proves its capital foil. To show how shifting has been the standard of musical beauty one has only to consult history or personal memories. A decade may transform the musical map, deposing reigning monarchs and elevating to the purple the veriest newcomer. Music is a fickle goddess.

How far symbolism may be pushed in music is seen in the attempts to pin down the phrase to precise meanings. It is true that there is a key-symbolism, that not by chance have the great composers selected certain keys—keys that, in Wordsworth's happy expression, are inevitable. Beethoven's Fifth Symphony is inconceivable in C sharp minor or E flat minor. C minor is a portion of its life. Berlioz has compiled a table of key characteristics and a certain theorist does not hesitate to call F major rugged; B major, energetic; E major, radiant, warm, joyous; A major, frank, sonorous; D major, gay, brilliant, alert; and so on through the list. Here again temperament counts, all else is purely arbitrary. Music has the power of evoking moods, that is a common experience; and it has on the formal side analogies to architecture, for it is structural, it is architectonic, and its subject is imitative of no known model. This has led Walter Pater to asseverate that all the arts in common aspire "toward music, music being the typical or ideally consummate art, the object of the great *Anders-Streben*—reaching forward—of all art, of all that is artistic or partakes of artistic qualities." It is "the blending of the animative thought and embodying vehicle," the absorption of the matter into the form of which music is the one perfect example among the arts, that attracted Pater. "All art constantly aspires toward the condition of music," he wrote, and made of sensual presentation, emotional suggestion, and technical perfection the archetype for all the arts. The danger of this view lies in the slighting of music's tremendous evocation of our subliminal depths, of spiritual shades. These cannot be exorcised by technical loveliness or richness of emotional eloquence. Beethoven has taught us in his symphonies that from tone may be wrung almost an ethical meaning. The Platonic theory of an ideal type for all the arts could not have failed to impress Pater. But it stops at the outer porches of the ear, the tone which should penetrate to the inner sanctuary losing on the way some of its grosser connotations. His doctrine is that art is always striving to be independent of mere intelligence, that the vaguer the subject the greater the impact of the thrill upon our souls. Gustave Flaubert, who is the creator of both the realistic and the symbolistic school, had some such idea; for he wished his prose to be as independent as music, to float in mid-air by reason of its euphony and rhythm. And there can be no doubt that it is the perfect balance found in Beethoven's phrases, both the meaning and the music, that makes of them the greater type for all future symphonists. Poetry is the usual standard for painter, poet, sculptor, and composer, and, as John Addington Symonds shows, this is as much of a heresy as Pater's. F. W. H. Myers writes: "The range of human thoughts and emotions greatly transcends the range of such symbols as man has invented to express them; and it becomes, therefore, the business of art to use these symbols in a double way. They must be used for the direct representation of thought and feeling, but they must also be combined by so subtle an imagination as to suggest much which there is no means of directly expressing. This power gives birth to the art of the musician, whose symbols are hardly imitative at all, but express emotions which, till music suggests them, have been not only unknown, but unimaginable." To each art its particular province. There is music in Milton; Wagner is a great painter; Bach an architect; and through the marmoreal prose of Flaubert rings the sound of the sculptor's chisel. But this 'reaching forward' is, as Symonds says, "at its best a way of expressing our sense of something subjective in the styles of artists or of epochs, not of something in the arts themselves." The subjectivity of a critic prompts him to select a particular art as the type for all. Wagner, in a superb effort, attempted to house all the arts within the walls of a mighty synthesis. Music, however, won the victory; it is Wagner the composer who will live, not Wagner the dramatic poet or Wagner the scene painter. The intellectualists are quite as wrong in their endeavor to force upon music the office of preacher or philosopher. By reason of its limitations, music is not well adapted for the expression of an intellectual content. It gives us the maximum of sensuous effect, though we do not agree with Symonds that in it is the minimum appeal to the intelligence. If this were so, Bach, Beethoven, Chopin, Brahms, Wagner, Richard Strauss would not be in the same category with Dante, Michelangelo, Milton, Shakespeare, Shelley, Swinburne, and Rodin. Besides, has not Spencer said, "The emotions are the masters, the intellect is the servant"? Great intellectuality, great emotional temperaments go to the making of great composers as well as of great architects, poets, dramatists, painters, and sculptors. Architecture is not emotional like music, but it is more concrete, it arouses the sense of the sublime—which music does, too, under certain conditions. Sculpture is impressive in its symbolism of the human form and its evocation of harmonious lines; of all the arts it is the most unlike music. Painting, with its illusions of life on a flat superficies, has certain affinities with music, while music and poetry have several qualities in common—the subtleties of sound and the power of continuous narration—though here music speaks a tongue not to be translated into words. It gives the sense of situation, not action, the prism of the arts, as Symonds phrases it, "each distinct, but homogeneous, and tinctured at their edges with hues borrowed from the sister arts. Their differences derive from the several vehicles they are bound to employ. Their unity is the spiritual substance which they express in common. Abstract beauty is one and indivisible. But the concrete shapes which manifest this beauty decompose it, just as the prism analyzes white light into colors."

We have rapidly surveyed music on its acoustical, psychological, and æsthetical sides; there remains the evolutionary. From a mere cry in the submerged, prehistoric world it has passed into the daily life of man, a magnificent art work in which the spiritual and the sensuous are harmoniously blended or struggle for precedence. A presentative art, it has nevertheless been made representative in the acoustic parellelisms of Richard Wagner and others. Furnishing the motive power for ballets, music is the handmaid of religion, and by some authorities is considered to have therapeutic powers. In history it has figured as a healer of sick souls, and to-day in its loftier manifestations it is a balm and a stimulant to the weary in mind and body. And in the last analysis is not music an aural mode of motion?

EVOLUTION. The history of musical art is an effort to record, to systematize and bring into general harmony a vast mass of hopelessly intractable material, conflicting facts, many *lacunæ* and irreconcilable traits which try the temper of the most ardent historian. Evolution there has been, and, despite pessimistic doubts, genuine progress; but it is an evolution that often curves in upon itself, its line of progress is more fancied than real. To draw a straight line from the earliest musical lispings to the omnipotent utterances of Beethoven, is the ideal of the critic; but the task is a difficult one. Musical history is a history of suppressions, evasions, and empirical classifications. Like the evolutionary processes in the physical world, progress is often seemingly crab-wise. If science aims at discovering law and reason in nature, a notation of the actual, the art of music furnishes an example of purely arbitrary progress. The artist does not create in the abstract, but in the concrete, so that two art products are independent and never alike. To explain one by the other is at once the cardinal fault of criticism and its excuse for existence. Palestrina and Wagner are poles asunder, and it is a bold man who claims precedence for either. And yet nothing of Palestrina's has been lost; his harmonic seeds are come to a flowering. Has Wagner surpassed Gluck in certain elementary qualities? Who since the death of Beethoven has symphonized so marvelously? Has the rush and sweep of the Handelian chorus ever been repeated, or who can equal Bach in polyphonic mastery? Music is the youngest of the arts, but it behooves us to ask if the nineteenth century is literally its seminal epoch. So there have been factitious groupings, vague theorizing by some compilers of musical history, who, be it said with emphasis, have made much of tantalizing, incomplete records. To be sure, schools usually followed the strong men, and there is a chain of development during the past few hundred years, enough to furnish credible criticism. Before that the roots are in the darkness of the mother churches, or the mediæval twilight of the cloisters. There has been much sublime guessing to build up a fabric capable of withstanding adverse comment. But it has been accomplished, and in Naumann, Ambros, Wallaschek, Rowbotham, Grove, Rockstro, Parry, Henderson, Finck, Apthorp, Hale, Krehbiel, Elson, Ernest Newman, Hadow, and others we may catch glimpses of a baffling whole. One fact is unalterably demonstrated by the researches of these scholars: that so far from music being a universal language, it is more subject to geographical limitations than is speech. It is a veritable tower of Babel in its multitudinous dialects, its jargons and eloquence. The divine stammering of the men who made ecclesiastical music is offset by the heathenish rhythmic howlings of the Bushmen; and the melancholy monotony of the Chinese pentatonic scale is drowned by the full orchestra of Tschaikowsky. Men of many climes may converse by mute signs, but set them all to music-making, each after their kind, and the result will be anarchy. It is one of the pleasing fancies of the poet, this catholicity of music. Facts, however, contradict the idea; just as surely as they deny the assumption that vocal music, i.e. words with song, is superior to absolute music, i.e. music that is self-sufficient, that needs no illustration, no libretto to explain its existence. Absolute music then is the highest reach of the art, the most dignified and satisfying. No doubt the human larynx is the most perfect of instruments, and the sound it produces touches the heart, for it is human. But poetry pure and music absolute cannot be blended without a loss to both. Vocal tones preceded instrumental ones; indeed, one school asserts that singing came before speech. Grell and Engel maintain that speech is but degenerated singing and that music with words is the archetype of the art. Music and articulate speech are far from resting on a common basis, though both begin at the human throat. Half the heresies of music originate in this confounding of widely disparate things. It was a stumbling block for Beethoven, Richard Wagner, and for Schumann and Richard Strauss. Even among the savages the break is clear between impassioned speech and song.

Rowbotham ingeniously groups prehistoric music under the drum, pipe, and lyre types; instruments of percussion, wind, and string. Man drummed and thrummed before he piped, and he piped before he plucked, and he probably yowled to the moon before the rhythmic noises of nature, dripping of waters, sounds of wood and wind, stimulated his phono-motor centres to imitation. (See Musical Instruments). The rhythmic chantings were part of a ritual, the soul of the savage worshiped its fetish; the beginnings of religion and art are identical. These manifestations belong properly to culture study. (See Folk-Music; see also the Music of Arabia, China, Egypt, India, Japan, Turkey, Russia, Scandinavia, of the Magyars, Celts, Negroes, North American Indians, and Hebrews, under Arabian Music; Chinese Music, etc.) The earliest musical system of which we possess any authentic record was invented by the Greeks or rather absorbed from Phœnician and Egyptian systems. The Hebrews also borrowed their forms from other nations. The invention of the lyre is attributed to the Egyptian god Thoth in the pretty fables. The Greek play is the prototype of modern opera. (See Opera.) It was sung, though the music has not been vouchsafed us. Two thousand years ago Athens thrilled at the *Antigone* of Sophocles, yet not a note of it has been preserved. The Greeks, sensitive to all the arts, made music part of their daily lives. Its influence upon them, as described by poets, must have been extraordinary. Yet in the three hypothetical Hymns of Apollo, Nemesis, and Calliope, and the first Pythian Ode to Pindar, we find little that would touch modern nerves. Theoretical writings of Pythagoras, Aristoxenus, Euclid, and others have come down to us and show that the Greek knew the perfect intervals of the natural scale—the octave, fourth, fifth, and greater tone. But their system is a highly artificial, needlessly complicated one, and finally blossomed into the modes: Dorian, Ionian, Phrygian, Æolian, Lydian, Mixolydian, etc. (See Greek Music; Modes.) The Romans derived their musical knowledge from the Greeks, but did not pursue its study seriously. The early Christians who found in the Imperial city a harbor of refuge brought with them new forms, echoes of the liturgy heard in the Temple of Jerusalem. Saint Ambrose, Bishop of Milan, made about the year A.D. 384 a general collection of these melodies and at the same time laid down a code of technical laws. Two centuries later Saint Gregory the Great is said to have made a second collection (c.590 A.D.) and based it on a more comprehensive system. The four modes or scales bequeathed by Ambrose were increased to nine. The combined melodies received in early times the names of *cantus planus*, plain chant; the older being known as the Ambrosian Chant (q.v.) —still sung in Milan—the later one as the Gregorian Chant (q.v.). (See Plain Chant.) From these liturgical chants has sprung the noble music of the Roman Catholic Church. Gevaert doubts with historic accuracy the historic basis of the Gregorian chants; believing that the Christian Church derived its modal scales and its melodies, not from the old Hebraic psalmody, but from the secular *Kithara* song of the Roman Empire, which comes from the Greek. These psalm tunes, whatever their origin, are the oldest ecclesiastical music we possess. Later music was treated as arithmetic by Boëtius and the art became a mere mathematical exercise. In the latter half of the ninth century Hucbald, a monk of Saint Amand in Flanders, proposed a new division of tetrachords, and attempted the arrangement of vocal music in parts, and invented a new system of notation. Semiography or sign writing was the method of notation that superseded the notation of Gregory. Figures called Neumæ (see Neumes) were placed over the words to which the tunes were sung. Though the ascent and descent of the melody were not at first shown, Hucbald remedied that by a series of horizontal lines arranged like the modern stave. The *Musica Enchiriadis*, which was until lately ascribed to him, contains information about notation and the Organum or Diaphony, which was the first form of harmony, consisting chiefly of consecutive octaves, fifths, or fourths added to the plain song of the church. (See Harmony.) Guido of Arezzo (c.1000-c.1050), another monk, distributed the twenty notes then used into groups of six, called hexachords. He invented solmization (q.v.), which is the naming of the notes of each hexachord by the syllables Ut, Re, Mi, Fa, Sol, La; the origin of these syllables being a verse of a hymn to Saint John, each hemistich of which began with one of them, and was sung to phrases a note higher each time. Ut was supplanted by Do, and Si was added to complete the necessary seven notes of the octave. (See Scale.) Franco of Cologne made the first recorded attempt to measure the relative length of notes in his 'cantus mensurabilis' or 'measured song.' Four standards of length were adopted: (1) *maxima*, or *duplex longa;* (2) *longa;* (3) *brevis;* (4) *semibrevis.* A time signature was put at the beginning of the music, which showed whether each long note was to be equal to two or three shorter ones. (See Mensurable Music.) Diaphony merged into discant; the former doubling the melody at the fifth or fourth, the latter varying the monotony of the organum by the addition of ornamental notes, passing notes. This discant was usually extemporaneous, though composers soon employed it, when it was called 'contrapunctus a penna,' in contradistinction to 'contrapunctus a mente.' Counterpoint, or note against note, was born; motets were sung, rough attempts at part-singing lent it at least a beginning. See Counterpoint.

Much of the musical development of the twelfth and thirteenth centuries was centred in Paris. The troubadours, trouvères, jongleurs, and minnesingers, who cultivated poetry and music, play no small part in the advancement of the art. They developed epic, lyric, and dramatic art, and spread over France, Germany, even the south of England. Some of the better-known were Thibaut, King of Navarre, Count of Champagne, Adam de la Hale, who wrote *Robin and Marion*—a play with music and dialogue interspersed—and later Walther von der Vogelweide, Wolfram von

Eschenbach, Frauenlob, and Hans Sachs. England gives us the round 'Sumer is icumen in' (see Rondo), and there are fragments of works by Marchault de Muris, Tunstede, and De Handlo in the fourteenth century which are not promising examples. The Netherlands in the early part of the fifteenth century showed signs of re-awakening energy, the first representative composer being Dufay, in the service of Philip the Good of Burgundy. His style was crude, showing the influence of John Dunstable, an Englishman (c.1400-1453), who at one time was regarded as the greatest composer in Europe. After Faugues, Caron, Busnois, the next figure of importance is Okeghem, who lived until 1513. He, too, was a Fleming. He is known to fame, however, as the master of Josquin Deprès (born about 1450), a genius. He wrote church and secular music with equal facility and was in the Papal choir from 1471 to 1484. His pupils were Jean Mouton and Nicholas Gombert. Obrecht, chapel-master at Utrecht, was another man of ability. The art of printing from music types was first practiced in the early part of the sixteenth century (1501). This led to an increased activity among composers, and soon came an interesting list of names, such as Adrian Willaert (1490-1562), attached to Saint Mark's Cathedral, Venice; Philip Verdelot (about 1500-67), composer of madrigals, canzonas; Jacques Arcadelt (c.1514-c.1575), and others. Constanzo Festa was the first Italian composer of prominence (1490-1545). But we must not forget other Netherland men, Jacques Clemens, Cyprian Van Rove, Walraent, Phillipus del Monte, and Orlando di Lasso (1520-94), who continued to write good music even after the Italian supremacy. Orlando di Lasso is famous for his setting of the Penitential Psalms, which contain much lovely and characteristic music. Then for a time the Italians, Zarlino, the two Gabrielis, Claudio Merulo (1533-1604), Marenzio, a great organist, and Palestrina held the field. The latter was born at the town from which he takes his name about 1514. He studied under Claude Goudimel, a Frenchman. The "Pope Marcellus Mass" was written in 1565, and in it the climax of ecclesiastical music was reached. Palestrina was the greatest master of pure choral style; he closed an epoch when he died in 1594. His contemporaries and pupils were Morales, a Spaniard; Nanini, Vittoria, also a Spaniard and second only to Palestrina; Giovanni Croce, and Allegri. In Germany, Heinrich Isaak, Johann Walther—the friend of Luther—Gallus, Stalzer, and Hans Leo Hassler (1564-1612), the latter a pupil of Andrea Gabrieli, passed on the torch of tradition, keeping it aflame by their own honest efforts. In England there was a musical activity that has not been paralleled since in the history of the nation. Christopher Tye, John Merbeck, Thomas Tallis, his celebrated pupil William Byrd, Edwards, Whythorne, Nicholas Yonge, Thomas Morley, Thomas Weelkes, John Dowland (1562-1626), Thomas Batesen, Orlando Gibbons (1583-1625), John Bull, W. Forster, Benjamin Cosyris, John Blow, wrote wonderfully sparkling, vigorous, and original music. All England sang their catches, roundelays, madrigals, motets, and the more cultivated played their virginal and lute music. Indeed, the beginnings of music for the clavichord, harpsichord, and modern pianoforte may be found in the literature of Byrd, Gibbons, Bull, and others. The school culminated in Purcell (1658-95). Whether because of Puritanical influences or the advent of the Italians and later George Frederick Handel, an overwhelming composer, certainly England has produced no other such original genius as Henry Purcell.

The currents of music now begin to run swifter, opera and oratorios absorbing the ears of the civilized world thanks to the work of Monteverde, Lully, Purcell, Alessandro Scarlatti, Lotte, Durante, Leo, Handel, and Bach. (See Oratorio.) This article will in the main confine itself to purely instrumental music and its progress. The crudeness of the viol family was giving way to the finished specimens of Italian violin-makers' art, and with improved instruments came music of a better quality and wider range. (See Violin.) The organ, which aided the growth of types of choral music, was now become a more highly differentiated instrument, and music *per se* was heard from its pipes. (See Organ.) The forerunners of the pianoforte (see Pianoforte) were engaging the attention of composers, and the orchestra (see Orchestra), from a simple gathering of heterogeneous instruments, many of them obsolete to-day, was gradually approximating its present size. Parry divides the history of instrumental music into three well-defined periods: the first extends from the early experiments in the fifteenth and sixteenth centuries up to the time of Bach; the second up to Beethoven; the third to the present day. Contrapuntal methods prevailed during the first; the second saw the development of pure harmonic forms of the sonata order, culminating in Beethoven; the third was marked by modifications of the form with greater freedom in contrapuntal devices, and the patent factor of orchestration playing a powerful part. There was much graceful, fantastic dance-music written for the clavecin and harpsichord by Purcell and Lully, while Chambonières and Couperin composed what are now known as suites, then called *ordres*, composed of lively dance movements out of which the sonata grew. (See Sonata.) Cambert and Lully also wrote ballads with overtures. Both Couperin and Rameau (1683-1764) contributed excellent music for the clavecin, and, being supple performers, did much to advance the purely formal side of composition, while in their suggestive titles we see the humble beginnings of programme music. Organ-playing was growing apace, Gabrieli, Merulo, Sweelinck of Amsterdam, Reinken, Frescobaldi, Scheidt, Froberger, a pupil of Frescobaldi, Kerl, Pachelbel, and Buxtehude the Dane, all helping to rear the mighty fabric of fugue and sonata which culminated in Bach. In Italy, Amati, Stradivarius, and Guarnerius stimulated the genius of Arcangelo Corelli (1653-1713), who gave the world his sonatas and concertos for stringed instruments accompanied by harpsichord or organ. The first set of twelve were called "Sonata da Chiesa," the second set of twelve "Sonata da Camera." The first, patterned after the churchly form, was in four movements, and is a prototype of the modern sonata; the second is a dance suite, consisting of Allemande, Corrente, Sarabande, Giga or Gavotte. And the music, as we can testify to-day, is sweet, sane, and dignified. Then followed a gifted group of Corelli's pupils, Somris, Locatelli, Geminiani, Veracini, Vivaldi, and Tartini. Being virtuosi, they all helped to solidify the technique of their instrument as well as of musical forms. Among the Germans of this period may be mentioned Von Biber (1638-98). Handel (1685-1759), busy as he was with opera, oratorios, and the fatiguing duties of an impresario in London, found time to compose suites for the harpsichord as well as concertos for organ, violin sonatas, and overtures for his choral works. He was hardly a pathbreaker, for he followed obvious Italian models, though he stamped everything he wrote with the seal of his vigorous genius. Johann Sebastian Bach (1685-1750) was first and last the ideal organist; into its literature he poured the purest treasures of his extraordinary genius. A set of fugues, concertos, and toccatas (see CONCERTO; FUGUE) that have never been equaled, the richness of which is far from being exhausted, were given the world by this modest cantor of Leipzig, who still found time to compose the *Well-Tempered Clavichord,* that unique collection of forty-eight preludes and fugues for a clavier tuned in equal temperament, so that all keys are equally available instead of some being in particular tune in order that a few others might be so. (See TEMPERAMENT.) He also wrote the English and French suites and partitas for the clavier, as well as the Italian concerto and those delightful lessons, two-part and three-part inventions. On Bach's prodigality of utterance, the astounding variety and depth of his music, its science, its art, its formal beauty and emotional signficance, there is little need to dwell now. The great Passions, the violin compositions, and the clavier and organ music, chorales and motets are a part of the world's most precious art heritages. His perfection, his inauguration, form the matrix of all latter-day music. He has influenced Beethoven, Schumann, Chopin, Mendelssohn, Wagner, Brahms, and Richard Strauss enormously. The orchestra of his days was still in an amorphous condition and he wrote for it as he did for other instruments, thoroughly, and as a medium for the expression of his ideas. Personality in music revealed itself with no uncertainty in Bach's case. Some of Bach's predecessors, Kulman, Matthesen, and Muffat, wrote sonatas and suites. Domenico Scarlatti (1683-c.1757), the son of Alessandro, wrote operas and church music, as did his father, but soon became the most famous harpsichordist of his day, the Liszt of the eighteenth century. His compositions show the expert virtuoso, and are remarkable for being the first works of the kind in which the fugue and dance are not essential. The key-grouping and arrangement of the movements, with phrasal repetition, set his music ahead of its time and link it with Mozart and the early sonata masters. Galuppi and Paradesi followed in his footsteps. Slowly the contrapuntal style gave way to the harmonic, the Italians simplified the scheme by writing luscious melodies with a slight accompaniment, and after Corelli (1653-1713) the decadence began. Tartini, Viotti, Rode, Baillot, all noble artists, continued the Corelli tradition. Bach's sons, Karl Philipp Emanuel and Johann Christian, were worthy descendants, though without his masterful grip. The former made the model for the sonata that Haydn followed, and Johann Christian wrote sonatas, symphonies, and operas. Symphonies (see SYMPHONY) had been attempted by Abel, Esser, Wagensail, but the form received its first shaping by Haydn and Mozart. Haydn (1732-1809) began by studying the clavier sonatas of Philipp Emanuel Bach and ended under the influence of his one-time pupil Mozart (1756-91). The Haydn string quartets and some of his symphonies and piano sonatas are inimitable. Mozart polished the symphony during his short, crowded life, and left us such masterpieces as the E flat, C major, and G minor symphonies. On his way to Paris in 1777 he stopped at Mannheim, where Stamitz conducted the best orchestra in Europe. There he learned the possibilities of instrumentation. Mozart had the real color-sense, and his orchestral writing shows a feeling for the varying *timbres,* and a balance of the various choirs hitherto unsuspected. His orchestra was a more elastic and highly organized instrument, and it lent itself to the most complicated types of composition. The wood and brass choirs were individualized, and writing for the string quartet had reached a degree of perfection. The dexterity displayed by Mozart was not lost on Haydn, and some of it was reflected in the operatic composers who followed him, though it may be confessed that Gluck (1714-87), his great contemporary, benefited little by his novel researches; indeed, he possibly never went out of his way to hear the D major symphony, which is said to have been given in Paris while the composer of *Orfeo* was there. Nineteenth-century operatic composers like Weber, Berlioz, Meyerbeer, Wagner, and Verdi in his later years, were the first to concern themselves with the possibilities of orchestra color enhancing the dramatic situation or contributing atmosphere.

After Muzio Clementi (1752-1832), the Italian pianist, went into pianoforte manufacturing and presented to the world a pianoforte that could withstand muscular attacks, and give out a great volume of tone because of its hammers instead of jacks, he paved the way for the Beethoven pianoforte sonata. He did more. He wrote his *Gradus ad Parnassum,* a collection of studies in style and invention that are in the curriculum of every pianist and student to-day. His inventive skill gave to pianoforte technique many new figures, and his was the technical foundation for the Beethoven sonatas. He is truthfully the father of modern pianoforte music, and until the appearance of Liszt, his pupils, J. B. Cramer, the Irishman; John Field—who originated the Nocturne form—and others whose style he influenced, Dussek, Pleyel, Steibelt, and Moscheles, dominated the entire field of pianoforte playing. In Beethoven (1770-1827) classical music reached its apex, and romantic music—so called—had its birth. The greatest of symphonists, his influence, like Bach's, has permeated every department of music. A short-time pupil of Haydn, admired by Mozart, this gigantic genius seems to have included in his mighty symphonies and sonatas all that had been. In his early efforts we see Haydn, in his ninth symphony and last piano sonatas may be found the seeds that sprouted into the luxuriant forests of the Wagner music-drama, and gave birth to the dream-haunted imaginings of Chopin, Schumann, and Berlioz. Beethoven has been called the Homer, the Michelangelo, the Shakespeare of music. He has more affinities with the great Englishman than with the Greek or Italian. He is intensely human, and his temperament, hugely passionate and poetic as it is, is never the ruler of his noble intellect. Nature dowered Beethoven with manifold gifts; gifts not only of originality, but of character. In the slow revolution of music, it may be remarked that the most original men are not always the elect; their very originality sometimes degenerates into the bizarre, and a splendid isolation is their fate. But Beethoven, with all his revolutionary instincts, began in a conservative manner, building on the foundations of his predecessors, keeping in the line of tradition. The bases of his tonal palaces are dug deep, but their towers pierce the very skies. His thirty-two sonatas, concertos, chamber music, and nine symphonies represent the *summum bonum* of human musical effort and, as Parry truthfully says, "bear the marks of a higher degree of concentration and a wider range of design" than those of his forerunners except Bach, "and the sum of the result is the richest and most perfect form of abstract instrumental music which exists in the whole range of music." Beethoven literally re-created the sonata form, adding to it new movement, filling it with an incomparable emotional and intellectual content. The symphony he enlarged and vivified, buried the old tones of formalism, and gave it the scherzo, gave it power, majesty, tenderness, and supreme beauty. The orchestra became a new instrument in his treatment of it, and for the first time each member of the instrumental army was given liberty. Color, grace, delicacy, and elasticity are revealed in the Beethoven orchestration. (See INSTRUMENTATION.) Unity in variety, the highest law in all artistic creation, is the distinguished characteristic of this wonderful man's work. There is little need to dwell upon Hummel (1778-1837), a pupil of Mozart and a refined pianist; or upon Ries and other imitators of the Beethoven style. Karl Maria von Weber (1786-1826) proved himself to be a versatile composer and one who greatly influenced Wagner. *Der Freischütz* is still played. In his overtures to *Der Freischütz, Oberon, Euryanthe,* Weber revealed a fine color sense and a genuine fantasy. His piano music is brilliant, effective, and some of it chivalric, though in formal sense he broke away from the classic and reveled in the romantic. Franz Schubert (1797-1828), unique as a *lied* composer (see LIED), wrote many symphonies, two of which, at least, are famous, many piano sonatas, minor pieces, and chamber music. His charm lies in his rich melodies, the most fragrant and original since Mozart's, and a personality of rare attractiveness. His very profusion enchants. With Louis Spohr (1784-1859) we have little in common nowadays, despite his valuable contributions to violin literature. His music in the larger choral and instrumental forms sounds antiquated. Felix Mendelssohn-Bartholdy (1809-47) was one of the best equipped musicians of the century, a writer of refined melodies, a master of orchestration and a man of delicate imagination. He wrote his *Midsummer Night's Dream* when a mere youth, and he never surpassed it, though there is more depth in the Hebrides overture (1830). From an idol of the mid-Victorian reign, Mendelssohn has become a man to-day comparatively neglected and certainly underestimated. He wrote absolute music in a pure style and did not attempt to transcend its sphere, or rather his own limitations. He was an accomplished organist and pianist, and wrote with skill and ingenuity for both instruments. The Mendelssohn piano music—not the familiar *Songs Without Words*—is a mine of good things—the *Variations sérieuses,* for example. (See VARIATION.) His oratorios *Elijah, Saint Paul,* and the *Reformation Symphony,* with its chorale, are built upon a close study of Bach and Handel. To Mendelssohn the musical world owes a debt of gratitude for his labors in unearthing many Bach manuscripts. Of the many symphonies Mendelssohn wrote, the most frequently heard are the *Scotch* and the *Italian.* His violin concerto is a model of its kind.

Hector Berlioz (1803-69), a Frenchman of colossal ambition, elected to tread in the footsteps of Beethoven, composing music in the grand manner and devoting himself to the development of orchestral resources, with the result that he died the greatest composer of France and may be truly entitled the father of the programme school in music. What he did for it was chiefly in a loosening of formal knots, in rhythmic devices and orchestral color. The affixing of romantic titles, such as *King Lear, Waverley, Les francs juges, Lélio, Harold,* and the rest, is not an original device, while Franz Liszt, affected as he was by Berlioz's original discoveries in instrumentation, is really the intellectual protagonist of the movement, for he invented the *Poème symphonique,* a species of foreshortened symphony. (See SYMPHONY.) Berlioz had not so much new to say, but he was an incomparable stylist. His music is agitated, dramatic, fantastic, and also fascinating. In his *Te Deum* he has almost compassed the sublime, and he forged a passport to posterity in his *Damnation of Faust.* Like Liszt, Schumann, and Wagner, Berlioz was a man of pronounced literary ability. Frédéric Chopin (1809-49) stands alone in an age crowded with musical greatness. The most poetic of all composers, using poesy as subject matter rather than the ordinary phraseology of music, he contrived to write for the pianoforte, an instrument abused by vapid virtuosi, a mass of music as individual as Bach's or Beethoven's. He had no predilection for the sonata form, though he left three solo sonatas and one for piano and violoncello; but he idealized various dance forms such as the polonaise, valse, mazurka, krakowiak, composed most original ballads, scherzos, nocturnes, fantasias, impromptus, and as a companion book to the *Well-Tempered Clavichord* wrote twenty-seven studies and twenty-five preludes which are invaluable contributions to piano literature. More than this, Chopin was a melodist of rare quality and an inventor of harmonies the most daring of the century. Even Wagner shows a close study of Chopin in his harmonic system. An apparition in art, this Pole sang the sorrows of his native land in exquisite accents, played the pianoforte as no one before or after him, and literally formed a new technical school. His early music shows traces of Hummel and John Field, but his native originality soon lifted him out of the track of routine. His influence affected Liszt and the younger school, the Neo-Russians, and Wagner. Robert Schumann (1810-56) is another original composer quite as subjective as Chopin, but without the latter's formal sense, a sense cultivated by devotion to Bach's music. Schumann's imagination is tropical and his indirect influence in modern music has been a powerful one. Not a great symphonist, he nevertheless composed four charming symphonies, and chamber music of

CHRONOLOGICAL CHART OF COMPOSERS

	15th Century		16th Century		17th Century		18th Century		19th Century	
Italian..........		Festa (1490-1545)	Animuccia (c. 1500-71) A. Gabrieli (c. 1510-86) Palestrina (c. 1514-94) Cavalieri (c. 1550-99)	Merulo (1533-1604) G. M. Nanini (c. 1540-1607) Caccini (c. 1546-1615) G. Gabrieli (1557-1612) Peri (c. 1560-1630) F. Anerio (1560-1630) Monteverde (1567-1643) Frescobaldi (1583-1644) Allegri (1584-1652)	Cavalli (c. 1600-76) Benevoli (1602-72) Carissimi (c. 1604-74)	Corelli (1653-1713) A. Scarlatti (1659-1725) Buononcini (1660-1750) D. Scarlatti (1683-c. 1757) Durante (1684-1755) Porpora (1686-c.1766) Tartini (1692-1770) Leo (1694-1766)	Logroscino (c. 1700-63) Pergolesi (1710-36) Jomelli (1714-74) Piccini (1728-1800) Sacchini (1734-86)	Paisiello (1741-1816) Cimarosa (1749-1801) Clementi (1752-1832) Zingarelli (1752-1837) Viotti (1753-1824) Cherubini (1760-1842) Spontini (1774-1851) Rossini (1782-1868) Donizetti (1797-1848)	Bellini (1802-35)	Verdi (1813-1900)
German........		Isaak (c. 1450-1517) Hofhaimer (1459-1556) Agricola (1496-1556) Senffl (1492-1555)		Sweelinck (1562-1621) Hassler (1564-1612) Prätorius (1571-1621) Schütz (1585-1672) Schein (1585-1630) Scheldt (1587-1654)	Froberger (1605-67)	Pachelbel (1653-1706) Keiser (1674-1739) J. S. Bach (1685-1750)	Graun (1701-59) Gluck (1714-87) P. E. Bach (1714-88) Mozart (1756-91)	Haydn (1732-1809) Beethoven (1770-1827) Hummel (1778-1837) Spohr (1784-1859) Weber (1786-1826) Marschner (1795-1861) Schubert (1797-1828)	Lortzing (1803-51) Mendelssohn (1809-47) Schumann (1810-56) Hiller (1811-85) Flotow (1812-83) Wagner (1813-83) Franz (1815-92) Kiel (1821-85) Raff (1822-82) J. Strauss (1825-99) Brahms (1833-97)	
French..........	Dufay (c. 1400-74)		Goudimel (c. 1505-72)		Cambert (c. 1628-77) Lully (1638-87)	Couperin (1668-1733) Rameau (1683-1764)		Grétry (1741-1813) Le Sueur (1760-1837) Isouard (1775-1818) Boieldieu (1775-1834) Auber (1782-1871) Hérold (1791-1833) Meyerbeer (1791-1864) Halévy (1799-1862)	A. C. Adam (1802-56) Berlioz (1803-69) F. C David (1810-76) Ambroise Thomas (1811-96) Gounod (1818-93) Offenbach (1818-80) Bizet (1838-75)	

CHRONOLOGICAL CHART OF COMPOSERS (*Continued*)

English.........	Dunstable (c. 1400-53)		Tallis (c. 1520-85)	Byrd (c. 1538-1623) Morley (1557-1604) Dowland (1562-1626) Bull (1563-1628) Orlando Gibbons (1583-1625)	Humfrey (1647-74) Purcell (1658-95)	Handel (1685-1759)	T. A. Arne (1710-78)	J. Field (1782-1837)	Benedict (1804-85) Balfe (1808-70) Bennett (1816-75) Wallace (1824-65) Barnby (1838-96)	Sullivan (1842-1901)
Flemish........	Binchois (c. 1400-60)	Hobrecht (c. 1430-c. 1506) Okeghem (c. 1430-c. 1513) Josquin Deprès (c. 1450-1521) Willaert (c. 1490-1562) Gombert (c. 1495-1570)	Arcadelt (1514-c. 1575) Orlando di Lasso (1520-94)					Gossec (1734-1829)		
Russian........									Glinka (1804-57) Rubinstein (1830-94) Tschaikowsky (1840-93)	
Danish..........						Buxtehude (1639-1707)			Gade (1817-90)	
Hungarian...									Liszt (1811-86) Heller (1814-88)	
Spanish........				Vittoria (c. 1540-c 1608) Morales (fl. 1550)						
Polish...........									Chopin (1809-49)	
Bohemian.....									Smetana (1824-84)	

a high character, notably the pianoforte quintet. (See QUARTET; QUINTET.) The concerto for pianoforte in A minor is justly beloved by artists and public alike. It contains passages of rare romantic beauty. But it is in his songs and smaller pieces for the pianoforte that the peculiarly introspective nature of this German musician is seen at its best. The *Carnaval, C major Fantasia, F sharp Minor Sonata,* the *Symphonic Studies,* the *Fantasiestücke, Kreisleriana, Toccata*—most spiritual of technical studies—*Papillons,* and the rest are Schumann's monuments. As a song-writer he ranks below Schubert and with Robert Franz and Brahms. Franz Liszt (1811-86), after bewitching the world with his wondrous pianoforte playing, composed an incredible quantity of music, and the twentieth century will doubtless give him the laurels of the composer he craved. His pianoforte music is in the highest degree stimulating; his orchestral compositions, *Symphonic Poems,* and symphonies *Faust, Dante,* and the superb *Graner Mass* proved too tempting for his son-in-law, Richard Wagner, who assimilated their melodic content and harmonic audacities in his music-dramas. Liszt's is still music of the future. The exact antipodes of this gifted Hungarian was Johannes Brahms (1833-97), who, finding the classic forms sufficiently strong for his new wine, poured it out with gravity and unhurrying serenity. His four symphonies (colored by Hungarian feeling), his piano and chamber music, are the revelations of a noble nature. Brahms is not dramatic in the theatric sense, but he has epic breadth of utterance, and his music is always noble. A romantic in feeling, his Teutonic reserve checked extravagance; and yet his later piano music, with its formal freedom and novel content, proclaims Brahms to be far from the ascetic classicist his critics style him. He is the great symphonist since Beethoven, and in his chamber music is second only to the Bonn master. His songs prove him to be a born romanticist and a poet of recondite moods. Raff, Rubinstein, Henselt, Heller, Bruch, Hiller, Rheinberger, Gade, Reinecke, Scharwenka, Moszkowski, Saint-Saëns, Grieg, Svendsen, Goldmark, Bruckner, Dvořák, César Franck, Bizet, d'Albert, Gounod, Chabrier, Humperdinck, Massenet, Godard, Bungert, Debussy, C. M. Loeffler, d'Indy; the Russians, Glinka, Dargomyzhky, Rubinstein, Borodin, Balakireff, Mussorgsky, Cui, Rimsky-Korsakoff, Glaziunoff, Rachmaninoff, Scriabine, Tschaikowsky; the memorable army of virtuosi and singers, Paganini, Bottesini, Wieniawski, Popper, Joachim, Davidoff, Wilhelmj, Kalkbrenner, Thalberg, Bülow, Clara Schumann, Karl Tausig, Joseffy, Rosenthal, Essipoff, Paderewski, Pachmann, Sophie Menter; the singers, Sontag, Malibran, Albani, Rubini, Lablache, Mario, Jenny Lind, Tamburini, the two Pattis, the de Reszkes, and others whose name is legion—all these are derivative composers or interpreters. Grieg and Dvořák deserve especial mention for their national characteristics—Norwegian and Bohemian. Grieg is a harmonist of rare skill, and Dvořák a master of orchestration. His sympathetic music displays influences of Schubert and Smetana (1824-84), the latter Bohemia's representative musician. Tschaikowsky (1840-93), Russia's one supreme composer, is treated at length elsewhere, as is Richard Strauss.

MUSIC IN THE UNITED STATES is largely the history of the past quarter of a century. Before that, Italian opera ruled the eastern shore of the land, and previous to the advent of Italian opera in 1825—a company that included Garcia and his daughter, Malibran—the psalmody was the sole musical pabulum of our nation. Struggling for independence, transfixed by many wants and dangers, it is not surprising that hymn-tunes of the most primitive order should prevail. Our ancestors were too busy fighting, or toiling for daily food, to find solace in the arts. And the Puritan draped the country in the deepest morality, so that music with difficulty conquered a place. Thomas Hastings, Lowell Mason, and Dudley Buck have done much to elevate church music, though our real musical culture began not with the numerous visits of Italian opera, but with the formation of local orchestras; the Philharmonic Society of New York, the Boston Symphony Orchestra, the Chicago Symphony Orchestra, the Pittsburg and Philadelphia orchestras, and also the many choral societies throughout the country. Theodore Thomas was our pioneer in matters symphonic, and, both with the Philharmonic and Chicago Symphony Orchestra, his work will never be forgotten. Carl Zerrahn, Carl Bergmann, Henschel, Louis Maas, Leopold Damrosch, Asger Hamerik, Anton Seidl—who first taught us the beauties of the Wagner music-drama—Frank Van der Stucken, Arthur Nikisch, Wilhelm Gericke, and Emil Paur have all contributed their quota to the general fund of culture. Resident conductors are George Chadwick, Victor Herbert, the Damrosch brothers, Walter and Frank, Fritz Scheel, Arthur Mees, F. X. Arens, B. J. Lang, E. Heimendahl, Jules Jordan, and many others, while in the domain of popular music the names of Gilmore and Sousa have become classic. The so-called vein of negro music, so dear to folk-lorists, was mostly written by white men. John Howard Payne wrote "Home, Sweet Home," to which Stephen C. Foster's "Old Folks" is a close second in popularity. But the present generation of composers contains men in its ranks of real worth, though their culture has been attained under European masters: John K. Paine, William Mason, Pratt, Gleason, George W. Chadwick, W. W. Gilchrist, Arthur Foote, Converse, Edward A. MacDowell, Horatio W. Parker, Frank Van der Stucken, Henry Holden Huss, Harry Rowe Shelley, Edgar Stillman Kelley, Walter Damrosch, Arthur Whiting, Reginald de Koven, Rubin Goldmark, and last but not least that most brilliant pianist and composer of Creole music, Louis Moreau Gottschalk (1829-69), who was long considered a representative American by Europeans. Music is now a necessity in America, and the culture of choral singing makes several of the larger universities like Harvard, Yale, Columbia, Pennsylvania, Ann Arbor, and Oberlin, have chairs of music. Foreign artists find in the United States a veritable gold mine, for singers draw higher salaries here than in any other part of the globe. So we have enjoyed the great music-makers of the world, from Malibran to Ternina. Many of the famous virtuosi, Thalberg, Von Bülow, Essipoff, Rubinstein, Joseffy, Rosenthal, Paderewski, de Pachmann, d'Albert, Fannie Bloomfield Zeisler among pianists; and Vieuxtemps, Sivori, Ole Bull, Camilla Urso, Wieniawski, Sarasate, Wilhelmj, Reményi, César Thomson, and Ysaye, violinists, are a few of the prominent artists who have earned applause and money on these shores. Dr. Antonin Dvořák made New York his home for three years as the director of the National Conservatory, and composed here his *New World Symphony.* American singers, especially women, are better known abroad than our native composers; Albani, Clara Louise Kellogg, Annie Louise Cary, Minnie Hauk, Emma Thursby, Antoinette Sterling, Lillian Nordica, Emma Nevada, Emma Eames, Sibyl Sanderson, Lilian Blauvelt, Zélie de Lussan, and others have honored their country with artistic triumphs. Adelina Patti spent the early years of her life in New York, and, as well as Christine Nilsson, Parepa, Gerster, Melba, Sembrich, and Lilli Lehmann, has been adored by enthusiastic operagoers. Thus far America has not produced a genuinely representative composer.

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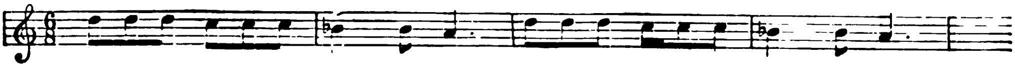
MUSIC, PSYCHOLOGY OF. The psychology of music deals with the mental processes which furnish both the motives for its production and the ground of its appreciation. It has an individual and a social aspect: for music as an art involves not only the individual consciousness, as such, but also, since it is a means of expression and communication, the modification of one mind by another.

The mental elements primarily involved in music are sensations of tone. Of the 10,000 or 11,000 tones which may be distinguished in consciousness, music uses a comparatively small number. Our own elaborate musical system includes only 85 or 90, ranging from about 40 to 4000 vibrations per second; something less than seven octaves. The simple tonal sensation is produced by an uncompounded pendular vibration of the air. The note or simple clang is composed of a number of simple sensations, called partials or partial tones, one of which (the lowest) is the fundamental; the others are called overtones. The character ('timbre,' 'clang-tint,' 'quality') of the note is determined by the number and intensity of the various partials. (See CLANG-TINT, EXPLANATION OF.) Every simple tone has three aspects or attributes: quality, intensity, and duration (qq.v.). Quality is pitch (high or low); intensity is degree (a tone is 'loud' or 'soft,' strong or weak); duration is temporal length (long or short). To these some psychologists add a fourth attribute, extension or voluminousness; a tone is said to be 'big' or 'thin,' 'broad' or 'pointed.' It is a question whether the spatial attribute is not reducible to simple qualitative differences plus associations from vision and pressure. By the combination and variation of the first three attributes, all classes and forms of music are produced. There is, first of all, the combination of qualities and intensities in the note, which is the practical basis of music. Above this stand the alternations of intensities which produce rhythm, the successive rise and fall of pitch forming the essence of melody, and the synchronous combinations of pitches (see FUSION) known as harmony. Music began, doubtless, with the simplest of these combinations. We find in primitive music a small number of qualities used over and over, without the finer shadings of intensive differences, with little or no appreciation of harmony, but often with a strongly marked rhythm, accentuated by various bodily movements. (See ART, PRIMITIVE.) But the growth of music has been marked not so much by complications in quality, intensity, and duration—great as these have been—as by another factor in development which has proceeded *pari passu* with the mental evolution of the race. This factor is the capacity to group and unify series of units, the capacity to form perceptions and associations between isolated tones. A perception (q.v.) is always something more than the summation of a series of sensational elements. It is the reading of meaning, of significance into the series taken as a group or whole. Musical perception has developed in precisely the same manner as have other forms of perception, by the widening and deepening of meaning. Compare, e.g. a savage's perception of a protruding stratum of rock with a geologist's. One is poor, simple, shallow—as bare as the rock itself; the other is rich, complex, deep—as complicated as the conditions under which the rock was formed: it contains group after group, and leads to complex trains of associations. The case is similar with music. Primitive man used a simple musical alphabet and spelled out simple, childish phrases. Take as an instance the following example which the aborigines of Australia were accustomed to reiterate over and over for hours:



Put this beside Wagner's "Ring of the Nibelungs." The two may be said to represent almost the extremes of musical culture, the capacity to combine tonal elements into significant unitary wholes. The monotonous chant of the Australian, no less than the creations of Wagner and Beethoven, contains a design, an organization, a putting into definite form of a number of detached elements. It is this which distinguishes music from a haphazard arrangement of tones or the isolated calls and cries of animals, however important these may have been in the genesis of music.

But if music implies form, it also implies content. It is a vehicle of expression no less than a way of arranging and organizing tones. When now we come to inquire into the processes which lie behind musical production, we find that they are various and highly complex. We shall, however, get an insight into their nature if we look upon music both as a means of conscious expression and as a medium of communication. Regarded in this light, music takes its place beside gesture speech and writing. It differs from speech, however, in that it gives voice to feelings and emotions instead of to ideas. Speech is primarily a medium for the communication of 'thought,' and when it attempts to express emotion and sentiment borrows straightway from music—either rhythm (in taking poetic form) or melody (in constructing recitative or song)—or it may go back to the common root of speech and music, and enrich itself from the language of gesture and mimetic movement. But while music's ultimate appeal is to the sensibilities, it cannot be said to exist apart from the intellect or the will. Such absolute disjunction could only rest on the fallacy that intellect, feeling, and volition are separable faculties of the mind. (See FACULTY.) Music arouses not only feeling, but also thought and action. The complex nature of the 'musical consciousness' is indicated by the fact that it is now called a feeling, now an emotion, now a perception, and now a sentiment. (See these words.) It is, indeed, all of these. The pleasurable feeling which music induces is undeniable: it arouses an emotion in the sense that it presents 'situations' which call forth organic sensations squarely faced by the attention; it includes the organization of auditory sensations into unitary perceptual wholes; and, finally, it involves sentiment by taking the form of the æsthetic judgment, e.g. 'these elements combined in this way are beautiful.' Nor does this exhaust the contents of musical expression. There may be, both in the motive of the artist and in the consciousness aroused in the hearer, imaginations, retrospections, moods, desires, associations, resolves, and volitions. Thus far does the 'musical consciousness' range. The key to its complexity is furnished by a review of the large number of modes through which music appeals to consciousness. In the first place, simple tones have an affective value, which is different at different parts of the scale. Secondly, the simple clang or note varies not only, as we have seen, in sensational elements, but also in pleasantness and unpleasantness, as its clang-tint changes. Thirdly, the same element of fusion which amalgamates the partials in the note is also present in the chord. Fourthly, the chord is also more or less pleasant, more or less consonant or dissonant. Other elementary factors are the indefinite number of possible accentuations, of pitch sequences, repetitions, and alternations, of similarities and contrasts. Add to these the possibilities of modulation from key to key, the host of figures in each of which there is the charm of the like and the diverse, of symmetry and of complexity, and of unity maintaining itself in variety; add the employment of various instruments, including the human voice, and centuries of experience lending their wealth of associations, and the intricacies of musical composition and appreciation receive at least a partial explanation. The explanation cannot be completed except by a comprehensive account of the genesis and development of music. (See ÆSTHETICS; MUSIC.) There are two or three stages in the evolution of music which deserve mention here on account of their psychological importance. The first is the production of the scale. It is very difficult for us to conceive what music would be without a definitely formulated scale. We have so constantly in mind the scale which has formed the basis of Western music for centuries that it is almost impossible to appreciate the mental processes of people who have had music without a definite scale, or even of those whose scheme of intervals differs from ours. And yet, it is certain that a formulated scale follows upon musical practice. The scale came from melodic utterances as rhythm came from the regular movements of the dance. We find in the music of savages informal and unsystematic vocal expressions of feeling which are sometimes no more than intoned wails or howls, sometimes haphazard collections of simple figures repeated with little order or unity. When these become definite enough to be remembered and to be repeated from time to time, material for the formation of scales begins to collect; but the scale as an abstract arrangement of musical intervals appears only at a comparatively late stage of intellectual progress. The nucleus of the scale was probably at first a single interval—an interval which was agreeable and expressive. A comparison of various scales, Eastern and Western, ancient and modern, points to the fifth and the fourth as the first intervals to be selected. Gradually other notes were added and two general types of scales were formed: the pentatonic (scales based on five notes), in use in China, Japan, Java, and the Pacific Islands, and the heptatonic (based on seven notes), the scales of India, Persia, Arabia, ancient Greece, and modern Europe. In all countries the octave seems to have been more or less explicitly recognized. The fact that most Caucasian races have produced seven-note systems, and the peoples of Eastern Asia five-note systems, indicates that the general structure of the scale depends ultimately upon artistic impulses which are common to a given type of mind. The attempt to derive the heptatonic scale from an earlier, more primitive pentatonic, seems to have failed. The two types appear to be equally primitive. Instruments giving a diatonic scale date as far back as the Stone Age. Doubtless, the choice of the interval of the semitone depends largely on the fact that the semitone is the smallest interval that the human voice can produce with ease and accuracy. Wallaschek, however, is of the opinion that the voice even with the aid of the ear would never have produced regular scales without help from musical instruments. Simplicity in construction and use of instruments determined, he believes, the formation of the two great types of scales. But there is no reason why vocal utterance itself should not have produced intervals of varying degrees of pleasantness and unpleasantness which would supply sufficient motive for the choice of a definite scale. The modes of Greek music furnish a good instance of scale construction upon a melodic basis; while our own major and minor scales illustrate the effect which harmony produces upon scale-making. The fact that the scale, as we have it now, was a thousand years in the making gives evidence at once of its evolutionary character and of its dependence upon antecedent and contemporary musical practice. From a melodic system was gradually developed the tonal sequence in which every note has its artistic functions in relation to every other note. This principle of tonality, relation of the various parts of the scale to the tonic, has had a gradual development no less than the selection of tones. Helmholtz remarks that primitive music, since it depends largely upon verbal expression to complete its meaning, has little need for tonality. This is true even in Greek and early Christian music. He argues that tonality is a purely æsthetic product, which has been increasing up to modern times. The latest modification of our scale has been the introduction of regular chromatic intervals (represented by the black keys upon the piano), for the purposes of modulation and the assimilation of keys. It would require, however, a great number of extra notes to produce the pure diatonic scale on each note taken successively as tonic. Various compromises have, therefore, been made by tempered intonation, in which the pure intervals are more or less modified. The present method of tuning in use among Western peoples is based upon the system of equal temperament, which divides the scale into twelve equal parts, or semitones. This system allows no perfectly pure interval except the octave, but is extremely simple and affords opportunity for varied musical expression.

From what has been said of the scale, it may easily be seen that its function is to furnish a stable basis for musical construction. It represents the results of æsthetic instincts and judgments which have been accumulating for centuries, and it is, at the same time, the embodiment of the principle consciously or unconsciously underlying every musical composition.

A second factor of psychological importance in the history of music is the growth of polyphony and harmony (qq.v.). It has often been said that the earliest form of musical expression was melodic. It is certainly true that there are great racial as well as temporal differences in the apprehension of harmonic relations. Hottentots, e.g. have shown a keen native appreciation for European harmonies which have failed to move the Chinese and other Orientals. But, at the same time, it may be laid down as probable that the same tonal peculiarities which had led to the development of melody have led also to the production of harmony, whether these peculiarities rest, ultimately, in the fusion of simple tones (Stumpf) or depend upon clang-relationship (Helmholtz). It must, however, be admitted that there are periods in which either melody or harmony seems to have an almost independent development. The history of European music furnishes a good illustration. Western music was essentially melodic in ancient Greece. The early Christians borrowed the melodic Greek modes in mutilated form. To these was added, very gradually, a new element. Ecclesiastical tunes were sung with the intervals of the fifth and the fourth, and attempts were made to sing different tunes together. Then came a long era of development of polyphonic music. Contrapuntal arrangement reached a high degree of perfection in the service of the Church. But the movement away from simple melody was destined to extend much further than the perfection of counterpoint. Choral singing had already laid the basis for the elaborate system of harmony which now began to be formulated. By the end of the sixteenth century the independent significance of chords and their artistic connection, apart from the progression of 'voices,' came to be recognized. This was the real opening of the modern era of harmonic music. There are two chief factors which contributed to its establishment: (1) the Church's demand for intelligible chorus and congregational singing, for which the complicated polyphonic forms were not suitable; and (2) the rise of the opera, which in its revival of ancient tragedy called for solo singing with harmonic accompaniment. The wealth of harmony has been greatly augmented by the development of instrumentation, which has reached its climax in the modern orchestra.

In making a survey of the achievements of Western music, it is important to keep in mind the fact that our system is largely a product of taste and by no means the only possible way of utilizing the tonal elements at man's disposal. Other races and other epochs have solved their musical problems in other ways. These, if not so agreeable to us as our own, have been satisfactory to their inventors. Neither can our canons of taste be regarded as more fixed than are others. They are, on the contrary, extremely variable. Even since mediæval times so radical a change has been effected in æsthetic preference as the substitution of first the fifth and the fourth, and later the major third, for the octave as the most agreeable interval. What further changes will take place it is unsafe to predict.

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MUSIC, CONSERVATORY OF. A school for instruction in music. See CONSERVATORY.

MUSIC, SCHOOLS OF COMPOSITION. In order to make possible a general view of the numerous composers that have contributed to the erection of the structure of music, musical historians have agreed to classify various composers into schools. The composers thus classed together under a certain school show common influences or tendencies, but dividing lines between the various schools are often imperfectly marked.

I. *The Old French School* (c.1100-1350).—The principal merits of this school are the invention of the *Fauxbourdon* (a progression of voices in sixths and thirds) and the *Discant* (contrary motion of voices). This contrary motion led to counterpoint, and this again to the establishment of a system of notation in which the different values of the notes in regard to time were definitely fixed. (See MENSURABLE MUSIC.) After a *discant* was once set in contrary motion to a *cantus firmus* composers soon conceived the idea of adding a third and even a fourth voice. But the masters of the Old French School did not stop here; they succeeded also in imparting complete independence to the individual voices. Three art-forms were developed: the *motet, rondellus* (rondeau), and *conductus* (conduit). In all these forms are found well-defined passages of writing which to-day we call 'canon' and 'imitation.' The prominent masters are: Leonin, Perotin, De Garlande, Franko of Paris, De Vitry, De Machault, De Muris.

II. *The Gallo-Belgic School* (c.1350-1500).—The masters of this school began to feel the emptiness of consecutive fourths and fifths, and so used sixths and thirds more freely. Greater attention was given to the leading of the voices, and technique made great strides. Occasionally the compositions rise above the level of mere technicality. The principal masters are: De Zeelandia, Faugues, Dufay, Binchois, Busnois, Regis.

III. *The School of the Netherlands* (c.1450-1600).—This school divides itself into four distinct periods: (A) Okeghem developed the art of canonic writing to such an extent that it became merely ingenious trickery. Instead of unified forms, the works of this school present a conglomeration of detached details. Okeghem's successors were: Hobrecht, Tinctor, Jannequin, Brumel, Compère. (B) The leader of the second period is Josquin Deprès, a pupil of Okeghem. He and his contemporaries strove to make their skill subservient to artistic purposes by emphasizing the symmetry of form and by paying attention to the development of their themes. The leading composers are, besides Deprès, Agricola and Mouton. (C) The extreme artificiality of the two preceding periods led to a reaction in favor of a more simple and natural style. The masters started from Josquin's principle of symmetry. They also developed the purity of harmonic writing, and insisted upon definite melodic phrases. Several of them carried this style to Italy, where they became the founders of new schools. These composers were: Gombert, Willaert, Goudimel, Arcadelt, Van Rore. (D) The fourth period shows the influences which the Italian schools had begun to exert over the mother school. Whereas the importance of the earlier schools rests entirely upon the vocal works, the fourth period marks the rise of instrumental music (organ) in the works of Sweelinck, who practically became the founder of the famous school of the North German organists. The whole school of the Netherlands reached its culmination in the works of Orlando di Lasso, a master scarcely inferior to the great Palestrina. The great musicians of this period are: Sweelinck, Lasso, Di Monte, Pevernage.

IV. *The Old English School* (c.1220-1600).—(A) England possesses the oldest known specimen of polyphonic writing, the famous canon "Sumer is icumen in." As long as the school of the Netherlands was regarded as the oldest, this manuscript puzzled musical historians. Coussemaker in 1865 proved the existence of the still older French School (I.), and so this canon is now assigned to the year 1226. During the fifteenth century a school showing the same general characteristics as the Old French School must have existed in England, if we may judge from a few preserved compositions by John of Dunstable. (B) The reign of Henry VIII. witnessed a considerable musical activity, but no new style was created. The representative composers, Redford, Johnson, Merbecke, and Tye, show the influence of the School of the Netherlands. (C) These men really prepared the way for the next generation, when the style of the School of Venice predominated. Of this period numerous large choral works and madrigals have been preserved. The chief composers are: Farrant, Tallis, Byrd, Gibbons.

V. *The School of Venice* (1527-1612).—Willaert brought the musical art of the Netherlands to Venice, where he settled in 1527. Under the influence of the more impressionable Italian musicians, he gradually acquired a new style. In the style of the Netherlands each voice was practically independent, and its relation to a definite chord was not strongly pronounced. The Venetian masters established the chord as their basis, and, instead of simultaneous progressions of voices, we find, rather, progressions of chords. The independence of the separate voices was restricted, but not abolished. The custom of writing for a double chorus was introduced, the madrigal was perfected, and for the first time vocal works with instrumental accompaniment appear. The great composers of this school are: Willaert, A. Gabrieli, Van Rore, Zarlino, Merulo, Donati, G. Gabrieli.

VI. *The School of Rome* (1535-1674).—The founder of this school was Goudimel, who settled in Rome about 1535. While the Venetian School regarded the chord as a basis, and gained their effects largely by means of modulation, the Roman masters restored greater freedom to the individual voices, and subordinated technique to art. The introduction of secular themes into sacred works had led to serious abuses, but the Roman masters, especially Palestrina, proved that the contrapuntal style is not antagonistic to the dignity proper to church music. To the Roman School also belongs the honor of having originated the oratorio (Carissimi) and a distinct instrumental style (Frescobaldi). Merulo in Venice had done much to develop the toccata, but not until Frescobaldi appeared did instrumental music become entirely free from the influence of vocal music. The greatest masters are: Goudimel, Festa, Animuccia, Palestrina, Nanini, Anerio, Allegri, Frescobaldi, Carissimi.

VII. *The Spanish School* (1540-1608).—Spain at no time succeeded in establishing an original school. During the sixteenth century several Spanish composers lived in Rome, and returning to their native land, carried with them the art of the Roman School, so that in reality the Spanish School forms only a part of the Roman School. The most prominent Spanish masters are Da Vittoria and Morales. The Portuguese composer à Goes shows the influence of Gombert, which can be accounted for by the fact that this Flemish musician spent some years in Spain.

VIII. *The German Polyphonic School* (1500-1625).—This school divides itself into two periods, the former showing Flemish, the latter Venetian, influences, but in the frequent and bold use of dissonances the German masters go beyond their predecessors. The chief composers showing Flemish influences are: Isaak, H. Finck, Senffl, Hermann Finck. Those showing Italian influences (almost all pupils of G. Gabrieli) are: Gallus, Gumpeltzhaimer, Hasler, Aichinger, Prätorius.

IX. *The School of Protestant Church Music* (1540-1672).—(A) In Germany, the Reformation popularized church music by the introduction of congregational singing. For untrained voices simple music was needed, and this need gave rise to the *chorale*, which originated in the singing of sacred words to popular folk-songs. The musicians whose importance rests chiefly upon their chorales are: Luther, Walther, Eccard, Calvisius, Franck, Schein. (B) From the earliest times it had been customary in the Catholic Church to recite during Holy Week the Passion of Our Lord according to the Gospels. Luther desired to preserve this custom for the Reformed Church. He translated the text and had various composers furnish the music. Thus arose the "Passion," to the cultivation of which many German masters devoted their best energies. Along this line vocal polyphonic music steadily developed until, in the works of Schütz, German music reached an originality that places it on a level with the famous Italian schools. The German School combines the beauty of the Roman School with the massiveness of the Venetian. In addition, there is a tenderness and a subjective, passionate element quite distinct from the colorless solemnity of the early Italian music. The important masters are: Schütz, J. C. Bach, J. M. Bach.

X. *The School of German Organists* (1620-1722).—(A) While vocal music was steadily advancing, instrumental music, although of later date, was not neglected. Sweelinck had founded a great school in the Netherlands, which trained many Germans, who carried the art into their native land. There the cities of Hamburg and Lübeck became the centres of a new instrumental school whose basis was the chorale. The principal forms cultivated were the *toccata, ciaconna, fugue*, and, toward the end of the period, the *sonata*. The great North German masters were: Scheidt, Scheidemann, Reinken, Buxtehude, Kuhnan. (B) While the North German masters developed the style of Sweelinck, a group of composers in the middle and south of Germany worked along similar lines, but under the influences of Frescobaldi and the Roman School. The authority of the Italian sonata writers had by this time extended to Germany, and the forms of the *sonata da chiesa* and the *sonata da camera* were cultivated. Nor was the *fugue* neglected. All the great composers used the Italian forms, but infused their own individuality into them, and thus prepared the way for J. S. Bach, who wrested the leadership in musical affairs from Italy and transferred it to Germany. The German masters who aided in this great work are: Kerl, Froberger, Pachelbel, Muffat, Biber.

XI. *The School of Florence* (1594-1676).—While the earlier Italian composers cultivated almost exclusively the polyphonic style of vocal music, a school with widely different tendencies sprang up in Florence. The revival of the learning of Greece led to an attempt to reconstruct the ancient drama. Thus arose the monodic style, in which one voice sings while instruments furnish the accompaniment. In 1594 Peri set an entire drama, *Dafne*, to music in this manner. Crude as the attempt was, it found favor, and in less than half a century the new style had conquered all Europe. Its development was not confined to Florence; in fact, its greatest exponent, Monteverde, was a native of Cremona, although he lived chiefly in Mantua and Venice. But as the style originated in Florence, it seems advisable to classify all composers identified with its development under the Florentine School. This school first dispensed with the preparation of dissonances, and greatly developed the orchestra, establishing the strings as its foundation. The works of this school were first designated by the title *Dramma per musica*. About 1650 we find *Opera per musica*, which soon afterwards became simply *Opera*. The principal names of this division are: Peri, Caccini, Monteverde, Cavalli. See OPERA.

XII. *The School of Naples* (1675-1757).—As early as 1475 a Flemish master, Tinctor, settled in Naples, but not until two hundred years later did a distinct school arise. From Rome and Venice the Neapolitans adopted the polyphonic church style, from Rome the oratorio, and from Florence the musical drama. The new school paid more attention to the melodic outline of the highest voice, perfected the form of the *aria* (q.v.), and introduced it into their dramatic works. Whereas the Florentine musical drama consisted of continuous recitative by a single voice, the Neapolitans introduced not only the aria, but also choruses, duets, trios, etc. The Florentines had emphasized the *dramatic*, the Neapolitans emphasized the *musical* element. They also cultivated the form of the concert overture. (See OVERTURE.) Transferring the form of the *sonata da chiesa* to compositions for the clavichord, and introducing a secondary against a principal subject, they prepared the way for the modern sonata. The principal masters are: Stradella, A. Scarlatti, Durante, Logroscino, Leo, D. Scarlatti.

XIII. *The Early School of French Opera* (1645-1764).—After the Old French School had been supplanted by that of the Netherlands, we have no more records of music in France until 1645, when a work of the Florentine monodic style was produced in Paris. The rise of the French drama through the works of Corneille, Racine, and Molière turned the general attention to the stage. Lully became the founder of a distinct school of French opera. The characteristics of this school are better dramatic characterization and the raising of the chorus to an active participation in the dramatic development. The orchestra also is increased by the addition of kettledrums and trumpets, and the character of the wood-wind is recognized. The important names are: Cambert, Lully, Marais, Rameau.

XIV. *The Later School of Venice* (1650-1739).—The German Protestant masters had introduced a subjective and emotional element into their church music. This became the keynote of the later Venetian masters. A distinctive feature is the development of some particular theme which begins in a lower register and gradually rises higher and higher, leading to an effective climax. The growth of the orchestra also gave the composers an opportunity to heighten the effect of their vocal polyphonic works. The chief masters of this school are: Legrenzi, Lotti, Caldara, Marcello.

XV. *The English School of the Restoration* (1660-94).—After the death of Gibbons in 1625 music declined rapidly in England. This decline is due to the unsettled state of affairs during the reign of Charles I. and the fanaticism of the Puritans, who objected to the cultivation of music, and destroyed many valuable manuscripts. When, at his accession in 1660, Charles II. attempted a restoration of music, practically a new start had to be made. In spite of many drawbacks, however, music soon attained its former importance. Purcell, the greatest musical genius England has ever produced, now appeared, and under his inspiration English music rose to such a height that for a short time England boasted a national school of opera. The principal composers of the Restoration are: Humfrey, Wise, Blow, Purcell.

XVI. *The School of Italian Sonatists* (1620-1800).—Up to the seventeenth century the organ was the great means of developing instrumental music (toccata, ricercare, fugue). By the beginning of that century the violin had been considerably perfected and attracted a number of musicians in Northern Italy. These composers prepared the way for our highest musical art-form, the sonata. About 1650 a distinction began to be made between *sonata da chiesa* and *sonata da camera;* the former consisted of several movements of contrapuntal writing, the latter employed various dance-forms. Great attention was paid to thematic development. The instrumental concerto was introduced and the *concerto grosso* was cultivated. The principle of musical dualism, first announced by Scarlatti, was strongly emphasized. While in the eighteenth century all the art-forms in Italy declined, this school of sonata writers was the only one that made progress in the art. The principal masters are: Legrenzi, Bassani, Torelli, Veracini, Corelli, Tartini, Boccherini.

XVII. *The School of the German Singspiel* (c.1630-1800).—(A) In the beginning of the seventeenth century there arose in Germany the so-called 'school comedy'—dramatic representations by students. Each act was preceded by a short musical dialogue introducing mythological personages. This custom led to the establishment of the German *singspiel* (q.v.), in which the acting personages were shepherds, shepherdesses, nymphs, etc. These *singspiele* finally gave rise to a national German opera in Hamburg, but not until Hiller in Leipzig established the *singspiel* upon the basis of the folk-song did this form rise to an artistic level. The composers of this school are: Strungk, Kusser, Keiser, Mattheson, Handel, Telemann, Hiller, Dittersdorf, Schenck, Weigl, Winter. (B) While the *singspiel* was popular with the masses, the German princes, decrying everything that was German, favored the Italian opera. Especially Vienna and Dresden became strongholds of the foreign style. Many German composers began to write Italian operas, and thus aided the rapid decline of dramatic composition. Among these composers we find: Hasse, Graun, Doles, Naumann. See OPERA.

XVIII. *The Italian School of Decadence* (c.1750-1810).—With the aria the Neapolitan School had given to music that form which was soon to bring about a general decline of dramatic music. Dramatic truth counted for nothing; sensuous charm of melody and display of vocal art were paramount. Composers became the slaves of singers. The ballet became an important factor in the opera. Naturally composers did not waste time in studying counterpoint and polyphonic writing when success was so easily won by writing pretty melodies over the plainest harmonic accompaniment. The principal names of this school are: Porpora, Pergolese, Jomelli, Piccinni, Sacchini, Paisiello, Salieri, Cimarosa, Zingarelli, Righini, Paër. See OPERA.

XIX. *The Classic Masters* (c.1700-1827).—As the contributions to music by our great classic masters are fully treated under the separate titles, mention is made of them here merely for the sake of completeness. BACH marks the culmination of the polyphonic period of music (see POLYPHONY), as well as the beginning of the new homophonic-harmonic period. (See HOMOPHONY.) In him the *passion* (q.v.) and the *instrumental fugue* reach their highest development. He brings equal temperament (q.v.) into universal use. HANDEL brings the *oratorio* (q.v.) and the *vocal fugue* to perfection. Taking up English music where the premature death of Purcell had left it, he becomes the founder of a new English school. GLUCK reforms the opera by emphasizing the dramatic in opposition to the purely musical element, without, however, disturbing the forms of the aria, chorus, duet, ensemble, etc. He greatly advances the art of orchestration. HAYDN perfects the *sonata* (q.v.) and establishes the modern form of the symphony and string quartet (q.v.), as well as the symphony orchestra, by individualizing the separate instruments. He is the 'father of modern instrumental music.' MOZART invents no new forms, but fills those existing with the contents of his wonderful genius. He is a universalist, equally great in all the forms he handles. In the works of BEETHOVEN absolute music reaches a point which would indicate the highest possible development, beyond which no progress can be imagined. He greatly enlarges the forms of Haydn and Mozart, and replaces the *minuet* (q.v.) of the symphony by the *scherzo* (q.v.). He strikes passionate accents never heard before in music, and discloses marvelous depths of emotion. SCHUBERT creates the art-song (*kunstlied*). (See LIED.) In the field of instrumental music he follows the path opened by Beethoven, but preserves his own strong individuality.

XX. *The English School Since Handel* (1750-1829).—When Handel settled in England in 1718 the national opera of Purcell had been entirely superseded by the Italian. Handel's own Italian operas exerted no uplifting influence, and have shared the fate of the works by his contemporaries. But when Handel began to cultivate the oratorio he laid the foundation of his fame as well as that of the English School. Unfortunately, he remained the only master. His contemporaries and immediate successors were unable to carry on his work, although they made earnest efforts. They, therefore, turned their attention to the opera—not the foreign Italian product, but the national English opera. They even succeeded in establishing a style of their own different from the German *singspiel* or the French *opéra comique.* The spoken dialogue occupied altogether too much space, and, although the musical numbers were not lacking in a certain freshness and melodious charm, they were utterly devoid of all dramatic expression. Hence this national opera died with its authors. The most prominent composers are: Arne, Arnold, Dibdin, Storace, Hook, Shield.

XXI. *The French Grand Opéra* (1774-1864).—A peculiarity of the French opera is the fact that several of the masters who have contributed most materially to its advancement were foreign born. After the death of Rameau, French national opera was at a standstill, during which time the Italian opera gained ground. Then a German, Gluck, appeared with his reforms. The success of his *Iphigénie en Aulide* in 1774 marks the beginning of a new era of French opera. The new style was taken up by two Italians, Cherubini and Spontini, who finally established the *grand opéra.* Then native French composers began to take part. The characteristics of this school are: the prevalence of tragic subjects; the absence of spoken dialogue; the great attention paid to declamation, which very often degenerates into empty rhetoric and hollow bathos; a heavy orchestration, whose aim is for striking effects; and elaborate ensembles and finales. The introduction of a ballet after the second act is indispensable. In the choice of subjects those taken from history are specially favored. This school may be divided into two periods, roughly separated by the year 1830. The characteristics just mentioned apply more strictly to the second period (Meyerbeer); while the works of the first period, as a rule, are marked by a greater earnestness of purpose as far as the purely musical setting is concerned. The principal composers are: Gluck, Berton, Gossec, Cherubini, Lesueur, Spontini, Auber, Rossini (*Tell*), Meyerbeer, Halévy. See OPERA.

XXII. *The French Opéra Comique* (c.1760-1870).—This school presents three sharply marked periods. The productions of the first period somewhat resemble the German *singspiel.* The subjects are taken from everyday life or fairy tales. The secco-recitative of the Italian *opera buffa* gives place to the spoken dialogue; for the aria is substituted the French *chanson.* The works of the second period (c.1800-30) show the influence of German romanticism. The purely comic subjects are replaced by a mixture of comedy and romanticism. The music assumes a more serious character and better musical characterization is attained; the orchestra becomes an important factor, and the ensemble is strongly influenced by that of the *grand opéra.* In fact, some of the masters of the *grand opéra* belong equally to the *opéra comique* (Cherubini, Auber, Halévy). In the works of the third period we find very often that the only comical thing about them is their designation as *opéra comique.* Composers do not hesitate to choose tragic subjects. And yet such works are called *opéra comique,* because they differ from *grand opéra* by the fact that there is spoken dialogue. Nothing can very well be more tragic than Bizet's *Carmen.* But it contains spoken dialogue; hence it is *opéra comique.* In *opéra comique* there is generally a healthier musical atmosphere, less striving for mere effect, more truthful dramatic expression, less artificiality. The great masters of this school are: Philidor, Monsigny, Grétry, Cherubini, Méhul, Isouard, Auber, Boïeldieu, Hérold, Halévy, A. Thomas, Bizet, Delibes.

XXIII. *The School of Bel Canto* (1813-68).—We have seen that the opera in Italy declined rapidly after the middle of the eighteenth century. With the appearance of Rossini a new school may be said to begin. Even before him singing was the chief attraction; but his predecessors relied upon the technical skill of the singers to please the audience. Rossini surpassed all Italian operatic composers before him in the power of melodic invention. It is this sensuous charm of melody that distinguishes the school of the *Bel Canto* from the school of Decadence. Besides Rossini, the principal exponents of this style are Donizetti and Bellini. Of only secondary importance are Generali, Mercadante, and Pacini.

XXIV. *The German Romantic School* (1818-80).—The German romantic opera was developed from the *singspiel.* About the middle of the eighteenth century witches, gnomes, ghosts, and all kinds of spirits were introduced into the *singspiel,* which thus gradually gave rise to a new kind, the *Zauberoper* (magic opera). Although the texts of these productions were silly, and the attention was distracted from the purely musical element to the scenic decorations, yet this *Zauberoper* led opera into the realm of the mysterious, phantastic, and wonderful, where it has scored its greatest triumphs. The real beginning of the Romantic School is marked by the appearance of Weber's *Freischütz* (1818). With the appearance of romanticism music becomes more and more the individual, subjective expression of each composer, so that it is exceedingly difficult to arrange composers into schools. One characteristic of the Romantic School in general is the great advance in orchestral tone-coloring over the classic masters, and a decided preference for dissonances. Not only the different instruments become so many separate voices, but a distinction is made even between the various registers of the same instrument. Harmony becomes greatly enriched and is the principal means of emotional expression, while rhythm assumes greater diversity and complexity. Music in general becomes more intense and passionate. The instrumental composers at first fill the classical forms with romantic contents, and then originate new forms. In the field of dramatic music the principal composers are: Weber, Spohr, Marschner, Lortzing, Holstein, Kretschmer, Goldmark, Götz, Nessler, Brüll. Those who devoted their energies to instrumental and choral works are: Spohr, Schumann, Mendelssohn. The latter master has much in common with the classicists, and became the head of a school whose principal representatives are: Hiller, Reinecke, Jadassohn. The influence of Schumann is perceptible in another group of masters, of whom the most prominent are: Franz, Volkmann, Jensen, Huber. Midway between these two schools, and preserving characteristics of their own, are Raff and Rheinberger.

XXV. *Wagner — Liszt — Brahms* (1843-97).—Among the great German masters of the nineteenth century three stand forth so prominently that it is impossible to classify them. Wagner and Liszt became founders of two distinct schools, whereas Brahms stands alone, without followers. Wagner began as the successor of the romantic opera of Weber. His reformatory work is concerned not with the opera in particular, but with dramatic composition in general. He emphasizes the drama and asserts that music must only follow and intensify the text. He practically banishes the chorus, ensembles, etc., and substitutes the monologue. The voices declaim in a highly dramatic kind of recitative, while the development of the musical ideas is assigned to the orchestra. The unifying principle of his works is the leitmotiv (q.v.), which constitutes the basis of the *musical drama* (q.v.). The music-drama is a combination of the dramatic, musical, and plastic arts into one new art-form. Wagner demands first of all a *drama*, not a text or libretto (q.v.); all the resources of music are to be employed toward a true interpretation of this drama; and the plastic arts are to combine with music. The orchestra is enormously enriched by new tone-colors and means of expression. (See MELOS; OPERA; WAGNER.) Liszt applied Wagner's principle of descriptive music to purely instrumental music, and became an exponent of 'programme music' (q.v.). Unable to make the classic form of the symphony serve his purpose, he invented the *symphony poem*. In the field of piano-music he becomes the originator, with Schumann and Chopin, of modern pianoforte technique. Together with Wagner and Berlioz he also laid the foundations of a new school of conducting (the interpretative conductor). (See CONDUCTOR; LISZT.) Brahms, in an age of musical excitement and innovations, stands forth as the keeper of classical forms. He successfully carries on the style of Beethoven's third period, faithfully preserving the form, but showing the possibility of filling it with new and original contents. Thus he proves that absolute music is unlimited in its scope and power of expression; that its capabilities were not exhausted even by the titanic Beethoven; that any original genius can employ those forms for conveying his ideas; that the polyphonic art of Bach can successfully be combined with the homophonic-harmonic art of Beethoven and with Romanticism. See BRAHMS.

XXVI. *The Berlin Academicians* (1830-1900). —While Brahms was not hostile to the development of music, a number of composers refused to recognize that Romanticism was an advance in the art of music. They closed themselves to the new influences and sought their ideals in the past. The strongholds of this school were several Berlin institutions, notably the *Singakademie*. (See CHORAL SOCIETIES.) The energies of these masters were directed to the cultivation of the polyphonic style of the older Italian schools and Bach. But some of the later masters finally adopted the principles of Romanticism. The important names are: Dehn, Grell, Kiel, Bargiel, Blumner, Becker, Bruch, Hofmann, Herzogenberg, Gernsheim.

XXVII. *The Neo-German School* (1847—). —The beginning of Liszt's activity in Weimar in 1847 may be regarded as the commencement of this school. Liszt attracted a great number of young musicians who enthusiastically devoted themselves to the cultivation of programme music, carrying out Liszt's ideas. But the Neo-German masters did not devote their energies entirely to the field of instrumental music. Wagner's works attracted more and more admirers, and composers began to imitate him. Up to the present day a great many dramatic works constructed upon Wagner's principles have been written. The failure of all would seem to indicate that one might almost be justified in stating that Wagner's art-form is one suited to his own gigantic genius, but hopeless for lesser masters. This would seem to be confirmed by the fact that the new dramatic works that have achieved success are all by non-German composers who adopted many of Wagner's ideas, but not his form *in toto*. The Neo-German School has been marked by earnest effort, but its composers have made no lasting impression. The only one whose work seems destined to outlive contemporary criticism is Richard Strauss, a man of pronounced originality and as a master of orchestration equal to Wagner himself. The dramatic composers of this school are: Cornelius, Ritter, Bungert, Kistler, Humperdinck, Kienzl, D'Albert, Weingärtner, Schillings, S. Wagner. The instrumental composers are represented by: Krug, Nicodé, Mahler, Hausegger.

XXVIII. *The Modern Italian School* (1851—). —Beginning about 1750, the history of Italian music is practically the history of the decline of the opera. When Verdi scored his first success in 1839 no one dreamt that this man, beginning in the degenerate style, would raise the Italian opera to a high level. In *Rigoletto* (1851) there is a very perceptible effort for dramatic truth and characterization, which the school of Bel Canto entirely ignored. The successive works advance along this line until in *Aïda* (1872) we have a rare combination of exquisite melody, dramatic characterization, and truth of expression. *Otello* (1887) and *Falstaff* (1893) mark the culmination of Italian opera. Wagner's principle of dramatic truth is strictly observed. Nevertheless these works are not imitations of Wagner. Verdi has retained all the forms of the opera, but has knit them together into an artistic whole. The principle of the leitmotiv is not used. The orchestration shows a mastery never exhibited by any previous Italian composer. The influence of Verdi is noticeable in a number of composers known as the *Veriotic* School (Mascagni, Leoncavallo), who for some years attracted much attention. Among the many operatic composers, none of whom can approach Verdi, the following deserve mention: Boito, Ponchielli, Marchetti, Faccio, Coronaro, Puccini, Smareglia. The elevating influence Verdi exerted upon dramatic music turned some serious composers to the field of instrumental and choral music, which had been sadly neglected in Italy. The principal instrumental and choral composers are: Pinelli, Sgambati, Cesi, Grazzini, Mancinelli, Martucci, Franchetti, Perosi.

XXIX. *The Modern French School* (1830—). —So far we have spoken of musical development in France only in connection with the theatre. Instrumental music had not been cultivated to a very great extent. But we cannot disregard the name of the family of Couperin during the seventeenth and eighteenth centuries. Several members have become famous through their contribution to the perfection of the suite-form. Under section XXII. the history of dramatic music up to the death of Meyerbeer has been given. Berlioz first awakened a deeper interest in instrumental music. This master was led to instrumental composition through the influence of Beethoven, but, uninspired by the classic forms, he became the originator of programme music (q.v.). His works, all conceived in large forms, lack symmetry of construction and have not yet found universal recognition. But Berlioz first aroused general interest in France for instrumental music and, independently of Wagner, did much for the art of orchestration. Soon other composers began to cultivate instrumental music; and these used the classical forms. After Berlioz's ideas of programme music had been adopted by Liszt, who established the symphonic poem as a recognized art-form, French composers accepted the idea. All through the past century German classical and romantic influences have been at work in France. The mingling of these influences with the individuality of the French masters has been productive of excellent results, and to-day France can boast an influential instrumental school. The principal masters are: David, Franck, Lalo, Saint-Saëns, Bizet, Delibes, Godard, d'Indy, Chausson, Chaminade, Halm. But dramatic music did not remain at a standstill; the German romantic opera and lyric drama influenced French dramatic composers. Although the grand opera (the historic and heroic opera of Meyerbeer) was in danger of losing sight of dramatic truth in its striving after mere effect, the *opéra comique* and the later lyrical French drama are distinguished for truth of expression and successful musical characterization. Wagner's works have exerted only a wholesome influence, for French composers wisely did not imitate his form, but only followed the German master in the art of orchestration, as well as in a few other principles which can be safely adopted without danger of losing individuality. The most prominent dramatic composers are: Gounod, Saint-Saëns, Bizet, Massenet, Chabrier, Guiraud, Reyer, Massé, Bruneau.

XXX. *The Polish School* (1830—).—The Slavic and Scandinavian nations took no important part in the development of music until the last century. (For a complete account the reader is referred to the articles on SCANDINAVIAN MUSIC and SLAVONIC MUSIC.) Polish music is chiefly represented by the works of Chopin, who is one of the founders of a new school of piano-playing. His original harmonic combinations have become a great means in modern emotional expression. He also showed how embellishments can be made an important factor of expression. The other Polish masters show less national characteristics, and those living at present in Germany are more German than Polish. The principal Polish masters are: Moniuszko, Kurpinski, Dobrzynski, X. and Ph. Scharwenka, and Moszkowski.

XXXI. *The Russian School* (1836—).—The beginning of a distinct school may be dated from the first performance of Glinka's *Life for the Czar*. At first the national school cultivated chiefly dramatic composition, but soon composers turned also to instrumental music, in which line several have achieved marked success. The characteristics of Russian music are strength and great variety of rhythm, amounting almost to irregularity. The prominent masters are: Bortnianski, Verstowski, Glinka, Dargomyszki, Seroff, Borodin, Cui, Balakireff, Mussorgski, Tschaikowsky, Rimski-Korsakoff, Arenski, Glasunoff, Rubinstein.

XXXII. *The Scandinavian School* (1840—).—Like the Russians, the Scandinavians established a distinct school by emphasizing the national element in music as it was presented in their folk-music. Denmark made the beginning, but Norway soon took the lead. The characteristics of the school are an artistic use of dissonances and an emphasis of rhythm, rather than of melody. The principal masters are: (Denmark) Berggreen, Hartmann, Gade, Enna; (Sweden) Hallstroem, Södermann, Hallén, Sjögren; (Norway) Kjerulf, Svendsen, Nordraak, Grieg, Sinding. See SCANDINAVIAN MUSIC.

XXXIII. *The Bohemian School* (1866—).—The attempts of Russian composers to establish a national opera led Bohemian musicians to make the same experiment in their own country. A distinct Bohemian school may be said to begin with Smetana's *The Bartered Bride* (1866). Smetana also was the first notable instrumental master. He, and still more Dvořák, have made the Bohemian school famous, but the merit of the instrumental works overbalances that of the dramatic compositions. The forms cultivated are those of the German classic and romantic masters. The principal composers are: Schraup, Skuhersky, Schebor, Rozkosny, Smetana, Dvořák, Fibich. See SLAVONIC MUSIC.

XXXIV. *The Modern School of the Netherlands* (c.1800—).—Although after the time of the great contrapuntal schools of the fifteenth and sixteenth centuries we meet no distinct school in the Netherlands, music was not neglected in those countries. But the influences of the neighboring countries, France, and especially Germany, always predominated, thus preventing the rise of a national school. Both Belgium and Holland have produced a number of excellent composers. But the importance of the Netherlands during the nineteenth century rests more upon the contributions to musical history. In this line Belgian writers are second to none in the world. Without the labors of Fétis, Coussemaker, and Gevaert our knowledge of the musical past would be very incomplete. Besides, Belgium has produced some of the greatest instrumental performers (De Bériot, Vieuxtemps, Léonard, Servais). The more prominent of the composers are: (Belgium) Janssens, Benoit, Mertens, Wouters, van den Eeden, Tinel, Mathieu, Gilson; (Holland) Verhulst, Koning, Coenen, Silas, Hol, Thooft, de Hartog.

XXXV. *The Modern English School* (1830—).—The predominance of spoken dialogue had caused the downfall of the English opera. About 1830 some English composers attempted to write national operas with a moderate amount of dialogue. The works of Weber assisted them in their efforts, but as these earlier works were of a lighter character English opera soon assumed the character of operetta. The appearance of Sullivan established this form upon a firm basis. In the field of grand opera England has as yet produced no successful work. The cultivation of instrumental music, through the influence of Beethoven, has yielded more satisfactory results, but the best work has been accomplished in the field of choral music. The modern English composers have not succeeded in developing a characteristic style, but their works show solid workmanship and mastery of form. The weak point is thematic invention; the themes lack spontaneity. The list of English composers is a very long one. The following deserve special mention: (Dramatic music) Bishop, Balfe, Barnett, Macfarren, Wallace, Benedict, Sullivan, Stanford; (Instrumental and choral music) Costa, Bennett, Barnby, Stainer, Parry, Cowen, Mackenzie, Coleridge-Taylor.

XXXVI. *The American School* (1880—).—We have seen that the English school of the Restoration (XV.) was obliged to rebuild what the Puritans had destroyed. Music beginning in America with the Puritan psalm-tunes and under Puritan influence naturally could not develop. Its growth came only with foreign influences; and even then considerable time had to elapse before any works by American composers appeared. Even at this present day there is no American school showing distinctive traits; the best works show German influences. The use of American themes (negro or Indian melodies) adds perhaps local color, but is not sufficient to create a school. It is a significant fact that the best works in which national themes are employed were written by a Bohemian, Dvořák. Among the composers who have produced works of sterling merit are: Gilchrist, Foote, Chadwick, Bird, Horatio Parker, van der Stucken, Klein, MacDowell.

For further information the reader is referred to the separate articles on Folk-Music; Music; Opera; Oratorio, and on the various important composers, forms of music, and musical instruments. Consult also: J. Hawkins, *A General History of Music* (London, 1875); *Oxford History of Music* (Oxford, 1901 et seq.); W. S. Rockstro, *General History of Music* (London, n. d.); A. W. Ambros, *Geschichte der Musik* (Leipzig, 1887-91); W. Langhans, *Geschichte der Musik im 17., 18., 19. Jahrhundert* (Leipzig, 1884-87); A. Svoboda, *Illustrierte Musikgeschichte* (Stuttgart, 1892); E. Naumann, *Musikgeschichte* (Berlin, 1885), translated also into English by F. Praeger (London, n. d.); A. Soubies, *Histoire de la musique* (Paris, 1900).

MUSICAL ART SOCIETY. See Choral Societies.

MUSICAL DICTATION. A branch of musical training of very recent date. The instructor sings or plays short musical selections or phrases which the pupil is required to fix in musical notation on paper. The object of musical dictation is not only to train the ear, but chiefly to develop the power of quickly grasping and fixing musical ideas. The beginning is made of course with simple melodies progressing in simple intervals. Gradually melodies with more difficult intervals are introduced. The next step is to melodies with a simple harmonic basis. A class for musical dictation was established at the Conservatory in Paris in 1871. Some of the German conservatories soon followed (Hamburg, Dresden, Karlsruhe, etc.). An elaborate treatise on the subject was published by A. Lavignac, *Cours complet de dictée musicale* (Paris, 1882). Smaller works are: Götze, *Musikalische Schreibübungen* (Breslau, 1882); and *Musical Dictation* (London, 1886) by Dr. Ritter (in Novellos series of Music Primers).

MUSICAL DRAMA, or Musikdrama. A term now generally employed to distinguish the later works of Wagner (*Tristan und Isolde, Die Meistersinger, Die Nibelungen, Parsifal*) from his earlier ones, or operas (*Rienzi, Der fliegende Holländer, Tannhäuser, Lohengrin*). Of a musico-dramatic work Wagner demands that the literary drama be the *first* and music the *second* consideration; whereas in the opera the music was almost the sole consideration. In his introduction to *Oper und Drama* Wagner declares emphatically: "The error in the art-form of the Opera consisted in the fact that a *means* of expression (music) was made the *end;* the *end* of expression (the drâma) a *means.*" After *Lohengrin* Wagner wrote chiefly theoretical works dealing with the method to be followed by the poet and composer in the production of a new form of art, which was to take the place of the opera. Several years elapsed before he began the composition of *Die Nibelungen,* according to his new artistic convictions. In the musical drama the fundamental material from which the music is constructed is the *leading motive.* (See Leitmotiv.) By this means artistic unity is obtained, whereas in the opera the different *numbers* may be artistic wholes, but can never be welded intimately together into the higher unity of the entire drama. Wagner's musical dramas have exerted a powerful and lasting influence upon all dramatic composers. For full information, the reader is referred to Wagner's *Oper und Drama,* vols. iii.-iv. of his *Gesammelte Schriften und Dichtungen,* (Leipzig, 1887); *Das Kunstwerk der Zukunft,* vol. iii. of same ed.; *Eine Mitteilung an meine Freunde,* vol. iv.; *Zukunftsmusik,* vol. vii. See also articles Melos; Opera; Wagner.

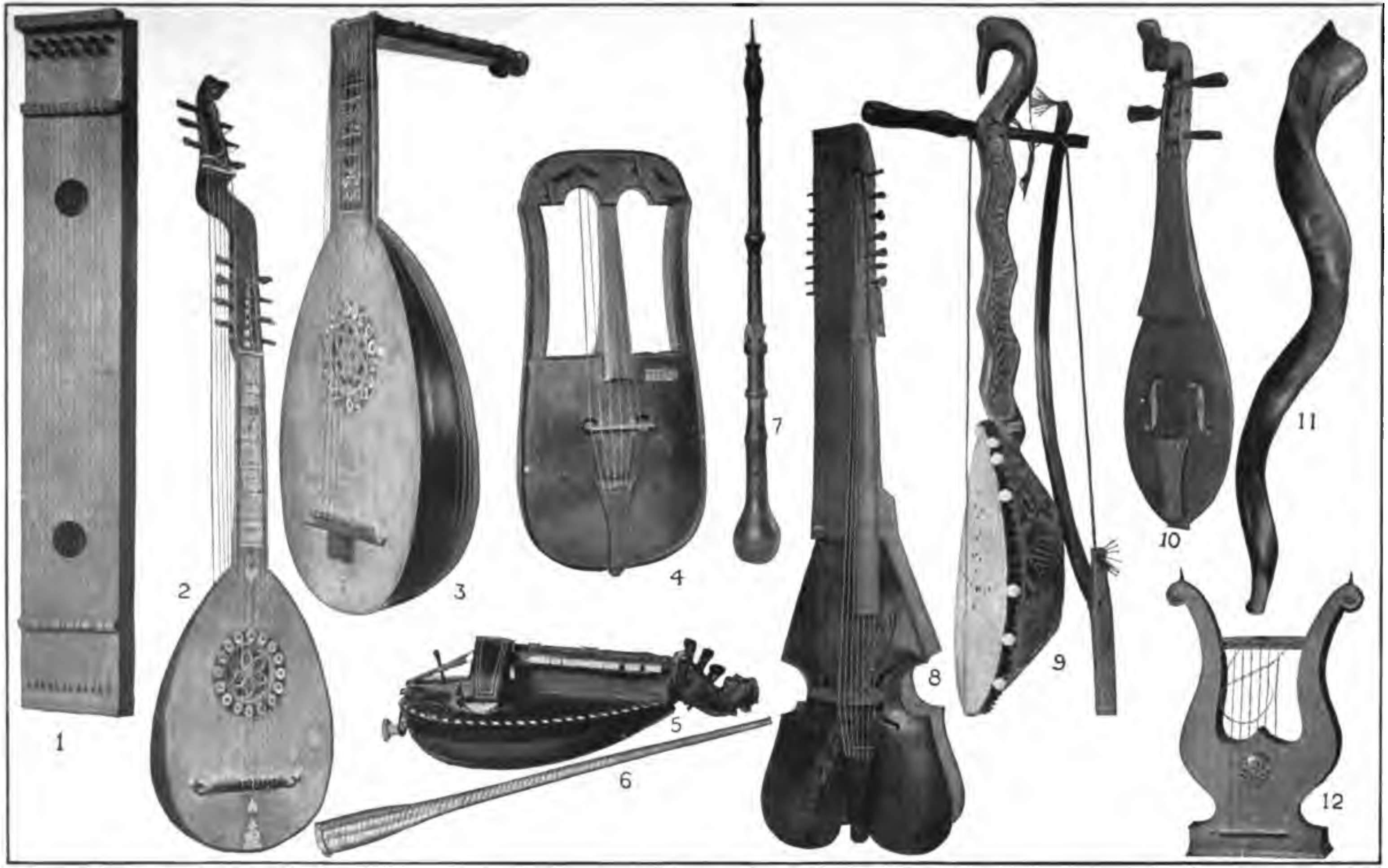
MUSICAL FESTIVAL. The performance of some large choral or orchestral work with a very large chorus or orchestra. The real era of musical festivals begins with the festival performances of the great Handel Commemoration held from 1784 to 1787 and again in 1791. It is true that previous to this time regular musical festivals were held in England; but they were practically unknown on the Continent. In England choral singing had always been more extensively cultivated than in any other European country, and the efficiency of English choirs led Handel to turn his attention in the direction of writing for large choral bodies in his oratorios. Since the first performance of the *Messiah* in 1749 it has remained a custom in London to perform that work with greatly augumented chorus and orchestra every year at Christmas. These performances on a grand scale in the English capital roused a feeling of national pride in the Germans, who felt that the great master belonged to them by birth. Festival performances of Handel's oratorios were first given in Berlin on the London plan and were imitated in other German cities. Soon the works of other composers were performed in a similar manner. And as on such occasions there was always a large orchestra, it was but natural that this body of instrumentalists was utilized in the performance of large orchestral works. Thus at the beginning of the nineteenth century several organizations devoting their energies to the production of any great work, whether choral or purely instrumental, sprang into existence in various parts of Germany. Among these the oldest and even to-day most famous are the *Gesellschaft der Musikfreunde* in Vienna and the *Niederrheinische Musikfeste,* which take place yearly in some city of the Lower Rhine District. The United States has not been behind in following the example of England and Germany, and many festivals are held almost yearly in several of the larger cities. On such occasions it is nothing unusual to find a chorus numbering from one to two thousand voices and an orchestra of from one to two hundred performers. These musical festivals have also powerfully affected the mode of conducting and have done very much toward establishing the universal custom of conducting by means of the bâton. Whereas formerly the conductor always presided at the piano, the handling of large bodies of singers and players necessitated the undivided attention of the conductor upon those whom he directed; and the singers, in turn, became likewise more dependent upon signs and gestures from the conductor. (See Conductor.) For an account of the principal musical festivals, see Bayreuth Musical Festival; Bethlehem Musical Festival; Cincinnati Musical Festival; Gesellschaft der Österreichischen Musikfreunde; Gewandhausconcerte; Leeds Musical Festival; Lower Rhenish Musical Festival; Sacred Harmonic Society; Salzburg Festival; Société des Concerts du Conservatoire; Sons of the Clergy; Tonkünstler-Societät; Musical Society of London; Three Choirs Festival; Worcester Festival.

MUSICAL INSTRUMENTS. The origin of many musical instruments dates back to the earliest times. Not a few of these ancient instruments are the prototypes of some of our modern ones. Monuments recently unearthed at Thebes and in the upper valley of the Nile contain representations of harps and flutes; and the relation of our modern instruments to the old Egyptian models is not difficult to perceive. In the case of other instruments the relationship is not so easy to trace, owing to the considerable modifications which they underwent in the course of centuries and in passing from one nation to another. Even so recent an instrument as our grand pianoforte can be traced through its many and vital changes to the dulcimer (q.v.) known to the Arabs and Persians. Hand in hand with the evolution of the art of music went the invention and perfection of musical instruments. Many of these were extensively used and admired in their day, but soon were superseded, so that to-day our museums are filled with various instruments of all times and nations preserved only as curiosities. Thus the large family of lutes is now entirely obsolete; and yet at one time these instruments enjoyed the same popularity as the pianoforte does to-day, and no orchestra was complete without them. If we except the stringed instruments, it may safely be asserted that no instrument found in the modern orchestra is the same as it was a century ago. All the instruments of the woodwind family have been vastly improved; the natural horns and trumpets have given way to the improved valve horns and trumpets; the serpents and ophicleides have been entirely superseded by the trombones and tubas. It may be said that the modern orchestra comprises the best and most efficient instruments now known, and the test for admission into this select family is sonority and beauty of sound. Musical instruments are generally divided into four large groups, according to the manner in which the sound is produced, viz.: (1) stringed instruments, (2) wind instruments, (3) instruments of percussion, (4) keyed instruments. This latter group embraces the organ and pianoforte, the former being really a wind, the latter a stringed instrument. Both differ from the other instruments of those groups in the use of a keyboard.

Stringed Instruments. Stringed instruments are divided into two principal classes: (A) Those in which the tone is produced by drawing a bow made of horse-hair across the strings. (B) Those in which the tone is produced by plucking the string either with the fingers or a small instrument called *plectrum*. The instruments of class A have but few strings (generally four), and depend for the production of their complete range upon stopping, i.e. shortening the vibrating portion of the string by means of the fingers. To this class belong (1) the violin, (2) the viola, (3) the violoncello, (4) the double bass. (See the separate articles.) Some of the instruments of class B have few strings like those of class A; others have a separate string for each note. Those having few strings are: (1) the mandolin, (2) the guitar, (3) the banjo. Those having many separate strings: (1) the zither, (2) the harp. (See the separate articles.) Formerly there were in use instruments that were played with a bow, which also had additional strings to be plucked with the fingers. (See Theorbo.) Among the stringed instruments by far the most important are those constituting the viol family (class A). The present perfection of these instruments is the result of a slow evolution of possibly a thousand years. But so far we have no evidence whatever that any instruments of the viol family were known in antiquity. Because Arabic authors of the fourteenth century mention stringed instruments, it was supposed for some time that viols originated in the Orient. This has been disproved by Gerbert, who in the second volume of his *Musica Sacra* published a representation of a European stringed *lyra* of the ninth century very similar in shape to the later *giga*. Even earlier, however, the crowd (q.v.) was known in Wales. For several centuries viols were built in two shapes, either with a flat body like the violin or with a pear-shaped body like the mandolin. During the fifteenth and sixteenth centuries stringed instruments of all possible varieties of shapes were built. These, however, were all superseded in the course of the following two centuries, when the art of violin-making reached its height. After the violin had been perfected the same attention was also bestowed upon the instruments of lower pitch of this family, such as the bratsche, viola da gamba, viola d'amore, etc. (See Violin; Violoncello.) A full account of how the viol family came to be the foundation of the modern orchestra will be found under Orchestra.

Wind Instruments. Under this heading are included all instruments on which the tone is produced by setting a column of air in motion. According to the material from which they are made, they are subdivided into: (A) Woodwind instruments, (B) brass instruments. Many of the wind class are transposing instruments, i.e. the tones actually produced upon them are *not* the same as those written for them. Let us take the clarinet family as an example. The

MUSICAL INSTRUMENTS



1. ÆOLIAN HARP
2. THEORBO
3. LUTE
4. CROWD or CRWTH
5. HURDY-GURDY
6. ALPENHORN
7. COR ANGLAIS
8. BARYTON
9. MONOCHORD
10. REBEC
11. SHOPHAR
12. LYRE

From the Crosby Brown Collection in the Metropolitan Museum of Art, New York

compass of the clarinet in C is from e to c^3. It is possible to obtain notes below and above this range by building clarinets in different keys. Thus the clarinet in A produces the same series of tones a minor third lower, so that the lowest tone is c♯ and the highest a^3. The clarinet in E♭ produces the tones a minor third higher, so that its lowest tone is g and its highest e♭^{3}. Hence the music for any transposing instrument must be written in a key *above* or *below* the key of the composition by the same interval as the key of the instrument is *below* or *above* C. For instance, a piece is written in A♭ major and the composer desires to employ the E♭ clarinet. Since every tone sounds a minor third higher than the written note, it is necessary to write this particular clarinet part in a key lying a minor third below A♭, i.e. in F. See TRANSPOSING INSTRUMENTS.

A. *The Wood-wind.*—The instruments belonging to this class are generally made of wood, but ivory is also used, and quite recently flutes have been made of silver. The instruments of the wood-wind family are: (1) the flute; (2) the piccolo (a small flute with very shrill tones); (3) the oboe; (4) the English horn; (5) the clarinet; (6) the bassoon; (7) the double or contra bassoon; (8) the flageolet. (See the separate articles.) This last instrument was extensively employed by Gluck and Mozart, but is now obsolete. Of the wood-wind instruments the English horn and the clarinet are transposing instruments, as was also the flageolet. All the wood-wind instruments have a rich, mellow tone approaching that of the human voice more closely than any other instruments.

B. *The Brass.*—The members of this class consist of (1) the horn; (2) the cornet; (3) the trumpet; (4) the trombone; (5) the tuba; (6) the ophicleide; (7) the serpent. (See the separate articles.) The two last named are obsolete. With the exception of the trombone, all these instruments are transposing instruments. The tones produced by brass instruments are distinguished as *natural* and *harmonic* tones. The former are produced upon the open tube by regulating the force of the air-current by means of the lips; the successive tones produced are the harmonics or overtones of the fundamental. (See HARMONICS.) All tones produced by the aid of the valves are called harmonic tones. In the case of the trombone the length of the vibrating air-column is not regulated by valves, but by a slide. Formerly the horns and trumpets had no valves, and these instruments are to-day called *natural* horns and trumpets. To produce a complete scale on them it was necessary to insert the left hand in the opening. They have now been entirely superseded by the valve-horns and trumpets. The trumpets must have undergone considerable change since the days of Bach and Handel, for in the works of these masters we find passages written for trumpets which no one can execute to-day. All the brass instruments are built in many keys, so that it is easily possible to write four-part harmony for only one group of brass instruments. For instance, in the case of trombones there are four varieties: the alto, tenor, bass, and double-bass trombone. The latest additions to the family of brass instruments are the tubas, which Wagner had constructed especially for his *Ring der Nibelungen.* See TUBA.

INSTRUMENTS OF PERCUSSION. The instruments of percussion may be divided into two principal classes: (A) Those which have definite pitch; (B) those which have not. The former class comprises (1) the kettle-drums; (2) the glockenspiel; (3) the xylophone. The latter class includes: (1) the bass drum; (2) the small drums; (3) the tambourine; (4) the tamtam; (5) the cymbals; (6) the triangle; (7) the castanets. (See the separate articles.) The chief use of instruments of percussion is for marking the rhythm. Those instruments that are devoid of definite pitch are capable only of rhythmic figures; whereas the glockenspiel and xylophone can play melodic figures as well. Of all the instruments of percussion the kettle-drums are the most important and most generally used.

For description of the keyed instruments (*pianoforte* and *organ*), the reader is referred to the extensive special articles.

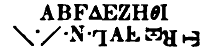
Under the above headings the instruments at present in use in the orchestra have been described in their general features and especially in their relation to other members of the same family. Besides the instruments mentioned, many others have been in use in former times. There are still others in actual use, but as they are not employed for music of a high character, they have not been discussed. Then there is still another class of instruments recently invented, which, however, have not yet come into general use, as the saxophone (q.v.). The following is a list of instruments of these classes: alpenhorn, bagpipe, basset-horn, bugle, cembal d'amore, chimes, clavichord, concertina, crowd, dulcimer, flügelhorn, glasschord, harpsichord, hurdy-gurdy, jews-harp, kazoo, krummhorn, lur, lute, lyre, ocarina, psaltery, sarrusophone, saxophone, shawm, spinet, theorbo, viol, virginal. Instruments of the nations of antiquity and of Oriental nations are treated in the special articles on the music of those nations.

Besides the instruments employed in musical performances, there are a few that are built solely for the purpose of acoustic experiments. These are (1) the monochord; (2) the siren; (3) the tuning-fork (qq.v.).

Among the most valuable works on the history of musical instruments may be mentioned: Wasielewski, *Geschichte der Instrumentalmusik im XVI. Jahrhundert* (Berlin, 1878); Comettant, *La musique, les musiciens et les instruments de musique chez les différents peuples du monde* (Paris, 1869); Vidal, *Les instruments à archet* (ib., 1878); Schletterer, *Die Ahnen moderner Musikinstrumente* (Leipzig, 1882); Hofmann, *Katechismus der Musikinstrumente* (ib., 1890); John Hawkins, *General History of the Science and Practice of Music* (originally published in five volumes in 1776, reprinted in two volumes, London, 1875). This latter work is particularly valuable for its many cuts of now obsolete instruments.

MUSICAL NOTATION. The art of expressing musical compositions in writing by means of certain conventional signs called notes. The oldest system of notation of which we have any knowledge is the *alphabetical notation* of the Greeks. The detailed descriptions of this system left to us enable us to decipher without much difficulty the few remnants of Greek music recently discovered. The Greeks employed uncial letters which appeared in a great variety of positions—inverted, sideways, divided in halves, etc. Thus no less than 120 different combinations were obtained.

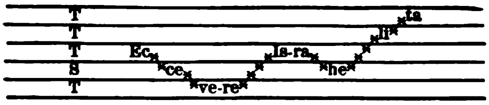
Example 1.



Long after the downfall of Greece this system of notation remained in use, especially in the writings of the theorists. During the sixth century A.D. Roman letters were first used. Boëthius employed the first fifteen letters of the alphabet. But these were later reduced to seven and applied to the degrees of the scale. These letters—as the Greek letters had also been—were placed in a straight line above the syllables of the words. Although in themselves sufficiently definite, the letters did not present to the eye the rising or falling of the melody, as does our modern notation. This need gave rise, in the eighth century, to a series of dots, hooks, curves, and peculiar figures which were placed above the syllables of the text at distances proportionate to the musical pitch of the note. These characters are known as *Neumes*. (See NEUMES.) From a combination of the signs of these Neumes and the alphabetical notation arose our modern system. But its progress was slow, and the complex system of *mensurable music* (q.v.) had first to outlive itself before the present simpler system was established.

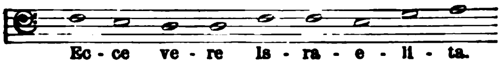
THE STAVE. The introduction of lines we owe to the Neumes. In the tenth century Hucbald took up the idea of using lines. He wrote the syllables between the lines, and at the beginning he indicated by the letters T and S whether the voice was to proceed by tones or semitones.

Example 2



This, in modern notation, reads

Example 3



By increasing the number of lines Hucbald was enabled to write even four-part compositions in this manner. Soon after his time dots were used *on the lines*, leaving the spaces vacant, and the degree of the scale was indicated by a Greek letter placed at the beginning of each line. But the great number of lines necessary rendered the reading of this manner of notation difficult, and it was soon abandoned. Guido of Arezzo in the eleventh century added two black lines to the red and yellow lines of the Neumes, in such a manner that the upper black line above the yellow represented E, and the second black line, drawn between the yellow and red lines, A.

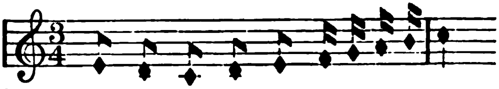
Example 4.

E ________________ black
C ________________ yellow
A ________________ black
F ________________ red

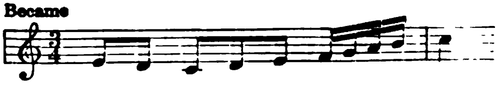
Whereas before his time only the spaces *or* the lines had been used, Guido made use of both lines *and* spaces. The advantages of this system were so obvious that this stave was soon adopted in every country of Europe. As long as music was homophonous, i.e. consisted of only a single melody, this stave answered all purposes. But the growth of polyphony soon rendered a greater number of lines and spaces an absolute necessity. No one seems to have thought of the simple idea of writing each voice on a separate stave. Instead the four lines were extended to six, eight, twelve, and even more. In the Paris Library there is a score, dating from the middle of the thirteenth century, in which all the voices are written on a single stave. The difficulty of reading scores written in this manner led musicians to adopt a uniform stave of nine lines arranged in two groups, each containing four black lines. The two groups were separated by a red line. In the fifteenth century we find three staves employed for different kinds of music. Plain chant melodies were written on a stave of four lines; all other vocal music on a stave of five lines; and a stave of six lines was used for all compositions written for the organ and virginal. After the invention of music-printing the five-line stave became the universal standard of all music, except the plain chant melodies, which to this day are written on a stave of four lines.

THE FORM OF THE NOTES. As long as music had no distinctive rhythm of its own and the musical accents were determined only by the word-accent, Guido's system of using simple dots answered all purposes. But it was not long before the need of notes having a fixed time-value made itself felt. Franco of Cologne, in the twelfth century, replaced the dots by notes of various shapes to indicate their relative duration. He also indicated the time-value of pauses or rests by a series of signs corresponding in duration to the different notes. A full account of this elaborate and difficult system will be found under MENSURABLE MUSIC. This system has become the foundation of our modern system of notation. The notes of larger value, the *large, long*, and *breve*, have disappeared, the *semibreve* having become our standard of value or *whole* note. The development of instrumental music during the eighteenth century brought with it a great advance in the technique of the instruments, and this led composers to write passages requiring more rapidity of execution than is possible to obtain from choral masses. Round notes were substituted for the square ones, because the former can be written more easily and rapidly. Another important innovation, and one which greatly facilitated the reading of scores, was the joining of all notes having hooks into groups readily recognized by the eye. Thus a passage which formerly was written

Example 5.



Became

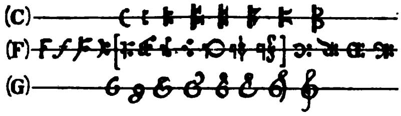


Whereas formerly the *semifusa* (corresponding to our sixteenth) was the note of smallest value, the increased rapidity rendered possible by instrumental technique led to a subdivision of sixteenths into thirty-seconds, and of these latter even into sixty-fourths. The signs denoting the rests in mensurable music have been adopted into the modern system without modification.

The Clefs. The oldest of the clefs is the F clef, which in its original form as a red line dates back to the tenth century. Almost as old is the C clef, which originally was a yellow line. These colored lines were used without a clef signature, as it was understood that every note upon the red line represented F, and every note upon the yellow line C. Later on the colored lines disappeared, black ones being substituted and the letter F or C placed at the beginning. (See Neumes.) The modern forms of these clefs are the result of a series of modifications of the plain letters.

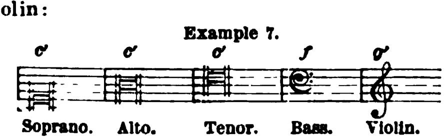
The G clef is more recent than the other two, but its present form is the result of similar changes of the letter G.

Example 6.



Originally the different clefs had no fixed position as they have to-day. In order to avoid the use of ledger-lines (which, in fact, were unknown), the position of the clefs was constantly shifted, so as to bring the range of every voice within the limits of the stave. In old manuscripts we find every clef, at various times, on every line of the stave. Even within the same melody the clef changes frequently. This arbitrary use of the clefs continued until the seventeenth century. The establishment of opera (q.v.) brought with it the introduction of many new instruments. To bring the range of all these instruments within the limits of the stave could not be accomplished any longer by the transposition of clefs. Previously some polyphonic writers of the sixteenth century had on very rare occasions resorted to the use of a single ledger-line above or below the stave. This idea was taken up by the operatic composers, and thus ledger-lines became a fixture in music. Now that there was no longer any need for the constant transposition of clefs, the positions of those that remained in use became definitely fixed. Each voice-part had its own clef, as also the violin:

Example 7.



In this form the classic masters have used the clefs. For the pianoforte the G and F clefs are used; the higher pitched orchestral instruments play with the G clef, those of lower pitch the F clef. The viola is the only one for which the alto clef (C) is retained. During the nineteenth century the C clefs have been superseded even in vocal music by the G clef.

Time-Signatures. Before the introduction of mensurable music there was no need of time signatures. The signatures used in mensurable music will be found in the special article on Mensurable Music. When, in the seventeenth century, the bar was introduced, composers soon saw an opportunity for reducing the very complicated and cumbrous time-signatures of mensurable music. The underlying principle of rhythmic division into binary and ternary forms still remained the basis. But, whereas in the older system ternary division (perfect) was the principal consideration and binary division (imperfect) only secondary, the new system inverted these relations by recognizing only binary division as natural. Ternary division was retained, but was regarded only as a modification of the natural binary division and obtained by the use of a dot which increased the value of the note by one-half. Moreover, all notes were referred to the whole note (the semibreve of mensurable music) as the standard of value. Thus the whole note was divided into two half notes, each half note into two quarters, etc. The time-signatures of this new system were expressed by fractions, the denominators indicating the subdivision of the standard whole note, and the numerators the number of subdivided notes to be allotted to each measure. The only signs still retained from mensurable music are the semicircle for common time (four quarters in a measure) and the semicircle with a line (alla breve), where the line still has the meaning of reducing the notes to half their duration.

The Bar. The earliest example of the use of vertical bars is found in Agricola's *Musica Instrumentalis*, which was published in 1528. The object of these bars, however, was only to keep the notes of the different voices one under the other, rather than to indicate rhythmic divisions. A few original drafts of older compositions give evidence that composers during actual composition did use bars to indicate the rhythm, although all the part-books up to the seventeenth century were printed without bars. The general use of bars we owe to the early composers of operas. Peri, in 1600, published the score of his *Eurydice* exactly as he had written it. In order to indicate clearly the connection between the different notes in the voices and accompanying instruments he drew vertical lines through the whole length of the stave. Caccini and Monteverde adopted this plan. The great facility of reading music printed in this way immediately led to its universal adoption. The new system of music, having established new signatures for time, allotted a certain number of beats to each bar, and in this way the bar became what it is to-day.

Accidentals. In spite of the strict laws governing plain chant and the use of the old Church modes, the human ear from the earliest times felt the need of a 'leading tone.' The tone of the scale that was subject to this modification was B. Thus at a very early time this letter was written in round (♭) and later square (♮) form to indicate whether the lower or higher tone was to be sung. It is easy to see how from these two forms arose our flat and natural (♭♮). Toward the end of the thirteenth century the sign ♮ was carelessly written ♯, and being applied to other tones than B, denoted the higher of the tones on the same degree. Thus, F♯ denoted the modern F♯, but F♭ was the same as our F natural, just as B♭ was regarded as the *natural* tone and B♯ (our B) a chromatic alteration of B♭. As a key-signature the sign ♭ appears first in the Church modes, but denoted only a transposition of the original mode. (See MODES.) Even in the eighteenth century a ♭ was used as a sign of resolution for a note having a ♯ or ♮ (these two signs were identical); and vice versa a ♯ or ♮ served to resolve a ♭. The signs of the double sharp and double flat (×, ♭♭) cannot be traced further back than the beginning of the eighteenth century. The sign × arose from writing the older ♯ in this position ⌗. Before the beginning of the seventeenth century accidental sharps, flats, or signs of resolution appeared very seldom in writing. The singer was supposed to introduce the necessary chromatic alterations during the actual performance. As long as the Church modes reigned supreme no use was made of regular key-signatures. A flat or sharp placed at the beginning of a piece denoted only transposition. But as soon as the modern major and minor scales displaced the modes the necessity of key-signatures arose, in order to avoid the great number of accidentals.

EXPRESSION MARKS. Toward the end of the eighth century we find in one old manuscript written in *neumes* small letters interspersed with the characters of the *neumes*. These letters refer to the expression. We find a small *f* (*fragor*), *b t* or *t* (*bene teneatur* or *teneatur*), *c* (*celeriter*), etc. This manuscript is the famous Antiphonary of Saint Gall. The works of the great polyphonic masters of the fifteenth and sixteenth centuries are utterly devoid of any marks of expression, nor are any evidences of expression marks to be found in works written between the eighth and fifteenth centuries. There really was no pressing need for such marks, for all music was vocal, and the text gave a sufficient clew to the singers, who were all thoroughly trained musicians. But the development of instrumental music gave rise to various marks of expression. Hand in hand with the development of instrumental music went the perfection of the musical instruments. Many new effects were discovered, and to express these composers were obliged to use words. Monteverde in his opera *Orfeo* (1608) demands that the trumpets play with mutes, and this is indicated in the score by the words *con sordini*. The same composer introduced a number of new effects in his *Tancredi e Clorinda* (1624), among which were the *tremolo* and the *pizzicato* for strings. Such effects were called for by the actual words placed in the score. These are the earliest instances of expression-marks. Operatic composers immediately followed the practice established by Monteverde. Among the earliest of purely instrumental masters who employed words to help the performers was Frescobaldi (1583-1644). He was particularly careful to indicate the tempo. One of his favorite marks is *adagio*. Soon the words *allegro, largo, grave, moderato* came into general use. In the course of the eighteenth century nearly all the important marks of expression and time were in use. The nineteenth century substituted convenient signs for some of the most frequently recurring marks, such as *crescendo* <, *diminuendo* >, *staccato* . . . . . , *legato* ⌒, *sforzando* ∧ etc., and increased the vocabulary of musical expression considerably. Some of the German masters of the last century, notably Schumann and Wagner, attempted to substitute a German terminology for the Italian. But the Italian terms are more definite, because two centuries of constant use have familiarized them to musicians of every nationality.

Another system of musical notation used formerly, especially for the lute, is discussed under TABLATURE. For the new system of designating chords by figures, used in theoretical treatises, see NUMERICAL NOTATION. A complete history of musical notation was written by Riemann: *Studien zur Geschichte der Notenschrift* (Leipzig, 1878); an abridgment of this is the same author's *Die Entwicklung unserer Notenschrift* (ib., 1881); Riemann, *Geschichte der Musiktheorie im IX.-XIX. Jahrhundert* (ib., 1898).

MUSICAL SAND. There are a large number of beaches, oftentimes, however, of very small extent, whose sand has the peculiar property of giving out a distinct musical tone when stepped upon. The musical note appears to depend upon the fact that the grains of sand are of such very uniform size that as they slip past each other under pressure the vibrations of the particles respectively reënforce each other so that sounds which would otherwise be inaudible become distinct, and the crunching noise which is heard when the foot presses down upon snow or ordinary sand becomes a clear musical note.

MUSICAL SOCIETY OF LONDON. A famous English musical society organized at London in 1683. At this period the study of choral music in England had assumed dimensions and a degree of artistic importance far greater than obtained in any other country. The success which had attended the work of 'The Corporation of the Sons of Clergy,' established in 1655 and incorporated by charter of Charles II., in 1678, led to the founding of the Musical Society, the principal function of which organization was the celebration of Saint Cecilia's Day. Among the poets who wrote odes for the society were Dryden and Congreve, and among the composers Purcell and Blow. At the last regular Cecilian festival held in London in 1703 the chorus numbered about thirty boys and as many men, and the orchestra about twenty-five persons. The society still occupies an important position in English musical life.

MUSIC BOX. A case containing mechanism constructed in such a manner that music can be produced automatically. Machines for making mechanical music have been known since the invention of clocks; but real music boxes were not introduced till after 1750. They have been greatly improved since then, and some modern musical boxes can play over 100 tunes. The mechanism is similar to that of the barrel-organ. The principal parts are the comb, the cylinder, and the regulator. Bells, drums, and castanets are frequently added to produce musical effects, and there are occasionally combinations of reeds and pipes. The musical boxes of Prague, Sainte Lusanne in France, and Geneva, Switzerland, are especially famous.

MUSIC-DRAMA. See MUSICAL DRAMA.

MUSIC RECORDER. See MELOGRAPH.

MU'SIMON. See MOUFLON.

MUSIN, mṳ'zăN', OVIDE (1854—). A Belgian violinist, born at Nandrin, near Liège. He studied at the Conservatory of that city under Heynberg and Léonard, followed the latter to the Paris Conservatory, where, in 1868, he won a gold medal, and taught for a year before leaving on his European and American concert tours that ultimately led him round the world. In 1898 he became violin professor at the Liège Conservatory, but continued to spend much time in the United States.

MUSK, or **MUSK DEER** (OF., Fr. *musc*, from Lat. *muscus*, from Gk. *μόσχος*, *moschos*, from Ar., Pers. *musk*, musk, from Skt. *muṣka*, testicle, mouse, from *muṣ*, to steal). An aberrant deer of the subfamily Moschinæ, which differs from ordinary deer in the lack of antlers; in the possession by the male of long upper canines, which project downward outside the lips; and in certain anatomical features. Hence there has been much discussion whether the animal should be included in the Cervidæ. There is only one species, *Moschus moschiferus*, of the high Himalayas, Tibet, and Eastern Siberia—a small animal, which stands about 20 inches high and has a clumsy form. Its favorite haunts are the tops of pine-covered mountains, but its summer range extends far above the region of pines. Its habits are nocturnal and solitary, and it is extremely timid. It is much pursued by hunters on account of its odoriferous secretion, which has been known in Europe since the eighth century, and is much valued as a perfume.

MUSK. This secretion is produced in a glandular pouch situated on the hinder part of the abdomen of the males, and its natural use seems to be that of increasing sexual attractiveness. The musk-bag, or 'pod,' is formed by an infolding of a portion of the skin of the belly, within which a number of membranes are contained, and between these membranes are glands by which the musk is secreted. When newly taken from the animal, musk is soft and almost resembles an ointment; it is reddish-brown, and has an excessively powerful odor. Very little of it reaches Europe unadulterated. Musk is usually imported either in the form of 'grain-musk,' that is, the musk which has been collected chiefly from stones upon which it has been deposited by the animal, in which state it is a coarse powder of a dark-brown color; or in the 'pod,' dried with the musk inside. Of both kinds the annual importations to the United States are about 15,000 ounces, chiefly from China and India. Small quantities are used in medicine, but the greater part is employed by perfumers. The kinds generally known in trade are the Tonquin or Chinese, and the Carbardine, Kabardine, or Siberian, which is inferior. Genuine musk has the valuable property of adding to the permanency of other odors. On account of its properties as a stimulant and antispasmodic, it is also used to some extent in medicine. See PERFUMERY.

BIBLIOGRAPHY. Lydekker, *Deer of All Lands* (London, 1898); Flower, a monograph in *Proceedings of the Zoölogical Society of London*, 1875. See Plate of FALLOW DEER, MUSK, ETC.

MUSKAT, mŭs-kăt′. A town of Arabia. See MUSCAT.

MUSK DUCK. (1) A very large Australian sea-duck (*Biziura lobata*), which has a musky odor. The male is decidedly bigger than the female and has a lobe of skin depending from its chin. (2) The Muscovy duck.

MUSKEGON, mŭs-kē′gŏn. A city and the county-seat of Muskegon County, Mich., 40 miles northwest of Grand Rapids; on Muskegon Lake, which is connected with Lake Michigan by a channel 200 feet wide and of ample depth for large vessels, and on three branches of the Pere Marquette, the Grand Rapids and Indiana, and the Toledo, Saginaw and Muskegon railroads (Map: Michigan, G 5). Through the liberality of one of its citizens the city enjoys numerous gifts—a manual training school, a public library, a gymnasium, a square, which is the site of a handsome soldiers' monument and of several bronze statues, and a hospital—for the maintenance of which also the donor has made ample provision. Muskegon has one of the finest harbors on Lake Michigan, open the entire year, which is in daily steamboat communication with Chicago, Milwaukee, and other lake ports. It carries on a large trade in lumber, fruit, celery, and other garden truck, and in the principal manufactures of the place, which include flour, paper, knit goods, furniture, refrigerators, curtain rollers, pianos, chemical engines, electric cranes, beer, and iron and tinplate products. The government is administered, under a charter of 1897, by a mayor, annually elected, a unicameral council, and subordinate municipal officers, chosen by the people. The city owns and operates the water-works. Though a trading post was here established in 1812, Muskegon was not permanently settled until 1834. In 1861 it was incorporated as a village, and eight years later was chartered as a city. Population, in 1890, 22,702; in 1900, 20,818.

MUSKELLUNGE, mŭs′ke-lŭnj. A common variant of maskinonge (q.v.).

MUSKET. See SMALL ARMS.

MUSKHOGEAN (mŭs-kō′gē-an) **STOCK.** A North American Indian stock which derives its name from Muscogee, the principal tribe of the Creek confederacy. (See CREEKS.) This is one of the most important linguistic stocks of the United States. It formerly occupied the greater portion of the territory of the Gulf States east of the Mississippi, and comprised the Creek, Choctaw-Chickasaw, Seminole, Apalachee, and a number of smaller tribes and bands, speaking perhaps five distinct languages, with several minor dialects. The difference was greatest between the Muscogee and the Choctaw proper, of which the Chickasaw was a dialectic form. The Seminole is a mixed dialect, based chiefly upon Hichitee, the prevailing language of the 'Lower Creeks,' formerly residing on the Chattahoochee River. The old Mobilian trade language (q.v.) was based upon Choctaw.

According to their traditions the Muskhogean tribes came from the West and Northwest, and those who formerly resided nearest the Mississippi, as the Choctaw and Chickasaw, have a clear tradition of having crossed that stream to enter their later territory. The migration must have occurred at a very early period, and they appear to have found the country occupied by other tribes whom they conquered and absorbed. Their authentic history begins with the first landing of the Spaniards on the Gulf coast under Narvaez in 1527. Thirteen years later De Soto traversed their country from east to west, finding the various tribes in practically the same positions which they occupied up to the period of their final removal to the Indian Territory. For three centuries their history is closely interwoven with that of colonization and conquest by the Spaniards, French, and English in the Southern States. Each tribe or village made such alliances as suited its purpose, with the exception of the Chickasaw, who, like the Iroquois in the North, remained the steady allies of the English, and by their command of the waterway of the Mississippi, were able to check the advance of French colonization by cutting off communication between Louisiana and the Illinois settlements. The Apalachee of Florida were Christianized at an early period by the Spanish Franciscans, but the entire tribe was exterminated by the English and their Indian allies about 1702, and the country left an uninhabited wilderness until it was gradually occupied by vagrant bands from the Creek confederacy, later known as Seminole, or 'runaways.' The Yamasi of South Carolina were driven from their homes in 1715 as a result of a war with the English and retired to Florida. The Muskhogean tribes played little part in the French and Indian War, but the Creeks took a particularly active part with the English against the Americans in the Revolution. This warlike confederacy again rose against the neighboring American settlements in the War of 1812, and by the opening massacre at Fort Mims and the desperate encounters at Talladega and Horseshoe Bend made the Creek War one of the bloodiest pages in American history. The two Seminole wars, which cost the Government years of effort and over $40,000,000, further illustrated the fighting temper of the Creek tribes. By these wars and successive treaty sales the Muskhogean tribes were rapidly dispossessed until by the year 1835 practically the whole body had been removed to the west of the Mississippi. Here the four principal tribes, the Creek, Choctaw, Chickasaw, and Seminole, reëstablished themselves as 'nations' under organized governmental forms in the Indian Territory, where they now reside, with a combined population of pure and mixed blood, exclusive of adopted aliens, of perhaps 33,000 persons, besides some 2000 more in detached bands in Florida, Mississippi, Louisiana, and Texas.

All the Muskhogean tribes were sedentary and agricultural, residing in compact and regular towns and villages, frequently palisaded, and always with a central 'town house' for councils and other public ceremonies, fronting upon a plaza or public square for outdoor gatherings. Their social organization was complex and exact, the rank and duty of each clan being specifically fixed in the tribe. They were a virile race and have maintained their population and tribal organization against all the wasting effect of contact with white civilization. Much study has been given to their language, particularly the Muscogee and Choctaw, of which there is a considerable body of native literature. The best summaries of their characteristics and history are: Adair, *History of the American Indians* (London, 1775); Hawkins, *Sketch of the Creek Country;* and Gatschet, *Migration Legend of the Creek Indians* (Philadelphia, 1884-88).

MUSK HYACINTH. A bulbous plant. See GRAPE HYACINTH.

MUSKINGUM, mŭs-kĭn′gŭm. The principal river of eastern Ohio. It is formed at Coshocton by the junction of the Walhonding and Tuscarawas rivers, and flows southeastward 112 miles through a rich agricultural region, entering the Ohio River at Marietta (Map: Ohio, G 6). The Ohio and Erie Canal follows its course as far as Zanesville, and slackwater navigation has been secured to Dresden, 92 miles from the mouth of the river.

MUSK MALLOW. A tropical plant. See MALLOW; HIBISCUS.

MUSKMELON (so called from its peculiar aromatic flavor), *Cucumis Melo.* An annual herbaceous vine of the natural order Cucurbitaceæ, a native of the warmer parts of Asia and now cultivated in both hemispheres for the sake of its rounded or ovate fruit, which, in its numerous varieties, varies from a few inches to more than a foot in diameter. Some varieties are distinguished by a thick, warty rind, some by a rind cracked in a net-like manner, some by ribs and furrows, and some by a perfectly smooth and thin rind. The flesh may be white, red, green, yellow, or of intermediate colors. There are also varieties that ripen early and late, and one group of varieties little grown in the United States, which keep well into the winter. They require a warm, quick soil. In field culture they are planted—6 to 10 seeds—in hills 4 to 6 feet apart either way. To hasten growth and on poor soils two or three shovelfuls of well-rotted manure are placed under each hill. In the North, commercial growers start the plants under glass, preferably in a hot bed, and transplant them to the open field when the weather becomes warm enough. The seedlings are transplanted with difficulty and are therefore usually grown on inverted sods or in pots. Some subspecies of *Cucumis Melo* are: Var. *saccharinus* or pineapple melon, a sweet-fleshed variety; var. *flexosus* or snake melon, 2 to 3 feet long and 1 to 3 inches in diameter, sometimes grown for preserves, but more often as an oddity; var. *chito,* also called orange melon, vegetable orange, garden lemon, vine peach, etc., and used for pickles and preserves; var. *inodorus,* a long keeper of poor quality; var. *Dudaim,* or pomegranate, dudaim, or Queen Anne's pocket melon, a highly perfumed, but inedible sort. See Plate of CUCUMBER ALLIES.

The striped beetle and flea beetle are serious pests of muskmelons. Spraying with Paris green or dusting with tobacco dust, air-slaked lime, or road dust when the plants are moist, helps to keep the insects under control. Land plaster mixed with kerosene or turpentine is used for the same purpose. The downy mildew and leaf spot diseases which attack the plant are held in check by applications of Bordeaux mixture. Muskmelons are commonly called cantaloupes in the United States. See FUNGICIDE.

MUSKOKA, mŭs-kō′kȧ. A lake region of Ontario, Canada, bounded on the north and northeast by Lake Nipissing and the Ottawa River, on the south by Lake Simcoe, and on the west by Georgian Bay (Map: Ontario, D 3). The region covers an area of about 10,000 square miles, 800 feet above the sea and 200 feet above Lake Huron. Besides a lake, river, and county of the same name, it includes extensive forests, several rivers, and from 800 to 1000 lakes and smaller sheets of water. Fine waterfalls also occur, of which the most important are the Bridal Veil Falls on the Shadow River, and the High

Falls and the South Falls with a descent of 130 feet, on the Muskoka, near Bracebridge (population, in 1891, 1419; in 1901, 2479), the county capital. The chief lakes, Muskoka, 20 miles long by 2 to 8 miles broad, Rosseau, 12 miles long and 1 to 6 miles wide, and Joseph, are connected and have regular steamer navigation service in summer, in connection with the Grand Trunk, the Canadian Atlantic, and the Canadian Pacific railways, which traverse the region. The forests abound in game, and the lakes with fish, and the district has become popular for its hunting, angling, boating, and bathing.

MUSK OX. The musk ox (*Ovibos moschatus*), although approaching cattle in size, is really quite as closely allied to the sheep. It undoubtedly belongs in the family Bovidæ and is perhaps entitled to have a subfamily division to itself. The genus contains only the single species, at present confined to Arctic America, but formerly ranging over the Northern United States as far south as Kentucky and over Northern Asia and Europe also, as is shown by the bones found in the Pleistocene deposits of those regions. Its southern limit is gradually retreating northward, and there can be little doubt that the number of musk oxen is steadily declining. The name 'musk ox' or 'musk sheep' refers to a peculiar musky odor, the origin of which seems to be in doubt; apparently, however, there is no special gland as in the musk deer and other musky mammals. The legs are short and stout, so that the animal is somewhat lower than a small ox, which it otherwise resembles in size and shape. The hair is amber brown, woolly and long; thick, matted and curly on the shoulders, giving the appearance there of a hump; elsewhere it is straight and hangs down so as to conceal the short tail and upper half of the legs. The wool has been spun into fabrics said to be extremely soft. The hoofs are remarkable in being asymmetrical, the outer half being rounded while the inner is pointed; the sole of the foot is hairy. The head is inclined to be massive, especially in old males, where the horns have extremely broad bases. The latter are elegantly curved, first obliquely downward and backward by the side of the head and then upward and forward. The ears are so small as to be concealed by the hair, and the muffle is hairy as in sheep and goats. The flesh is coarse grained, but of variable quality, some individuals being tender and of good flavor, while others are tough and so musky as to be uneatable. Curiously enough, the difference in flavor is apparently not a matter of age or sex. Musk oxen are gregarious, going in flocks of 20 or 30, or rarely as many as 80 or 100, and are said to be very sheep-like in their habits. Although the legs are so short, they run with speed, and can climb steep slopes and clamber over rocks with remarkable agility. The young are produced, one at a time, at the end of May or early in June, and the rutting season is in September. The food of the musk ox is grass, moss, lichens, and tender shoots of willow and pine. They are themselves an important item in the larder of the Eskimos and of Arctic explorers. The writings of these explorers contain the best accounts of the animal, whose young have now and then been brought alive to Europe, and have survived for a time in zoölogical gardens. See Plate of Wild Sheep and Musk Ox with Sheep.

MUSK PLANT, Musk Root, Musk Tree, Musk Wood. Various plants possessed of a musky odor. Among these are the common musk plant (*Mimulus moschatus*); the musk tree (*Olearia argophylla*) of Tasmania; the musk okra (*Hibiscus moscheutos*); the musk tree of Jamaica (*Trichilia moschata*); and the West Indian musk wood (*Guarea grandifolia*), used in perfumery. The drug called musk root or Sambul, brought from Asia principally through Russia and Persia, is the starchy root of *Euryangium Sumbul*, which has a pure musky odor, and is used as a substitute for musk.

MUSKRAT (so called from its musky odor), or Musquash. The muskrat (*Fiber zibethicus*) is one of the most widely distributed and best known of North American quadrupeds, and it is peculiar to this continent. It makes its home in the banks or water of streams, ponds, and lakes. It is the largest known species of the subfamily Arvicolinæ (see Vole) of the family Muridæ, and is peculiarly adapted to an aquatic life, although there are other species of the subfamily which are also amphibious. Its body is about 12 inches in length, and its tail about 8 inches. The body is rather stout and thickset, the head is rounded, and the ears are small and close. The front feet are rather small, with four digits and a rudimentary thumb, while the hind feet are stout, with five partially webbed toes, and so attached to the leg that they are well fitted for swimming, yet the sculling movement of the much compressed tail is the principal means of progress in the water. As with other aquatic mammals, the pelage consists of an undercoat of dense, soft fur and an outer coat, on the back and sides, chiefly of long, shining, smooth hairs. So much air is held by these outer hairs that in ordinary excursions the under fur is hardly wetted. The color above is dark umber brown, darkest on the middle of the back and on the tail, while beneath the prevailing shade is gray.

The musky odor from which the animal gets its name is due to the secretion of a large gland in the inguinal region, which is present in both sexes. The muskrat is omnivorous, eating roots (especially of the pond lily), fruits, vegetables, insects, worms, mollusks, etc., but it is especially fond of apples, in search of which it often wanders far from its home, and thus finds its way occasionally into barns and cellars. In some localities fresh-water mussels are a favorite article of food, and large heaps of the empty shells are sometimes found near muskrat burrows, due to their preference for dining day after day in the same place. Although so widely distributed and abundant, the muskrat is not often seen, as it is mainly nocturnal in its habits, and during the day remains in its burrow or house. The home of this animal is either built of sticks, mud, and grass, and forms a heap the size and appearance of a small haycock, or else is dug out of the bank of a stream or pond and then forms a burrow of indefinite length, the entrance to which is under water. The character of the home seems to depend upon the nature of the country; where there is an extensive swamp, or stretch of shallow water, so that the houses will not be ordinarily exposed to wandering enemies, muskrats seem to prefer these homes; but where they live in or about a narrow stream, with little swamp, the burrow in the bank is the more usual shelter. The houses are always entered from water deep enough so that the passageway shall not freeze up in winter.

The flesh of the muskrat is good eating, and was formerly much used by the Indians. The fur is used quite extensively, so that the skins are an article of commerce. For this reason, muskrats are extensively trapped and hundreds of thousands are killed annually. Their numbers nevertheless do not decrease, partly because their natural enemies are fewer, but chiefly because of the fact that the making of slackwater spaces by damming rivers, and the digging of canals (whose banks they seriously damage), have greatly extended waters suitable for them in various parts of the country. Trapping is done, chiefly in the winter, by setting small steel traps at the entrance to their houses or burrows or in runways where they come ashore.

The name muskrat is applied to a number of other more or less rat-like animals, on account of their strong odor. In Europe it is frequently given to the desman (q.v.), while in India it is associated with a shrew (*Crocidura cœrulea*) which has well-developed musk glands on the belly and flanks. In South Africa the genet (*Genetta felina*), a viverrine, carnivorous mammal, is sometimes so called.

Consult the works of Audubon, Richardson, Godman, Kennicott, and other early writers; and of C. C. Abbott, H. D. Thoreau, J. Burroughs, D. L. Sharp, R. Robinson, A. L. Adams, W. Cram, J. A. Allen, E. S. Mearns, and other recent naturalists; especially Merriam, *Mammals of the Adirondacks* (New York, 1895); Herrick, *Mammals of Minnesota* (Minneapolis, 1892); Butler, "Observations on the Muskrat," in *American Naturalist*, vol. xv. (Philadelphia, 1885); Cram and Stone, *American Animals* (New York, 1902).

See Plate of BEAVER, COYPU, AND MUSKRAT.

MUSK SHEEP. A musk ox (q.v.).

MUSK SHREW. One of a large group of Old World shrews, of which about eighty species of the genus Crocidura are known. They are noted for their musky odor, range from the Mediterranean to Northern India, and are of terrestrial habits. One of these shrews (*Crocidura cœrulea*) is the largest of its race (see SHREW), and as large as a rat. It is gray, and is known to Anglo-Indians as the 'muskrat.' It enters houses and at night runs about, catching insect vermin; but counterbalances this beneficial service by leaving behind a musky odor, sometimes unpleasantly strong.

MUSK TORTOISE, MUSK TURTLE, or STINKPOT. One of the mud or 'box' turtles (*Cinosternum odoratum*) of the eastern half of the United States, well known for its strong, musky odor, which exudes from glands in the arm-pits. It has a disproportionately large head, a long and slender neck, with two yellow stripes on each side, and a dusky shell, clouded and sometimes spotted. It is edible.

MUSKWAKI, mŭsk-wä′kē. An Algonquian tribe. See FOX.

MUSLIN (Fr. *mousseline*, from It. *mussolino*, muslin. made of muslin, from *mussolo*, muslin, from ML. *Mossula*, from Syr. *Mosul*, a city of Mesopotamia on the Tigris, whence the fabric originally came). A cotton fabric of Oriental origin. No such trade now exists in the Orient; and for muslins of the common kinds at least the Indian market depends upon the manufactures of England and France. Muslin is much less compact in its texture than calico—indeed, it more nearly resembles gauze in appearance; but it is woven plain, without any twisting of the filling threads with those of the warp. The manufacture of muslins is very extensive, especially printed muslins, in which the patterns are produced by the same processes as in calico-printing. The term muslin is also applied to a coarser and heavier, but plainly woven cotton cloth, suitable for sheets and pillow-cases. See WEAVING.

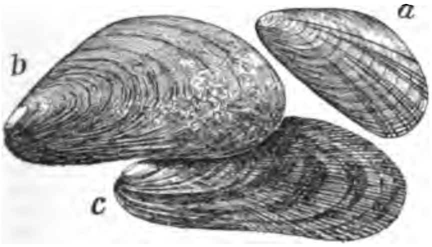
MUS′PRATT, JAMES SHERIDAN (1821-71). An eminent Irish chemist. He studied under Liebig, at Giessen, 1843-45, and there took the degree of Doctor of Philosophy, with a thesis tracing the resemblance between the carbonates and sulphites. In 1847 he produced a number of interesting organic substances from the sulphocyanates of ethyl and methyl. On his return to England in 1848 he established and became superintendent of a college of chemistry at Liverpool. From 1854 to 1860 he was engaged on his well-known dictionary of chemistry. The latest German edition of this important work may be found mentioned in the bibliographic section of the article CHEMISTRY. His *Outlines of Quantitative Analysis for Students* has had a considerable circulation.

MUS′QUASH. The name among the Indians of the Canadian Northwest for the muskrat (q.v.). 'Talking musquash' is a phrase in the Hudson Bay region for the gossip of trappers or fur traders about peltries, of which the fur of the muskrat forms a constant and important item.

MUSSAFIA, mụs-sä′fē-ȧ, ADOLF (1835—). An Austrian Romance philologist, born at Spalato. He studied medicine, but in 1855 became instructor of Italian at the University of Vienna, and in 1860 professor of Romance philology. He contributed valuable papers on Italian dialects to the proceedings of the Vienna Academy, and wrote: *Altfranzösische Gedichte aus venezianischen Handschriften* (1864); an edition of Fra Paolino's *De Regimine Rectoris* (1868); *Handschriftliche Studien* (1862-70); *Ueber die spanische Version der Historia Troiana* (1871); *Die catalanische Version der sieben weisen Meister* (1876); and studies of the legends of the Madonna (1884-91).

MUSSEL (AS. *muxle*, *mucxle*, from Lat. *musculus*, small fish, sea-mussel, diminutive of *mus*, mouse). The word mussel is one of those popular names of such uncertain limits that to attempt to define it is a difficult matter. At the present time it is applied to two totally distinct groups of bivalved mollusks, one marine and the other fresh-water. The first group includes the shell-fish of the family Mytilidæ, especially the genera Mytilus, Modiola, and Modiolaria. This family is characterized by the presence of a well-developed byssus, two adductor muscles, a fringed vestige of a siphon, and an equivalve but inequilateral shell, with a thick epidermis, but with a weak and usually toothless hinge. The 'common' mussel (*Mytilus edulis*) of all northern coasts is in the Old World much raised for food, but its greatest importance in the United States lies in its usefulness as bait for fishermen and as manure for farmers near the coast.

It is gregarious and occurs in masses, closely crowded together, adhering to rocks, sand, and each other, by the very tough byssus, the whole 'beds' being thus practically spun together. These beds are generally in shallow water, less than thirty fathoms, and are often exposed at low tide. The shell is oblong with a terminal umbone, and generally about three inches long by an inch and a half wide; but under favorable conditions they may become six inches or even more in length. The outside of the shell is black, but inside it is pearly blue. When young, mussels move about, but they soon anchor themselves by the byssus, and unless artificially disturbed will remain fixed throughout life. So strong are the byssus-threads that these mollusks have been utilized as an aid in the strengthening of breakwaters, the young mussels being planted on the rocks in myriads and thus assisting in uniting the separate pieces into a rigid whole. The horse-mussels (q.v.) belong to the genus Modiola, which does not have the umbone terminal. They are more elongated than Mytilus and some species reach a much larger size. See Colored Plate of CLAMS AND EDIBLE MUSSELS.



AMERICAN MARINE MUSSELS.

a, common edible mussel (*Mytilus edulis*); *b*, horse or meadow mussel (*Modiola modiolus*); *c*, ribbed mussel (*Modiola plicatula*).

The other group to which the name mussel is given is the family Unionidæ, which are fresh-water mollusks of very wide distribution. The family is characterized by the possession of two adductor muscles and regular shells, with thick epidermis and thin nacreous layer, prominent external ligament, and a variable hinge. Upward of a thousand species have been named, a very large proportion of which occur in the United States, where the family is very abundant and widely distributed. It is still an open question as to what constitutes a valid species or even a genus in this family, though several genera, as Unio, Anodon, and Margaritana, are recognized. These fresh-water mussels occur in lakes, ponds, and streams, generally in large numbers together, and are sometimes eight inches or more in length, by four in breadth, but they are usually smaller and narrower. They are sometimes used for food, but are tough and not very palatable. Their chief importance lies in the fact that they frequently produce pearls, and are indeed the only basis of the fresh-water pearl industry. As high as $25,000 has been paid for a single mussel-pearl. (See PEARL). All of the Unionidæ have a remarkable life-history, for the eggs when laid find their way into the mother's gills, where they remain until the young are hatched. Although these young have a bivalve shell, they are totally different from the adults and have a very simple structure. At this stage of development they are called 'glochidia' larvæ. After leaving the maternal gills they attach themselves to the skin of a fish, where they give rise to an excrescence which gradually swells until it is a capsule big enough to see with the naked eye. These capsules are almost black and are usually seen on or near the fins of the host fish; they are often very numerous on a single fish. Within the capsule the glochidium lives until it finally assumes the adult form, when it breaks through the outer wall of the capsule and settles to the bottom as a miniature mussel. The distribution of the species is therefore mainly dependent on the activity of the fishes which serve as hosts.

Fossil mussels are found in most geological formations from those of Ordovician age to those of recent time. They comprise the superfamily Mytilacea, containing the families Modiolopsidæ, Mytilidæ, and Dreissensiidæ. The first, now entirely extinct, are essentially ancestral forms of the Mytilidæ, which range through Devonian to recent formations. The Paleozoic species of this family belong mostly to the genus Modiola, which began in Devonian, was abundant in Jurassic and Tertiary time, and still persists as a common shell of the littoral zone of all seas. Mytilus began in the Triassic. Lithophagus or Lithodomus, the mussel which bores cavities in limestone rock, has been recognized in Mesozoic and Tertiary formations. The Dreissensiidæ are of later origin, appearing first in the Tertiary. They are essentially fresh-water and estuarine mussels, and have probably evolved from Mytilus or a closely allied genus of the littoral zone in late Mesozoic or early Tertiary time. See Plate of ABALONE, ETC., and illustration under MOLLUSK.

MUSSELBURGH, mŭs′sel-bŭr-ō. A small seaport town and Parliamentary burgh in the county of Edinburgh, Scotland, at the mouth of the Esk, 3½ miles north by east of Dalkeith (Map: Scotland, F 4). Tanning, leather-dressing, and the manufacture of sail-cloths, nets, and salt are carried on. The harbor at Fisherrow is frequented by coasting craft, and by small vessels from Holland and the Baltic. There are famous golf-links here. In the vicinity are interesting antiquities. Population, in 1891, 8888; in 1901, 11,704.

MUSSEL-DIGGER. A popular name for the California gray whale.

MUSSEL SCALE. A diaspine scale insect of the genus Mytilaspis, all of the species of which bear scales shaped like a mussel shell or the shell of an oyster. Several species are very injurious to vegetation. The so-called 'oyster-shell bark-louse' of the apple (*Mytilaspis pomorum*) is a cosmopolitan enemy of apples and pears; and the long scale and the purple scale of the orange are pernicious examples.

MUSSET, mụ′sȧ′, ALFRED DE (1810-57). A noted French poet, dramatist, and novelist, born in Paris, November 11, 1810. His father was a man of letters, and Alfred grew up in a literary atmosphere, was graduated with honors at the Collège Henri Quatre, and published at twenty his first verses, *Contes d'Espagne et d'Italie* (1830). This, with *Poésies diverses* (1831), and *Le spectacle dans un fauteuil* (1832), established his fame. The latter contained a poem, *Namouna*, and two short plays in a manner peculiarly his own, *La coupe et les lèvres* and *A quoi rêvent les jeunes filles*. He had already produced on the stage a comedy, *La nuit vénitienne* (1830), a failure. In 1833 he followed the dramatic vein in two tragi-comedies, *André del Sarto* and *Les caprices de Marianne*, possibly his best. *Rolla*, too, belongs to this year, and was once thought the French *Childe Harold*, though now less admired. This sudden flowering of Musset's genius was interrupted by a reckless passion for George Sand (q.v.), whom he first met in the summer of 1833, and accompanied in 1834 to Italy as her 'secretary.' He suffered acutely in this new relation from disillusionment and self-deception. He "was a child all his life and a spoiled child," never more so than in the inevitable estrangement (1835) that cost George Sand few pangs, but marks a cardinal point in Musset's career. He returned sick, experienced another unhappy love and a series of sordid entanglements, and worked intensely and admirably, at intervals interspersed with periods of depression. Through the patronage of the Duc d'Orléans he received a position as librarian in 1838.

Musset's work after the separation from George Sand (*Les nuits, Ode à la Malibran, Lettre à Lamartine, Espoir en Dieu*) shows at its best a sad, yet in the main sober, resignation. But during this period he was more occupied with drama and with prose fiction. Of the *Comédies et proverbes, Fantasio* and *On ne badine pas avec l'amour* belong to 1834, *Le chandelier* to 1835, *Il ne faut jurer de rien* to 1836. *Lorenzaccio*, an historical drama (1834), had no success. These, as Lemaître points out in his preface to Jouaust's *Théâtre d'Alfred de Musset*, show the most genuine and original dramatic talent of all the Romantic School. Tragedy mingles here with comedy, not as with Hugo by juxtaposition, but by interpenetration, for Musset had too true a taste to yield to the extravagances of Dumas or Hugo. In an essay *La tragédie* (1838) he refuses allegiance alike to French romantic or classic principles, but he combines the outward appearance of restraint with the new liberty to associate the weird and terrible in human life with its higher comic aspects. Thus he succeeded in presenting complex characters better than any of his contemporaries or predecessors in French drama. His wit in dialogue had not been equaled since Beaumarchais. None of these plays was acted in France before 1848, and their influence is hardly noticeable before 1865, but they contain the quintessence of romantic imaginative art. They show most and best the unchecked freedom of fancy that joined with the spirit of realistic comedy in Ponsard, Dumas, and Augier to produce the modern French drama. Musset's prose fiction begins with *Les confessions d'un enfant du siècle* (1836), which in spirit at least is autobiographic. This was followed by nine *Contes* (1837-44), of which *Croisilles* is best, and a tenth, *La mouche* (1851), one of the last flickerings of his genius. These are interesting chiefly in exhibiting the progress of ethical disintegration. *Margot* and *Le merle blanc* have autobiographic elements. So perhaps has *Mimi Pinson*, a 'profil de grisette' (1845). In this story Musset anticipates by some six years a type of the French working girl portrayed by Henri Murger. Mimi has few clothes, but she looks as tidy as she can, and has the pretty manners, the recklessness as to the future, and the easy morality of the *grisette*. Musset's critical essays are also worthy of remark, especially the witty *Lettres de Dupuis et Cotonet*, satirizing modern marriage, journalists, novelists, and, above all, the critics of thoroughbred Romanticism. Musset's closing years were marked by dejection and by comparative inactivity. In 1841 he flung at the Germans his fiery war song, *Le Rhin allemand*. In 1845 appeared *Il faut qu'une porte soit ouverte ou fermée, a proverbe*. In 1847 *Un caprice* (1837), a little tragedy with a chorus to utter platitudes in Greek style, was performed at the Théâtre Français. Between 1848 and 1851 *Bettine* was played, and *Carmosine* was written, but they are scarcely worthy of their author.

Musset died of an affection of the heart, May 2, 1857. His works were published in ten volumes in 1865.

Consult: Sainte-Beuve, *Portraits contemporains*, vol. ii., and also his *Causeries du lundi*, vols. i., xiii.; George Sand, *Elle et lui* (Paris, 1859); Paul de Musset, *Lui et elle* (ib., 1860); id., *Biographie d'Alfred de Musset* (ib., 1877); Jaubert, *Souvenirs* (ib., 1881); Faguet, *Etudes littéraires sur le XIXème siècle* (ib., 1887); Lemaître, *Introduction au théâtre de Musset* (ib., 1885-89); Palgrave, *Oxford Essays* (Oxford, 1855); Lindau, *Alfred de Musset* (Berlin, 1877); Spoelbergh de Lovenjoul, *Etude critique et bibliographique sur les œuvres d'Alfred de Musset* (Paris, 1867); Barine, *Alfred de Musset* (ib., 1893).

MUS′SEY, Reuben Dimond (1780-1866). An American surgeon, born at Pelham, N. H. He graduated at Dartmouth in 1803, and received the degree of M.D. from the University of Pennsylvania in 1809. He held medical professorships at Dartmouth, Cincinnati, and Miami Medical College, and gained a high reputation as a bold and skillful operator. He was the first to tie both carotid arteries, and the first to remove completely the shoulder blade (1837); and was unusually successful in lithotomy and operations for strangulated hernia. He wrote *Health: Its Friends and Its Foes* (1862).

MUS′SULMAN. See Moslem.

MUSTAGH (mōō-stäg′) **MOUNTAINS.** A mountain range in Kashmir. See Karakorum Mountains.

MUSTAPHA, mōō′stȧ-fä. The name of four Ottoman sultans. The first (1591-1639), a son of Mohammed III., succeeded Achmet I. in 1617, was deposed after three months, came to the throne again in 1622, and was again deposed (1623). He was feeble-minded.—Mustapha II. (1664-1704) came to the throne in 1695, and at the Peace of Carlowitz signed away the Morea, the Ukraine, Hungary between the Danube and Theiss, and Azov. He was deposed by a rising of the Janizaries in 1703.—Mustapha III. (1717-74) ruled from 1757 until his death. He quarreled with Russia and Poland and involved the country in war which lasted through his reign. His internal reforms were no more successful than his foreign policy.—Mustapha IV. (1779-1808) was made Sultan by the Janizaries, who rebelled against Selim III. in 1807, and was deposed and killed in the next year.

MUSTAPHA, Kara, kä′rȧ. A Turkish grand vizier. See Kara Mustapha.

MUSTARD (OF. *moustarde*, Fr. *moutarde*, from OF. *moust*, from Lat. *mustum*, must, neu. of *mustus*, fresh), *Brassica*. A genus of plants of the natural order Cruciferæ, having yellow flowers, and linear or oblong pods, which terminate in a sword-shaped, compressed, or four-cornered beak, and contain one row of seeds. The black mustard (*Brassica nigra*) is an annual, which grows wild in fields and by waysides in the middle and south of Europe. Its pods are bluntly four-angled, smooth, erect, and lie close to the stem, their valves one-nerved; the leaves are smooth, the lower ones lyrate, the upper linear-lanceolate; the seeds are brownish black. White mustard (*Brassica alba*), also a native of most parts of Europe, is an annual having divergent pods covered with stiff hairs, the valves five-nerved, the seeds yellowish, the leaves pinnatifid. Both these species are cultivated in Europe and to a limited extent in America, for their seeds, which are ground into powder to make the well-known condiment called mustard. The mustard of commerce is frequently mixed with flour and commonly colored with turmeric. The powder of the seeds is also much used in medicine as a rubefacient. Mustard seeds depend for their pungency on a principle which, when water is added to black mustard, forms volatile oil of mustard. There is also in the seeds a bland fixed oil, oil of mustard, which is obtained from them by expression, and constitutes about 28 per cent. of their weight. White mustard is often sown in gardens and forced in hot-houses for use as a salad. It is also sometimes sown as a green manure crop and for feeding sheep, when turnip or rape has failed. Wild mustard, or charlock (*Brassica arvensis*, or *Sinapistrum* of some botanists), which is distinguished by turgid and knotty pods with many angles and longer than the two-edged beak, is a troublesome annual weed in both Europe and America. It is controlled by spraying with a 2 per cent. solution of copper sulphate or 12 to 15 per cent. iron sulphate at the rate of 50 to 70 gallons per acre. (See HERBICIDE.) Indian mustard (*Brassica ramosa*) is extensively cultivated in India for its seeds, which are used as a condiment, as are those of *Brassica dichotoma* and *Brassica glauca* (regarded by some botanists as forms of *Brassica arvensis*), also cultivated in India. Other species are *Brassica japonica*, used to a considerable extent in the United States for greens; a turnip-rooted Chinese form (*Brassica napiformis*), and Chinese mustard (*Brassica juncea*). See illustration of CABBAGE AND ALLIES.

MUSTARD FAMILY. A natural order of plants. See CRUCIFERÆ.

MUSTARD OIL, or OIL OF MUSTARD, chemically known as *allyl iso-sulphocyanate*, C_3H_5NCS. A volatile oil obtained from black mustard, the seeds of the *Brassica nigra*, growing in Asia and in Southern Europe. The seeds contain a bland fixed oil which may be removed by expression, but they do not contain the volatile oil ready-formed. The latter is produced by the action of a soluble ferment (myrosin) upon the potassium salt of myronic acid (a glucoside), in the presence of water. Both myrosin and potassium myronate are contained in black mustard seeds. If, therefore, after the fixed oil has been removed, the crushed seeds are treated with water and distilled, the volatile oil is obtained, in much the same way as the volatile oil of almonds is obtained from bitter almonds. (See ALMONDS, VOLATILE OIL OF.) Mustard oil is a very volatile colorless liquid, having a painfully pungent odor and an acrid taste; when applied to the skin it speedily raises blisters; it is insoluble in water, and, if pure, boils at 151° C. Its formation from potassium myronate takes place according to the following chemical equation:

$$\underset{\substack{\text{Potassium}\\\text{myronate}}}{KC_{10}H_{18}NS_2O_{10}} = \underset{\substack{\text{Mustard}\\\text{oil}}}{C_3H_5NCS} + \underset{\text{Glucose}}{C_6H_{12}O_6} + \underset{\substack{\text{Acid}\\\text{potassium}\\\text{sulphate}}}{KHSO_4}$$

The pungency of ordinary mustard as a condiment is due to the formation of the volatile oil on addition of water. The allyl iso-sulphocyanate prepared by an artificial process in the chemical laboratory, is identical with the volatile oil obtained from mustard seeds.

The term *mustard oils* is often applied to organic iso-sulphocyanates in general.

MUSTEL'IDÆ (Neo-Lat. nom. pl., from Lat. *mustela*, weasel, from *mus*, mouse). The family of small carnivores, represented by the weasel, and embracing the more highly valued fur-bearing animals. They are related to the arctoid Carnivora, especially the bears, and the family includes three groups, as follows: (1) Melinæ (the Old World badgers); (2) Mustelinæ (grison, marten, sable, wolverine, polecat, weasels, ratel, American badger, and skunks); (3) Lutrinæ (otters). Consult authorities cited under MAMMALIA, especially Beddard. See FUR-BEARING ANIMALS.

MUSTER (from OF. *mostre*, *monstre*, Fr. *montre*, show, from Lat. *monstrare*, to show, from *monstrum*, portent, monster, from *monere*, to warn). When used in its military sense, this term applies particularly to the assembling of troops for the verification of membership. In the United States the troops are mustered for pay on the last day of each month, each stated muster being preceded by a minute inspection. In the British Army there is a special muster parade once each year, when every individual of each command must respond in person to the regimental muster roll. In the navy the crews are frequently assembled or mustered for the purpose of ascertaining if all are on board or for drill or instruction or reading general orders. Once a month (on the first Sunday occurring in the month) the officers and crew of the vessels of the United States Navy are called to 'general muster.' The presence of the officers is ascertained by inspection; but the names of the crew are called by the paymaster or his clerk, and each man in turn, except petty officers, as his name is reached, passes across the deck, before the captain. It was formerly the custom to muster the crew aft and read the *Articles for the Better Government of the Navy*, and then call the muster roll of the crew. The two performances now take place on different Sundays.

MÛT, mo͞ot. An Egyptian goddess, the wife of Ammon (q.v.) of Thebes, and the mother of Chons (q.v.). Her name signifies 'mother,' and in the inscriptions she is entitled 'the lady of heaven, the queen of the earth.' The chief temple of the goddess was at Karnak; it was connected with the great Temple of Ammon by a long avenue of sphinxes, and was partly surrounded by the sacred lake Asher. From the latter circumstance Mût is often called 'the lady of Asher.' She is frequently represented as a lion-headed goddess wearing upon her head the solar disk, but in mural decorations she is more commonly depicted in human form wearing the vulture head-dress and other symbols of a queen of Egypt. Consult: Wiedemann, *Religion of the Ancient Egyptians* (New York, 1897); Benson and Gourlay, *The Temple of Mût in Asher* (London, 1898).

MUTANABBI, mōō'tȧ-nä'bē (Ar. *Abu al-Ṭayyib Aḥmad ibn al-Ḥusain al-Mutanabbi* (905-965). One of the most noted of the Arabic poets of the period of decline. He was born in Syria, the son of a water-carrier, and spent several years in the desert *al-Samāwa* (Mesopotamia). He was not a fervid Moslem, and at one time even put himself forward as a prophet (whence his name, *Mutanabbi*, 'the one claiming to be a prophet'). He was taken prisoner by Lulu, the Ikhshid Emir of Emesa. After being set at liberty he lived in great poverty and neglect, but in 948 became attached to the Court of Saif al-Dawlah at Aleppo, whom he accompanied on his raids, and whose praises he sang. He left Saif al-Dawlah in 957, going over to his enemy the Ikhshid Kafur of Egypt. In 961 he went to Bagdad, and at last to Shiraz, where the Bujide Adud al-Dawlah became his patron. He was murdered in 965 on the road from Shiraz to Kufa. His *Dīwān*, containing 289 poems, has been very widely read in the East, where he is considered the last great Arabic poet, perhaps because of his intense national feeling. No less than forty commentaries have been written on his *Dīwān*. Mutanabbi is the type of the Court singer, his theme the battle and the heroic deeds of his patrons. His songs lack the fire of the earlier Bedouin poetry and are artificial, but their technical excellence cannot be denied. They have been edited by Dieterici, with the commentary of *al-Wāḥidī* (Berlin, 1861), and published at Bulak (1860) and Cairo (1870 and 1890) with that of *al-'Ukbarī*. Other editions are: Calcutta (1815), Beirut (1860), Bombay (1892). The *Dīwān* has been completely translated by Hammer-Purgstall, *Motenebbi der grösste arabische Dichter* (Vienna, 1824); extracts may be found in Rückert's *Hamasa* (Stuttgart, 1846), and in Ouseley, *The Oriental Collection*, vol. i. (London, 1797). Consult: Bohlen, *Commentatio de Mutanabbio*, (Bonn, 1824); Dieterici, *Mutanabbi und Seifuddaula* (Leipzig, 1847).

MUTATION. See UMLAUT.

MUTATION THEORY (Lat. *mutatio*, change, from *mutare*, to change, for *movitare*, frequentative of *movere*, to move, Skt. *mīv*, to push). The hypothesis that evolution (q.v.) takes place by means of sudden changes rather than through slow and almost imperceptible transformations. This idea, though not new, has been called into great prominence by the publication in 1901 of *Die Mutationstheorie* by Prof. Hugo de Vries, professor of botany at Amsterdam. Darwin himself, especially in his earlier works, recognized that 'single variations' or sports are to be reckoned with as well as natural selection. Through the influence of Wallace and others, natural selection had come to be the ruling theory, and it is only in recent years that the significance of sports in evolution has had much place. However, as long ago as 1864 Kölliker made an appeal for heterogenesis (which is identical with the mutation of De Vries) as a factor in the evolution of species. Professor Scott of Princeton has used the word mutation for gradual modifications. Still other writers have referred to the sudden origin of species as saltatory evolution. But De Vries is the first author who has performed experiments and worked out a theory to fit the facts which they have yielded.

Before taking up the experiments it may be said that mutation involves no necessary abandonment of natural selection, except in so far as it may have been held to account for the actual origination of new characters. Darwin recognized that natural selection improves but cannot originate anything new; mutation, on the other hand, is a means for the development of new characters, and even a new assemblage of characters, i.e. a new species. It should be stated, however, that DeVries gives but little place to natural selection, even as a means of improving something already present. His experiments show that there is a definite and rather narrow limit to individual variation, and the full advantage of artificial selection along any given line can usually be obtained within a few generations, as in the parsnip or carrot. He claims also that natural selection never fixes a character, but that reversion to the original may occur after many generations. Mutation, on the other hand, is believed to bring into existence something wholly new, without any transitions or connecting links. The new form, i.e. the mutant, remains fixed from the outset, and if it is fit, it will remain as a new species.

In 1886 De Vries observed a colony of evening primrose (*Œnothera Lamarckiana*) in which were two forms differing strikingly from the common type. Feeling that these aberrant forms doubtless came from the same parentage as the more common forms, he made artificial cultures to see if further aberrant forms would develop. He found such to be the case to an astonishing degree. Out of 50,000 seedlings of *Œnothera Lamarckiana* in the various years of study, 800, or about 1.5 per cent., were mutants, while 98.5 per cent. came true to seed. More than one-fourth of the 800 mutants were of one type, which De Vries named *Œnothera lata*, i.e. this form appeared anew in cultures more than 200 times. A form which he called *Œnothera gigas* appeared but once. When cultures are made from these new forms they are found to come true to seed except for occasional mutations; nor was any tendency to reversion observed. To these new forms, as to the two aberrant types observed in 1886, De Vries has given names which imply that these forms are actually new species. They have, he says, all the characteristics of species, differing not in one, but in several characters, and remaining constant in all cultures. He shows that they are as much entitled to be considered separate species as are the various members of the natural group to which the parent *Œnothera Lamarckiana* belongs. Indeed, it is possible to identify most of the new species even while yet seedlings. There are no transitions between parent and offspring, or between one new species and another. There is no slow and gradual fixation of characters by natural selection, but the new species is complete from the outset. Most of these new forms would doubtless disappear in a natural state, for they would be obliged to engage in a keen struggle with species already present, or would gradually suffer the loss of their specific characters through hybridization. However, some new species, especially if stronger than the parent form, might survive and extend their area; the two aberrant types first observed in a field in 1886 are still to be seen there and in greater numbers. Thus it may be said that De Vries has seen the birth of new species, a phenomenon which all evolutionists have wished to see.

It is of interest to observe that independently and almost simultaneously with De Vries, Korschinsky has brought together a vast mass of data under the title "Heterogenesis and Evolution." From the records of gardeners and horticulturists he has concluded that most cultivated 'varieties' of plants have arisen suddenly as sports, i.e. through heterogenesis or mutation.

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MUTAZ'ILITES (Ar. *Mu'tazilah*, from *'azala*, to separate). A Mohammedan sect founded by Wasil ibn Ata (c.745) and his disciple Abu al-Hudhail al-Allaf (died c.845). They had rationalistic tendencies, illustrated, e.g. by the teaching of Abu al-Hudhail, that man knows right and wrong by reason, independent of supernatural revelation. Later teachers developed several subdivisions of the sect. See MOHAMMEDAN SECTS.

MUTE (from Lat. *mutus*, dumb; connected with Skt. *mūka*, dumb). A small instrument used to modify the sound of any of the string instruments. It is made of hard wood, ivory, or brass, and is attached to the bridge by means of a slit, a leg of it being interjected between every two strings. The use of the mute both softens the tone and imparts to it a peculiar muffled and tremulous quality, which is sometimes very effective. It is much used in dramatic music to give color in dream-like or mystic stituations. Its application is indicated by the letters *c. s.*, or *con sordini*, and its discontinuance by *s. s.*, or *senza sordini*. Mutes for brass instruments are wooden cones with a hole bored through them so as to allow the passage of the air. They are inserted into the bell of the instrument. But, as their insertion affects the pitch of the instrument, these mutes must be used with the utmost care. Recently attempts have been made to construct complicated mutes for brass instruments that shall not affect the pitch. In the case of horns and trumpets the left hand is used as a mute. Mutes are also used for drums. On snare-drums a piece of cloth or felt is inserted on the lower side between the membrane and the snares. Kettle-drums are covered with a cloth or the membrane is lightly touched with the left hand. On the piano the soft pedal is frequently called mute.

MUTES. A term applied in phonetics (q.v.) to articulate sounds, also called occlusives, produced by a momentary closure, followed by a reopening of some portion of the oral passage. The mutes are either voiced (sonant, breathed) if the breath-stream makes the glottal chords vibrate, or unvoiced (surd, unbreathed) if the glottal chords are at rest, as *b, p; d, t; jh, ch.* With respect to the point of occlusion mutes are classified as gutturals, *k, kh, g, gh;* palatals, *c, ch, j, jh;* cerebrals (linguals, cacuminals), *ṭ, ṭh, ḍ, ḍh;* dentals, *t, th, d, dh;* and labials, *p, ph, b, bh.* The essential physiological condition for the mutes lies not in the closure, but in the reopening of the oral passage, while their quality is determined by the presence or absence of breath, and by the point of the occlusion.

MU'TIA'NUS, CONRADUS RUFUS (1471-1526). A German humanist, whose name in the vernacular was Konrad Mut. He was born at Homberg; studied under Hegius at Deventer, then at Erfurt, and for six or seven years in Italy. Thence he brought to Germany the idea of a humanistic association or academy, and by his letters from Gotha became the centre of the *Mutianische Bund*, which included Justus Jonas and Camerarius. Although he did not make common cause with Luther, Mutianus and his followers boldly attacked the abuses of the Church, and it seems certain that the *Epistolæ Obscurorum Virorum* owed their authorship to this circle. Consult Gillert, *Der Briefwechsel des Conradus Mutianus* (Halle, 1890).

MUTINY (from OF., Fr. *mutin*, mutinous, from *meute*, sedition, from ML. *mota*, revolt, *muta*, change, from Lat. *mutare*, to change). Mutiny at military law is unlawful opposition or resistance to lawful military authority with intent to subvert the same or to nullify or to neutralize it for the time. (Winthrop, *Military Law*, p. 892.) The acts constituting mutiny are exciting, causing, or joining in any mutiny or sedition in any troop, battery, company, party, post detachment, or guard, and are punishable with death or such other punishment as a court-martial may direct. (Twenty-second Article of War.) The punishment of death or such other punishment as a court-martial may adjudge may be inflicted on any person in the naval service who commits any of the acts which constitute mutiny. (Revised Statutes, Sec. 1624.) In England an annual act of Parliament passes to punish mutiny in the army and navy. (See MUTINY ACT.) Under the British articles "every one commits felony, and is liable upon conviction thereof to penal servitude for life as a maximum punishment, the maximum alternative term of imprisonment being three years, who maliciously and advisedly endeavors (a) to seduce any person serving in His Majesty's forces by sea or land from his duty and allegiance to His Majesty; or (b) to incite or stir up any such person to commit any act of mutiny, or to make or endeavor to make any mutinous assembly, or to commit any traitorous or mutinous practice whatever."

While mutiny is, in general, a concerted proceeding, a single officer or soldier may commit the offense. It is an offense punishable with death for a soldier or officer being present at a mutiny not to use his utmost endeavor to suppress it, or having come to the knowledge of a mutiny (or intended mutiny), not to give information of it to his commanding officer. (British and American Articles of War.)

Acts not characterized by an intent to subvert lawful authority, while they do not come within the legal definition of mutiny, may be regarded and punished as conduct tending to mutiny, but clear of the completion or commission of the offense. The law makes a distinction between mutiny and mutinous conduct, the latter being charged, and tried by court-martial, not under the mutiny articles, but as conduct to the prejudice of good order and military discipline.

Mutiny at Maritime Law is committed when there is a usurpation of the authority and command of a ship and an overthrow of that of the master or commanding officer. Any conspiracy to accomplish such an object, or to resist a lawful command of the master for such purpose; any endeavor to stir up others of the crew to such resistance, is an endeavor to commit a revolt within the meaning of the statute of 1790. (1, Stat. L., 113; *Abbott's National Digest*, 3. Mutiny.) The offense of making a revolt or mutiny on a ship is no longer punishable as a capital offense. (Act of March 3, 1835.)

For United States law on the subject of mutiny, see Revised Statutes, Sec. 1324, Arts. 22 and 23; Sec. 1624, Arts. 4 and 8; Secs. 4956, 5359, 5360.

MUTINY ACT. An act of the British Parliament passed from year to year, investing the Crown with powers to regulate the government of the army and navy, and to frame the articles of war. By the Bill of Rights, the maintenance of a standing army in time of peace, unless by consent of Parliament, was declared illegal, and from that time the number of troops to be maintained, and the cost of the different branches of the service, have been regulated by an annual vote. But Parliament possesses a further and very important source of control over the army. Soldiers, in time of war or rebellion, being subject to martial law, may be punished for mutiny or desertion; but the occurrence of a mutiny in a Scotch regiment soon after the Revolution of 1688, raised the question whether military discipline could be maintained in time of peace; and it was decided by the courts of law, that, in the absence of any statute to enforce discipline and punish military offenses, a soldier was only amenable to the common law of the country. The authority of the legislature thus became indispensable to the maintenance of military discipline, and Parliament, since 1689, at the beginning of every session, conferred this and other powers in an act called the Mutiny Act, limited in its duration to a year. In July, 1879, the Mutiny Act and the Articles of War were consolidated with a few changes into a complete military code called the Army Act, passed annually as before.

MUTSUHITO, mụt'sụ-hē'tō or mụ-t'-sē'tō (1852—). The name of the present Emperor of Japan, but little used and unknown to the vast majority of his subjects. The common people call him *Tenshi Sama*, 'August Son of Heaven,' and educated folks say *Shu-jo*, 'Supreme Master.' He succeeded to the throne February 3, 1867. Still a youth, he exercised little control during the earlier part of his reign, while Japan was being transformed into a modern nation, and opinions differ as to his activity in later years. He accepted the part of a constitutional ruler, and his influence on the Government became less apparent than that of the least self-assertive European monarch. No hostile criticism has been directed against him and his character has been considered blameless. His history is merged in the history of the Empire. He married the daughter of a noble on February 9, 1869.

MUTTON-BIRD. See Shearwater.

MUTTON-FISH. (1) A fish of the large, widespread group of eel-pouts, the eel-pout or mother-of-eels (*Zoarces anguillaris*) of the North Atlantic coasts. It feeds upon shellfish, may be caught with a hook in the bays north of Cape Cod, and reaches a weight of six to seven pounds. It spawns in late summer and produces a few large eggs. (2) One of the snappers (*Neomenis analis*) of the West Indies. (3) One of the mojarras (*Gerres olisthostomus*), also called 'Irish pompano.'

MUT'TRA. The capital of a district in the United Provinces, British India, 23 miles northeast of Bhartpur, on the right bank of the Jumna (Map: India, C 3). The city extends in crescent form for about 1½ miles along the right bank of the river, to which access is facilitated from a paved street by numerous ghats and chatburahs, ornamented with pavilions and temples. The devotional ablutionary exercises of the mixed crowds morning and evening constitute one of the characteristic sights of the city. Ravines intersect the town, and the streets are narrow, dark, and steep. The Hardinge, or Holi entrance gate, is a notable monument, and the houses of some of the wealthier native class are adorned with fine sculptures. There are numerous mosques and temples, of which the Jumma Musjid, dating from 1660, is the chief. Among interesting remains are the ruins of Akbar's fort, centrally situated on the river bank, and the observatory built by the celebrated astronomer Jey Singh, who became Prince of Amber in 1693, still containing several astronomical instruments. Modern features are the museum, botanical gardens, the European churches, and the extensive military cantonments to the south of the city. As early as the fourth century, Muttra is mentioned as a centre of Buddhism. As the reputed birthplace of Krishna and his brother Balarama, it is annually visited by thousands of pilgrims on the occasions of its religious festivals. The river abounds with turtles, and the streets swarm with monkeys, peacocks, paroquets, and sacred bulls, which are permitted to roam at large, protected and fed by the people. Muttra anciently was of great importance, and its splendor and wealth made it an object of attack to the first Afghan invaders; Mahmud of Ghazni in 1017 plundered and burned the city and carried off idols of gold, silver, and precious stones, valued at $1,500,000. In 1500, 1636, 1669, and 1756, it again suffered capture and spoliation. Since the British occupation in 1803, it has regained some of its former importance. During the Indian Mutiny of 1857, the Sepoys here murdered their British officers and joined the insurgents at Delhi. Population, in 1891, 61,195; in 1901, 60,042.

MUTUALISM (from *mutual*, from OF. *mutu*, from Lat. *mutuus*, reciprocal, from *mutare*, to change). That type of symbiosis (q.v.) in which each symbiont is believed to gain by the presence of the other. It has not been absolutely proved that a case of complete mutualism exists, though in the root tubercles (q.v.) of the Leguminosæ the evidence for mutualism is very strong.

MU'TULE (Lat. *mutulus*, mutule, modillion). A rectangular block under the corona of the cornice of the Doric order. One is regularly placed over each triglyph and metope. On each mutule are worked three rows of six *guttæ* or drops. They probably represent the heads of the nails by which the wooden block was fastened in the primitive brick and wood style from which the Doric order developed.

MUTUUM (Lat., loan). A loan of any article or commodity for consumption by the borrower, who agrees to return the articles in *kind.* The term and the rules governing such contracts originated in the Roman law, and were adopted into the English and Scotch law at an early period and became a part of the common law. It is not a true bailment, as the article itself is not to be returned, and it does not create a debt, as no money payment is to be made. The title to the commodity lent passes to the borrower, and, therefore, it seems like a contradiction in terms to employ the terminology of bailments to such contracts. It has been held in a few States that the delivery of grain to a miller for grinding is a contract of *mutuum,* and that the miller is only bound to return flour of the same quality that the grain delivered would have produced. The important effect of this doctrine on such a state of facts would be that the miller would still be bound to deliver the flour if the grain were destroyed. Consult Story, *Bailments;* id., *Fungibles.*

MUYSCA, mụ-ē′skȧ. A confederacy of South American Indians. See CHIBCHA.

MUZAFFAR-ED-DIN, mōō-zä′fẽr-ĕd-dēn′ (1853—). Shah of Persia, the second son of Nasr-ed-Din (q.v.). He was born at Teheran, March 25, 1853. He was appointed Governor of the Province of Azerbaijan, but was recalled for failing to suppress an uprising of the Kurds. Already declared heir apparent during his father's lifetime, Muzaffar-ed-Din became Shah June 8, 1896, after Nasr-ed-Din's assassination by a Babi (see BABISM) on May 1. In early life an almost fanatical Mohammedan, he showed great tolerance as Shah, particularly in his repression of an outbreak against the Christian Armenians at Kazoni in 1899. He further relieved his subjects at his accession of the taxes on meat and bread, and likewise abolished the system of purchase of civil and military positions. Of this change from his earlier character the European influence, especially that of the French, under which he came in Teheran, is the main cause. He twice visited Europe, first at the time of the Paris Exposition in 1900, when an unsuccessful attempt to assassinate him was made by an anarchist named Salson, and again in 1902.

MUZAFFARPUR, mŭz′ȧf-ẽr-pōōr′. The capital of a district in Bengal, British India, on the right bank of the Little Gandak River, 37 miles northeast of Patna (Map: India, E 3). It is a well-built town with a numerously attended high school and a German mission. Saltpetre is largely mined in the district, and there is a considerable trade, especially in indigo and saltpetre. Population, in 1897, 49,192; in 1901, 45,617.

MUŽÁKOVÁ, mụ′zhä-kō′vä, JOHANA (1830—). A Bohemian novelist, known by her pseudonym, Karolina Světla. She was born at Prague and her name was Rott before she married Professor Mužák. After 1858, when her first novel, *Double Awakening,* was published, she produced more than fifty works of fiction, such as: *Láška k bášnikovi* ("Poet's Love," 1860); *Prnvi Ceška* (1861); *Vesnicky roman* ("Village Romance," 1869); *Frantina* (1870); *Kriz a potoka* ("The Cross Beside the Stream," 1871); and *Barbara* (1873), besides essays, memoirs, and songs.

MUZIANO, mōō′tsē-ä′nō, GIROLAMO (1528-92). An Italian painter of the Mannerist School. He was born at Aquafredda, near Brescia, whence he was also called Bressano. His first master was the painter Girolamo Romanino, and he afterwards studied in Venice under Titian. Proceeding to Rome, he adopted the manner of Michelangelo, whose favor he gained by his first painting of importance, "The Resurrection of Lazarus," now in the Quirinal Palace. He is best known for his improvement of mosaics and the foundation of the Academy of Saint Luke, which was largely due to his efforts and endowment. He was also celebrated among contemporaries for his landscapes. Most of his pictures are in the palaces and churches of Rome. Among the best are: "Descent from the Cross," Borghese Gallery; "Christ Giving the Keys to Peter," his masterpiece; and a "Flagellation," in the Vatican. His principal surviving frescoes are in the Vatican and at Foligno. Though an imitator of Michelangelo, he preserved the excellencies of Venetian coloring. He died in Rome, April 27, 1592.

MY′ALI′NA (Neo-Lat., diminutive of Lat. *mya,* from Gk. *μύαξ, myax,* sea-mussel, from *μῦς, mys,* muscle, mussel, mouse). A fossil pelecypod somewhat resembling in shape a mussel (Mytilus), that is very common in the Carboniferous and Permian rocks, and hence an index fossil of those periods. The genus is of interest also as possibly representing an intermediate stage between the Aviculidæ and Mytilidæ, with both of which families it has characters in common.

MYC′ALE (Lat., from Gk. Μυκάλη, *Mykalē*). The ancient name of a mountain, now called Samsun, in the south of Ionia in Asia Minor. It terminates in the promontory of Cape Santa Maria, opposite the island of Samos. To the shore of this promontory the fleet and army of Xerxes withdrew in B.C. 479 on the news of the approach of a Greek fleet. The Greeks under the Spartan King Leotychides and the Athenian Xanthippus, father of Pericles, followed them, landed, and after a severe struggle stormed the Persian camp and burned the ships.

MYCE′LIUM (Neo-Lat., from Gk. *μύκης, mykēs,* fungus + *ἧλος, hēlos,* nail, wart). A collection of fungal filaments (hyphæ) making up the plant body. See FUNGI.

MYCE′NÆ (Lat., from Gk. Μυκῆναι, *Mykēnai*). An ancient city of Greece, situated on a steep hill in the northeastern corner of the Argolic Plain, commanding the passes toward Corinth. It was said to have been founded by Perseus and to have been ruled by his descendants until they were superseded by Pelops. It is celebrated in legend as the capital of Agamemnon. Here was laid the scene of the terrible story of the house of Atreus, and here was stored the wealth of Agamemnon. After the epic period, the city seems to have been completely overshadowed by the power of Argos, but it still preserved a quasi-independence, for during the Persian wars, when Argos was friendly to Persia, we hear of eighty Mycenæans at Thermopylæ, and along with Tiryns it sent two hundred men to Platæa. Later Mycenæ joined the Spartan league, but when the Spartans were occupied by the revolt of the Helots, in B.C. 463, the Argives besieged the city and expelled the inhabitants. From that time the place was the seat of a small village community, who in the time of Pausanias showed visitors the graves of Agamemnon and his household. The destruction of the city by the Argives did not greatly injure the massive Cyclopean wall; and this fortification, with the 'Lion Gate,' so called from the reliefs on the triangular slab over the lintel, and the domed tomb outside, commonly called the 'Treasury of Atreus,' had attracted the attention of archæologists long before Heinrich Schliemann in 1876 began his excavations. These opened an entirely new field in Greek archæology by the discovery just inside the Lion Gate of a carefully inclosed circle, within which at a considerable depth were five graves, hewn in the rock, and containing a number of bodies with an extraordinary mass of gold and silver ornaments, swords, and vases. Since that time the Greek Archæological Society has continued the excavations, for the most part through Dr. Tsountas, whose accurate and careful methods have proved highly successful. Besides the 'Treasury of Atreus,' eight other domed tombs and a very large number of smaller rock-cut chambers for burial have been opened. Within the wall a sixth grave was discovered near the others, the foundation walls of smaller houses were laid bare, while near the summit of the Acropolis were found the ruins of a palace showing great similarity to that at Tiryns. The discoveries at this site first brought into prominence that special period of Ægean civilization which preceded the historic Hellenic culture, and hence the name Mycenæan has been given to this age and civilization. Every year brings to light fresh material from this period, but until the recent discoveries in Crete no single site has yielded so large a variety of objects, or so complete a series of vases. For the general characteristics of Mycenæan art and for illustrations, see ARCHÆOLOGY. Consult: Schliemann, *Mycenæ* (London, 1878); Schuchhardt, *Schliemann's Excavations*, trans. by E. Sellers (London, 1891); Tsountas and Manatt, *The Mycenæan Age* (Boston, 1897); Ridgeway, *The Early Age of Greece*, vol. i. (Cambridge, 1901); Hall, *The Oldest Civilization of Greece* (Philadelphia, 1901).

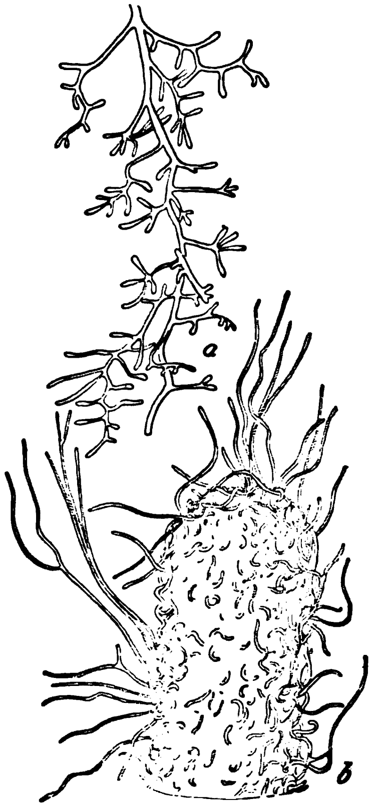
MY'CERI'NUS. An Egyptian king, the sixth of the Fourth Dynasty. His name, written by Herodotus as above, and by Diodorus, 'Mecherinus,' is, following the Egyptian form, 'Menkaura.' He built a pyramid southwest of Gizeh, the third in size and the first in point of preservation. In it in 1837 were found his stone sarcophagus (afterwards lost at sea) and fragments of his wooden coffin. Mycerinus was famed for his piety. He is the subject of one of the early poems of Matthew Arnold.

MY'CETOZO'A (Neo-Lat. nom. pl., from Gk. *μύκης*, *mykēs*, fungus + *ζῷον*, *zōon*, animal). A small class of terrestrial Protozoa (q.v.).

MYCO'NIUS, FRIEDRICH (1491-1546). A German theologian of the Reformation. He was born at Lichtenfels in Upper Franconia, of a family named Mekum, and assumed the Latinized name Myconius. At the age of nineteen he entered a Franciscan cloister at Annaberg, and in 1516 became a monk. In the following year Myconius embraced Luther's teachings, and about 1524, as pastor of a church at Gotha, became one of the leaders of the Reformation. He rendered especially valuable service in Thuringia and, after 1539, in Leipzig, by reviving the primitive custom of episcopal visits to the different churches. He attended several of the conferences of the Reformation period and in 1538 was sent on a mission to England. Myconius's *Historia Reformationis*, which contains much autobiographic matter, was published in 1710. Consult: Ledderhose, *Friedrich Myconius* (Gotha, 1854), and the biography by Meurer in his *Altväter der lutherischen Kirche* (Leipzig, 1864).

MYCONIUS, OSWALD (1488-1552). A Swiss reformer and friend of Zwingli. His real name was Oswald Geishüsler. He was born at Lucerne, studied and taught at Basel; then lived for three years (1516-19) at Zurich. After teaching at Lucerne and Einsiedeln he returned to Zurich. About 1532 Myconius became pastor at Basel, and was soon elected to succeed Œcolampadius as antistes of the district and professor of theology, a choice which met with Erasmus's disapproval. His great labor was the reform of the Swiss schools. In theology he mediated the views of Luther and Zwingli on the nature of the Lord's Supper, and finally came to a mystic interpretation of it. He wrote a *Life* of Zwingli (1532) and a commentary on Mark's Gospel (1538). Consult Hagenbach, *Oekolampad und Oswald Myconius, die Reformatoren Basels* (Elberfeld, 1859).

MY'CORRHI'ZA (Neo-Lat., from Gk. *μύκης*, *mykēs*, fungus + *ῥίζα*, *rhiza*, root). The whole structure formed by the intimate association of



MYCORRHIZA.

a. Root and rootlets of *Carpinus Betulus*, showing the coralloid character of mycorrhiza.

b. End of root of the beech (*Fagus sylvatica*), showing mat of fungus threads; more highly magnified than a.

certain fungi with the roots of higher plants. The fungi either grow inside the cells of the cortex (endotrophic mycorrhiza) or invest the young absorbing portions of the roots with a jacket of interwoven hyphæ (ectotrophic mycorrhiza, Fig. b.). Recent investigations have shown that mycorrhizal fungi are very widespread and that they are associated with perhaps more than half of the higher plants. They are particularly abundant in humus, and the conclusion has been reached that a large number of humus plants are very much benefited by their presence, and further, that some plants, such as the Indian pipe, certain orchids, and even the beech tree, are unable to complete their normal life cycle in sterilized soil. The relation between the fungus and the higher plants is not fully known, but it is believed that the fungus by its digestive powers secures and prepares certain foodstuffs, especially those containing nitrogen, for the roots. Whether or not the fungus gains benefit from the higher plants is not altogether clear, although it is probable that it lives in part as a parasite, getting certain carbohydrate foods. See SYMBIOSIS.

MYELAT, mē′ȧ-lȧt (Bur., unoccupied country). A division of Burma, India, comprising sixteen of the Southern Shan States, the largest having an area of 1600 square miles, and the smallest 4 square miles. Total area, 3723 square miles. The region is sparsely populated, the few inhabitants being chiefly occupied in the cultivation of rice and sugar-cane.

MYELI′TIS (Neo-Lat., from Gk. *μυελός*, *myelos*, marrow). An inflammation of the substance of the spinal cord which may be limited to the white or the gray matter and involve the whole cord or isolated portions of it. When the white matter is inflamed with the meninges it is called 'cortical myelitis;' when the gray matter only is affected it is known as 'central myelitis.' The disease may extend transversely, or may proceed in an upward or downward direction. The causes are, in general, injuries of various kinds, exposure, and overexertion; the infectious diseases, such as measles, typhus fever, and smallpox; and caries or tumors of the spine or the cord itself. The symptoms depend upon the extent and location of the inflammatory process. A transverse myelitis, for instance, produces complete paralysis of all the voluntary muscles whose nerve fibres arise from nuclei below the seat of the lesion. In children the disease attacks the anterior horns of the gray matter (when it is called *poliomyelitis* or 'infantile spinal paralysis'), and results in rapid loss of power and atrophy of certain groups of muscles.

MY′ER, ALBERT JAMES (1827-80). An American meteorologist, born at Newburg, N. Y. He graduated at Hobart College, and took his degree in medicine at the University of Buffalo in 1851. In 1854 he was appointed assistant surgeon in the United States Army, and was assigned to Texas, where he first developed his celebrated signal system of flags by day and torches by night, which afterwards came into general use. In 1860 he was commissioned major and made chief signal officer of the army. On the outbreak of the Civil War he was made signal officer on the staff of General Butler, and afterwards on that of General McClellan, and was successively brevetted lieutenant-colonel, colonel, and brigadier-general, his last promotion being for distinguished services in organizing, instructing, and commanding the signal corps of the army, and for especial service on October 5, 1864, at Allatoona, Ga., where his signal system enabled the apparently doomed garrison to summon assistance from the main army. On July 28, 1866, he was made colonel in the Regular Army and chief signal officer. In 1870 he commenced his work of observing and giving notice by telegraph of the approach and force of storms on the northern lakes and seacoast, at the military posts in the interior, and at other points in the States and Territories. He published *A Manual of Signals for the United States Army and Navy* (1868). A short time before his death he was promoted to the full rank of brigadier-general of the United States Army.

MYER, FORT. See FORT MYER.

MY′ERS, FREDERIC WILLIAM HENRY (1843-1901). An English poet and essayist, born February 6, 1843, at Keswick, where his father was incumbent of Saint John's Church. He was educated at Cheltenham, and at Trinity College, Cambridge, graduating with distinction, and gaining a fellowship in his college (1865). His taste for poetry was shown in his boyhood. He delighted in Homer, Æschylus, Lucretius, in fragments of Sappho, and in Pindar. Before quitting school he had learned all Vergil by heart. He was for many years inspector of schools. In 1882 he took an active part in founding the Society for Psychical Research, of which he became president. He died in Rome, January 17, 1901. The verse of Myers, which belongs mostly to an early period, comprises *Saint Paul* (1865); *Poems* (1870); and the *Renewal of Youth* (1882). In these collections are pieces of rare beauty, which give the author one of the first places among the lesser poets. Myers undoubtedly wrote some of the finest essays of his time in *Essays Modern and Classical* (1885), and in *Science and a Future Life* (1893). He also prepared for the "English Men of Letters Series" an admirable *Life* of Wordsworth (1880). His work in psychical research is represented by his contributions to the *Phantasms of the Living* (1886). After his death appeared a remarkable book on the evidences of immortality entitled *Human Personality and Its Survival of Bodily Death*, ed. by R. Hodgson and A. Johnson (London, 1903). Consult the London *Athenæum* for January 26, 1901.

MYERS, PETER HAMILTON (1812-78). An American author, born at Herkimer, N. Y. He practiced law in Brooklyn, and wrote a number of novels dealing with the early settlers of New York State, among which are: *The First of the Knickerbockers: A Tale of 1673* (1848); *The Young Patroon, or Christmas in 1690* (1849); *The King of the Hurons* (1849), republished in England under the title *Blanche Montaigne* (1856); and *The Prisoner of the Border: A Tale of 1838* (1857).

MYERS, PHILIP VAN NESS (1846—). An American educator and author, born at Tribes' Hill, N. Y. He graduated at Williams College in 1871, studied law for a year, and then went to South America on a scientific mission. After two years in Europe he returned to the United States and became president of Farmers' College, Ohio, in 1879. In 1890 he was appointed professor of history and political economy at the University of Cincinnati, where five years later he was chosen dean of the academic faculty. His publications include: *Life and Nature Under the Tropics* (1871); *Remains of Lost Empires* (1875); and *Rome: Its Rise and Fall* (1890).

MYIASIS, mī-yā'sĭs (Neo-Lat., from Gk. *μυῖα*, *myia*, fly). A medical term for the state of being infested with the larvæ of dipterous insects. A rather large number of flies may infest human beings in this way, and the disease has been divided according as the larvæ are found in the skin, in the ear, in the conjunctiva, in the intestines, in the mucous membranes, in the nose, or in wounds. The most common form is the presence of the larvæ of flesh-flies, or blow-flies, in open and neglected wounds. In certain portions of the United States, the screw-worm fly (*Lucilia macellaria*) deposits its eggs or larvæ not only in open sores upon the bodies of men and women, but many cases are on record where the eggs have been deposited in the nostrils of persons sleeping exposed in the daytime. These flies are especially apt to be attracted by an offensive catarrhal condition. Scores of maggots have been taken from the nasal passages of such individuals, and a complete destruction of the soft palate has been brought about in this way. The European flesh-fly known as *Sarcophila Wohlfarti* has been reared from larvæ found in numbers in the nasal cavities and in the ear of man. *Lucilia nobilis* of Europe has also been reared from the ear of a man, causing extensive discharges and much putrefaction. The bluebottle fly (*Calliphora vomitoria*) sometimes causes nasal myiasis, and the common flesh-fly (*Sarcophaga carnaria*) has been reared from larvæ found in the nasal passages. There are also cases of myiasis of the vagina. In all of these instances the flies are either Sarcophagidæ or Muscidæ, and the adults were attracted to putrid or septic wounds, or to an offensive or purulent discharge from the body, depositing their eggs or larvæ therein. Internal myiasis is nearly always caused by the larvæ or flies of the family Anthomyiidæ. These flies deposit their eggs in spoiled vegetables, which are afterwards eaten in the raw state, as in salads. The larvæ of several species have been passed while still alive, and frequently cause intestinal disturbances of a more or less serious character. *Homalomyia canicularis*, for example, has several times been reared in this way. In the family Sepsidæ, the common cheese maggot (larva of *Piophila casei*), taken into the stomach with old cheese, has been found alive in excreta, having passed through the entire alimentary canal. Cutaneous myiasis, aside from that of open wounds, is produced by several of the bot-flies of the family Œstridæ. In tropical regions there are one or more species of the genus Dermatobia, which may lay their eggs upon the skin of human beings, the resulting maggot forming a pus-sac below the surface of the skin, and, if undisturbed, reaching its full growth in this situation. Such cases as this are not uncommon among the unclothed inhabitants of tropical countries, and persons while bathing occasionally become infested. The best known of these human bot-flies is *Dermatobia cyaneiventris*, common in South America.

MYLIT'TA. A word long believed to be the name of a Babylonian deity, on the authority of Herodotus, who describes the cult of Mylitta in Babylonia. As a matter of fact, Mylitta is a corruption of the Babylonian *belit* (lady), used as a title of the goddess, who is more properly known as Ishtar (q.v.). She originally represented the female portion of the twofold principles through which all creation burst into existence, and which, by their united active and passive powers, uphold it. Ishtar, however, developed other qualities besides those typical of procreation. She is a goddess of war, who, armed with sword, arrows, and spear, marches at the head of the Assyrian armies. Consult Jastrow, *Religion of Babylonia and Assyria* (Boston, 1898).

MY'LODON (Neo-Lat., from MGk. *μυλόδους*, *mylodous*, molar, from Gk. *μύλη*, *mylē*, mill, millstone + *ὀδούς*, *odous*, tooth). A gigantic extinct edentate mammal, allied to Megatherium and Megalonyx, found in the Pleistocene deposits of North and South America. See MEGATHERIUM.

MY'NA-BIRD, or **MINA-BIRD** (Hind. *mainā*, starling). A starling (*Sturnia religiosa*) of the East Indies, deep velvety black in color, with a white mark on the base of the quill-feathers of the wings, yellow bill and feet, and two large bright yellow wattles at the back of the head. It is very lively and intelligent, and possesses a power of imitating human speech excelled by none of the parrots. It has sometimes been trained to repeat sentences of considerable length. It is therefore in great request, and is often brought to Europe and America, while in India it is one of the most familiar and interesting of village birds, and is regarded by the Hindus as sacred to Ram Deo.

MY NOVEL; OR VARIETIES IN ENGLISH LIFE. A novel by E. Bulwer-Lytton (1853). The story, told by P. Caxton, is partly of Hazeldean and partly of London. The principal hero is Harley L'Estrange, witty and brilliant, the friend of Squire Hazeldean. He at first fancies Helen Digby, who marries Leonard, the son of Colonel Egerton, by an early, secret marriage, and finally marries Viola, daughter of an Italian gentleman, who with his friends forms a secondary story. The plot is involved, but the novel is one of Bulwer's finest productions.

MYOCARDITIS (Neo-Lat., from *myocardium*, from Gk. *μῦς*, *mys*, muscle, mouse + *καρδία*, *kardia*, heart). An inflammatory affection of the wall of the heart. It is a term first used by Sobernheim in 1837. Myocarditis is considered as an inflammation due to infection. It is a disease secondary to typhoid fever, diphtheria, scarlet fever, cerebro-spinal meningitis, variola, erysipelas, malaria, rheumatism, influenza, or septicæmia. See HEART, DISEASES OF.

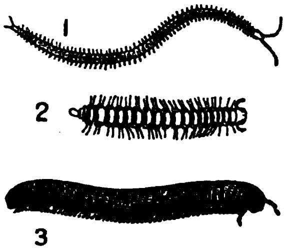
MYOMANCY. See SUPERSTITION.

MYOPIA (Neo-Lat., from Lat. *myops*, from Gk. *μύωψ*, short-sighted, from *μύειν*, *myein*, to close + *ὤψ*, *ōps*, eye). Short sight. A form of ametropia due to the fact that the antero-posterior axis of the eyeball is too long; and hence its refracting media are not proportionately diminished in power. Parallel rays of light, therefore, are not brought to a focus on the retina, but in front of it, forming circles of diffusion on the retina. See SIGHT, DEFECTS OF.

MY'OSIN. See GLOBULINS.

MYOSOTIS. See FORGET-ME-NOT.

MYR'IAP'ODA (Neo-Lat. nom. pl., from MGk. *μυριόπους*, *myriopous*, having ten thousand feet, from Gk. *μύριοι*, *myrioi*, ten thousand + *ποῦς*, *pous*, foot). A class of arthropods resembling annelids in their lengthened form, and in the great number of equal, or nearly equal, segments of which the body is composed; but in most of their other characters more nearly agreeing with insects, among which they were ranked by the earlier naturalists. They differ from insects and all other arthropods in the fact that the posterior segments of the body bear jointed locomotor appendages. In addition to their affinities with insects, myriapods are worm-like and some of them suggest relations with the thysanurans. They have a distinct head, but there is no distinction of the other segments, as in insects, into thorax and abdomen. They have simple or compound eyes; a few are destitute of eyes. They have antennæ like those of insects. The mouth is furnished with a complex masticating apparatus, in some resembling that of some insects in a larval state, in others similar to that of crustaceans. Respiration is carried on through minute pores or spiracles, placed on each side along the entire length of the body, the air being distributed by innumerable ramifying air-tubes to all parts. In most parts of their internal organization the myriapods resemble insects, although a decided inferiority is exhibited, particularly in the less perfect concentration of the nervous system. The resemblance is greater to insects in their larval than in their perfect state. The body of the myriapods is protected by a hard chitinous covering. The number of segments is various, seldom fewer than 24, although in some of the genera they are consolidated together in pairs, so that each pair, unless closely examined, might be considered as one segment bearing two pairs of feet. The legs of some of the lower kinds, as Julus, are very numerous, and may be regarded as intermediate between the bristle-like appendages which serve many annelids as organs of locomotion and the distinctly articulated legs of insects. In the higher myriapods, as Scolopendra, the legs are much fewer, and articulated like those of insects. Some of them feed on decaying organic matter, chiefly vegetable; those of higher organization are carnivorous. The myriapods do not undergo marked metamorphoses, but the young greatly resemble the adults, although some of them are at first quite destitute of feet; and, contrary to what takes place in insects, the body becomes more elongated as maturity is approached—the number of segments and of feet increase.



FORMS OF MYRIAPODS.
1. *Geophilus.* 2. *Polydesmus.* 3. *Julus.*

Myriapods are widely distributed, and are represented in almost every part of the earth. They flourish in moist and dry, hot and cold climates. Like other widely distributed animals, they show great variation in size and color, ranging from microscopic size to a length of more than six inches. Some of the Julidæ and Polydesmidæ of the tropics are beautifully and brilliantly colored. Some of the species of Geophilus are phosphorescent. Most myriapods inhabit dark and obscure places. Some of the cave-inhabiting species from Wyandotte and Bradford caves in Indiana are described by Packard as light in color, and those from the latter cave have rudimentary eyes. The organs of defense throughout the class vary greatly. In the centipedes the large claws, supplied with poison from a gland, are weapons of offense and defense. The millipedes, on the other hand, rely for defense on an acid secretion from certain glands. Other forms are hairy or bristly. Hairiness was the most common mode of defense among fossil myriapods.

A fossil bristled myriapod has been found in America in Paleozoic strata, and two species have been found in the Old Red Sandstone of Scotland. The highest vertebrates in this deposit are fishes, and the highest plants are conifers. The Paleozoic species, about forty in number, all belong to an extinct order (Archipolypoda) and most of them were of gigantic size. Later fossil myriapods, contemporaneous with giant fossil Amphibia, occur in the coal measures. One of these forms from Illinois approaches very closely the Julidæ of to-day. Only one species has been found in the chalk layers, but in Tertiary and recent times plentiful remains have been found. The majority of these belong to the Chilognatha and Chilopoda. They have been found in the gypsum of France, in the brown coal of Germany, and in the Green River formation of North America. Amber has also yielded several species.

Classification. The class Myriapoda is now divided into five orders, the Chilognatha or Diplopoda, the Chilopoda or Syngnatha, the Schizotarsia, the Symphyla, and the Pauropoda. To the Chilopoda belong the common thousand-legs of the family Julidæ, as well as the representatives of seven other families, all of which bear two pairs of legs to each of the body segments except the first three. Verloef states that the males of some of the Julidæ undergo certain seasonal changes. In the spring and autumn the form of the legs and other organs changes. These seasonal changes are correlated with the sexual condition of the Julus just as the males of certain birds and fishes show a brighter coloration and other changes at the breeding season. Julus will feed freely in captivity if the earth is kept at the proper moisture and proper food is furnished plentifully. They will thrive on grass, leaves, and bits of apple and pear. The eggs are numerous, from 60 to 100 being deposited at a laying. The female forms a receptacle for the eggs some distance below the surface of the ground. It is in the shape of a hollow sphere, and is composed of little pellets of mud, which are molded by her jaws and front legs. The nest is perfectly smooth within, but the outside is rough and shows the pellet composition. In the top of the sphere a small opening is left until the eggs are laid. The hole is then plugged up with earth and the eggs are left to chance. The chilopods have many-jointed antennæ and only one pair of legs to each joint. To this group belong the large tropical centipedes of the family Scolopendridæ and the long slender Geophilidæ, as well as the Lithobilidæ and Notophilidæ.

The order Schizotarsia contains but a single family, the Scutigeridæ, of which the common household centipede of the United States (*Scuti-*

gera forceps) is a familiar example. This creature, although viewed with horror by careful housekeepers, preys upon house-flies and small cockroaches, and is by no means an entirely undesirable denizen of households. It is prevalent in the Southern States, and extends as far north as the Hudson River Valley. The order Symphyla contains the single family Scolopendrellidæ, which have a great resemblance to certain of the Thysanura among the insects. The order Pauropoda consists of the single family Pauropodidæ, which contains only three genera. The type-genus, Pauropus, a curious crustacean-like form, was first discovered by Lord Avebury (Sir John Lubbock) in his kitchen garden in 1866.

Consult Sinclair, *Cambridge Natural History*, vol. v. (London, 1895); Scudder, "Systematic Review of Our Present Knowledge of Fossil Insects, Including Myriapods and Arachnids," in *Bulletin of the United States Geological Survey*, No. 31 (Washington, 1886).

MYRICA. An Asiatic and North American shrub. See CANDLEBERRY.

MYRISTIC ACID (from Neo-Lat. *Myristica*, from Gk. *μυριστικός*, *myristikos*, suitable for anointing, from *μυρίζειν*, *myrizein*, to anoint, from *μύρον*, *myron*, unguent), $C_{13}H_{27}$.COOH. A crystalline fatty acid, found in nutmeg, the seed of *Myristica fragrans*, growing on the Molucca Islands, and cultivated in tropical countries. It occurs in the form of a glyceride in the fat of the nutmeg, or nutmeg butter. It has also been found in small quantity among the products of the saponification of spermaceti, and of the fatty matter of milk; and hence this organic acid is one of those which are common to both the animal and vegetable kingdoms.

MYRMECOPHILY. See MYRMECOPHYTES.

MYRME'COPHYTES (from Gk. *μύρμηξ*, *myrmēx*, ant + *φυτόν*, *phyton*, plant), or MYRMECOPHILOUS PLANTS. Plants in which there are symbiotic relations between the plants and ants. Typical myrmecophytes are most commonly found in the tropics, and present peculiarities that are hard to explain in a purely scientific way. In some cases ants cut off leaves, take them to their nests, and raise crops of fungi that serve them as food. In other cases, as in the famous South American Cecropia, ants live in peculiar chambers within the plant, and feed upon products that appear to be useless so far as any other purpose is concerned. They appear, on the other hand, to defend the plants in which they dwell against leaf-cutting ants and other enemies. The relation here outlined is one of the most remarkable known types of symbiosis. The terms myrmecophily and myrmecophilous should be discarded for myrmecophytism and myrmecophytic. See SYMBIOSIS.

MYRMID'ONES (Lat., from Gk. Μυρμιδόνες). In the *Iliad*, the Achæans of Phthiotis, in the south of Thessaly, ruled by King Peleus, and led to the Trojan War by his son Achilles. Later writers discovered an eponymous hero Myrmidon, son of Zeus, and father of Actor, the husband of Ægina, daughter of Asopus, who was by Zeus the mother of Æacus. For him Zeus changed the ants (*μύρμηκες*, *myrmēkes*) on the island of Ægina to men, and this race later wandered to Thessaly. The story is evidently due to the resemblance which the Greeks saw between Myrmidones and myrmekes.

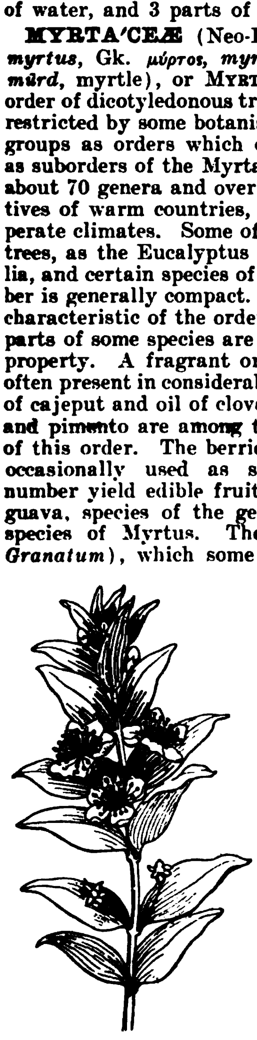
MYROB'ALAN (Lat. *myrobalanum*, from Gk. *μυροβάλανος*, *myrobalanos*, from *μύρον*, *myron*, unguent + *βάλανος*, *balanos*, acorn). The astringent fruit of certain species of Terminalia (natural order Combretaceæ), natives of the mountains of India. Terminalia bellerica and Terminalia chebula produce most of the myrobalans of commerce, but the fruits of other species often appear. Formerly myrobalans were credited with tonic properties; now they are rarely used medicinally. They are largely exported for tanners' and dyers' use, since they give a durable yellow with alum and an excellent black with iron. A number of species are valuable for timber, the best known of which, Terminalia catappa, is a large deciduous tree planted in many tropical countries. It is a popular shade tree in Honolulu, where it is called Mexican almond from the almond-like flavor of the nuts.

MY'RON (Lat., from Gk. Μύρων). An Athenian sculptor, who flourished about the middle of the fifth century B.C. He was a native of Eleutheræ, near the Bœotian frontier of Attica, and is called a pupil of Hagelaïdas of Argos. In his style he belongs in the period of transition just before Phidias, but his works show also a remarkable power of observation and great technical skill. He seems to have taken special pleasure in representing vigorous action, and to have indicated emotion rather by gesture and position than by expression. He was a worker in bronze, and also skilled in the engraving of plate. No original work has survived, but late copies of some of his statues are extant. Of these the most famous is the Discobolus (q.v.), or discus-thrower, of which there are specimens in the Vatican and the British Museum, though the best copy is in the Palazzo Lancellotti in Rome. (See illustration under GREEK ART.) Another work was a group on the Acropolis of Athens of Marsyas preparing to pick up the flutes thrown away by Athena, but starting back at the approach of the goddess. A copy of the Marsyas is in the Lateran Museum in Rome. In antiquity a bronze cow on the Acropolis was especially famed for its truth to nature. Many epigrams on the statue of the runner Ladas have also come down to us. Consult, in addition to the histories of Greek art, Furtwängler, *Masterpieces of Greek Sculpture*, Eng. trans. by E. Sellers (London and New York, 1895).

MYRRH. An umbelliferous plant. See CICELY.

MYRRH (AS. *myrre*, *myrra*, from Lat. *myrrha*, *murrha*, *murra*, from Gk. *μύρρα*, *myrrha*, myrrh, from Aramaic *mūrā*, Heb. *mōr*, Ar. *murr*, myrrh, from Aramaic *mārr*, Heb. *mārar*, Ar. *marra*, to be bitter). A gum resin produced by Balsamodendron myrrha, a tree of the natural order Amyridaceæ, growing in Arabia and in Eastern Africa. The myrrh tree is small and scrubby, spiny, with whitish-gray bark, thinly scattered small leaves, consisting of three obovate obtusely toothleted leaflets, and the fruit a smooth brown ovate drupe, somewhat larger than a pea. Myrrh exudes from the bark in oily yellowish drops, which gradually thicken and finally become hard, the color at the same time becoming darker. Myrrh appears in commerce either in tears and grains, or in pieces of irregular form and various sizes, yellow, red, or reddish brown. It is brittle, and has a waxy fracture, often exhibiting whitish veins. Its smell is balsamic, its taste aromatic and bitter. It is used in medicine as a tonic and stimulant, in disorders of the digestive organs, excessive secretions from the mucous membranes, etc., also to cleanse foul ulcers and promote their healing, and as a mouth-wash and gargle, particularly in a spongy or ulcerated condition of the gums. The best myrrh is known as Turkey myrrh, being brought from Turkish ports. Most of the myrrh of commerce, however, passes either through Aden or through Bombay. The chief constituents of myrrh are: A resin known as myrrhin; a gum; a volatile oil known as *myrrhol* and having the composition $C_{10}H_{14}O$, and a bitter principle. An excellent mouth-wash for sore gums may be prepared by mixing 1 part of myrrh, 16 parts of eau de cologne, 1 part of borax, 3 parts of water, and 3 parts of syrup.

MYRTA′CEÆ (Neo-Lat. nom. pl., from Lat. *myrtus*, Gk. *μύρτος*, *myrtos*, myrtle, from Pers. *mūrd*, myrtle), or MYRTLE FAMILY. A natural order of dicotyledonous trees and shrubs. Even as restricted by some botanists, who exclude various groups as orders which other botanists consider as suborders of the Myrtaceæ, this order contains about 70 genera and over 2000 species, chiefly natives of warm countries, but represented in temperate climates. Some of the species are gigantic trees, as the Eucalyptus or gum trees of Australia, and certain species of Metrosideros. The timber is generally compact. Astringency seems to be characteristic of the order, and the leaves or other parts of some species are used in medicine for this property. A fragrant or pungent volatile oil is often present in considerable quantity, of which oil of cajeput and oil of cloves are examples. Cloves and pimento are among the best known products of this order. The berries of several species are occasionally used as spices. A considerable number yield edible fruits, among which are the guava, species of the genus Eugenia, and some species of Myrtus. The pomegranate (*Punica Granatum*), which some botanists place in this order, Engler makes the type of the order Punicaceæ. Bentham and Hooker place it in the order Lythraceæ. The chief genera of the order as limited by Engler are Myrtus, Psidium (the guava), Pimenta (allspice), Eugenia (cloves), Metrosideros, Eucalyptus, Melaleuca, and Darwinia.



COMMON MYRTLE (*Myrtus communis*).

MYRTLE (*Myrtus*). A genus of plants of the natural order Myrtaceæ. The common myrtle (*Myrtus communis*) is well known as a beautiful evergreen shrub, or a tree of moderate size, with white flowers. It is a native of the Mediterranean region and of the temperate parts of Asia. The leaves are astringent and aromatic, contain a volatile oil, and were used as a stimulant by the ancients. The berries are also aromatic, and are used in medicine in Greece and India. A myrtle wine, called myrtidanum, is made in Tuscany. Myrtle bark is used for tanning in many parts of the south of Europe. Among the ancient Greeks the myrtle was sacred to Venus as the symbol of youth and beauty, and was much used in the festivals. It is often mentioned in poetry. The small-leaved myrtle (*Myrtus microphylla*) of Peru has red berries of the size of a pea, of a pleasant flavor and sugary sweetness. Those of the luma (*Myrtus Luma*) are also palatable, and are eaten in Chilé, as are those of Myrtus Ugni, the Chilean guava, which is said to become a large tree with very hard and useful wood. These species have all been successfully grown in California as outdoor ornamental shrubs.

MYRTLE-BIRD. The American yellow-rumped warbler (*Dendroica coronata*). It is about 5¾ inches long, bluish ash above, streaked with black; white below, with a black patch on the breast; crown, rump, and sides bright yellow, and the throat white. It is one of the most numerous and earliest of spring migrants in the United States, and scatters all over the country, but passes on to the north, and few breed south of the latitude of Lake Ontario. The name refers to the prevalence of this warbler in the Southern States in winter, where they feed on berries, especially those of the wax-myrtle (*Myrica cerifera*). From the Rocky Mountains to the Pacific Coast a very similar species (differing mainly in having the throat yellow) takes the place of the Eastern form; it is known as Audubon's warbler (*Dendroica Auduboni*).

MYRTLE FAMILY. A popular name for the natural order Myrtaceæ (q.v.).

MY′SIA (Lat., from Gk. *Μυσία*). In ancient geography, a district in the northwest of Asia Minor, bounded on the north by the Hellespont and Propontis, on the east by Bithynia and Phrygia, on the south by Lydia, and on the west by the Ægean. In a stricter sense, Mysia was only the southeastern part of this district. The principal rivers were the Granicus, Scamander, Caïcus, Æsepus, and Rhyndacus. The surface is mountainous in the interior, and in part tableland, among the mountains being Ida in the west and Olympus in the east. The inhabitants were thought by some ancient writers to be of Thracian, and by others of Lydian descent; probably there were immigrations from both countries. Mysia was subject to the Lydian monarchy, and under the Persian dominion formed, together with Lydia, one of the satrapies created by Darius. After the death of Alexander the Great it shared in the vicissitudes of Asia Minor during the wars of his successors and the Gallic invasion, but first assumed prominence in history with the rise in the third century B.C. of the Kingdom of Pergamum. Among its principal towns were Abydos, Cyzicus, Prusa, Lampsacus, Adramyttium, Alexandria Troas, and Pergamum.

MYSLOWITZ, mĭs′lō-vĭts. A town in the Province of Silesia, Prussia, on the Przemsa, 110 miles southeast of Breslau (Map: Prussia, H 3). Coal-mining, zinc-refining, flax-spinning, and brick-making are its principal industries. Population, in 1900, 13,365.

MYSORE, mī-sōr′, or **MAISUR,** mī-sōōr′. A native State of Southern India, bounded on the east, south, and west by Madras, on the southwest also by Coorg, and on the north by Bombay and Madras (Map: India, C 6). Area, 27,936 square miles. The country consists of a plateau from 2000 to 3000 feet above the sea, inclosed in the angle between the Eastern and Western Ghats. Its surface is undulating, somewhat level in the east, but rugged and mountainous in the west, where it is heavily forested and sparsely populated. It consists mainly of primitive rocks, and basaltic trap formations are common; the *drugs*, precipitous rocky masses rising more than 1000 feet above the plateau, are characteristic features of the State. The rivers are all unnavigable mountain streams; most of them flow toward the Bay of Bengal, and are largely utilized for irrigation purposes; the northern streams belong to the basin of the Kistna, and the southern to the Kavery basin. Grain and oil-seeds form the major part of the crops. The betelnut and cocoanut palm are important, and coffee is grown in large quantities. There are a number of gold mines in the eastern part of the State.

Mysore is ruled by a Maharaja, whose word practically is law. A representative assembly meets annually, but its powers are limited to discussion. The State maintains a small military force of about 4000 men. An annual tribute is paid to the British Government in consideration of military protection. British interests are looked after by a political agent who resides at Mysore, the capital. In 1901 the population was 5,538,482, showing an increase of 12 per cent. for the decade. Nearly 94 per cent. of the population are Hindus. The remainder are mainly Mohammedans. The principal town is Bangalore.

HISTORY. Frequently mentioned in Hindu literature under the rule of various dynasties, the territory was merged with the Balala Kingdom of Delhi after the Mohammedan invasion of the fourteenth century. After the overthrow of the Ballala rule by Ala-ud-Din, a new State arose, including Mysore and part of the Carnatic, with Vijayanagar as capital. In 1565 its ruler, Raja Ram, was defeated and killed at the battle of Talikot by a Moslem confederation, and the State again became divided under the rule of several minor chiefs. One of these, Raja Wodeyar, captured Seringapatam in 1610, and his successors strengthened their rule until, at the close of the seventeenth century, their sovereignty extended throughout Mysore. This dynasty was supplanted in the eighteenth century by Hyder Ali (q.v.), the formidable foe to the rising British power in India. By the defeat and death of his son Tipu, Sultan at Seringapatam, in 1799, the State came under British control. Part of the territory was annexed to India, and a descendant of Wodeyar was appointed to rule over the remainder. Owing to misrule, the British took charge of the administration from 1831 to 1881.

MYSORE, or **MAISUR.** The capital of the native State of the same name, India, 10 miles southwest of Seringapatam and 245 miles southwest of Madras (Map: India, C 6). The town is picturesquely situated in a valley at the foot of the temple-crowned Chamundi Hill, which rises on the southeast 3489 feet above the sea. It is a well-built town, with wide and regular streets; area, about three square miles. The houses generally are built of teak and roofed with tiles: the chief buildings are the quadrangular fort inclosing the Maharaja's palace, the Residency, the Mohan Mahal or pleasure palace, the summer palace, and the European churches. Modern methods have greatly improved the sanitation of the town. The manufacture of carpets is the leading industry, and there is an active trade in the products of the State. Mysore was tributary to Seringapatam until its ruler captured that city in 1610, and henceforth it was the capital of the State and the seat of the Raja. During the period of English rule (1831-81), the capital was removed to Bangalore. Population, in 1891, 74,048; in 1901, 68,111.

MYSTAGOGUE, mĭs′tȧ-gŏg (Lat. *mystagogus*, from Gk. *μυσταγωγός*, one who introduces into mysteries, from *μύστης*, *mystēs*, initiate, from *μύειν*, *myein*, to initiate, close the lips or eyes, from *μῦ*, *my*, slight sound made by the lips + *ἀγωγός*, *agōgos*, leader, from *ἄγειν*, *agein*, to lead). In the Greek religious system, the functionary who directed the preparations of the candidates for initiation in the mysteries (q.v.). They were men who had passed through all the grades of initiation, and were probably under the cognizance of the State. Prior to presenting himself for initiation, each votary had to place himself under the guidance of one of these mystagogues, and received instruction from him as to the various purifications and ceremonies to be performed. The mystagogue passed upon the fitness or unfitness of the applicant to receive the rites. In the Christian writers the term is used of the priest who prepared candidates for the sacraments of baptism, confirmation, and the Eucharist.

MYSTERIES (Lat. *mysterium*, from Gk. *μυστήριον*, *mystērion* from *μύστης*, *mystēs*, initiate). Secret rites connected with the Greek religion. They have been divided into two groups: (1) those where the participants were a small circle of priests, officially connected with the sanctuary, and (2) those where the participants were numerous. Naturally our information on these matters is very scanty, and by no means trustworthy, and the subject has been a fertile field for ingenious speculation. For a long time the view was prevalent that the mysteries concealed deep truths and the remnants of a primitive revelation, too profound for the popular mind. The chief representative of this doctrine was Creuzer in his *Symbolik und Mythologie der alten Völker* (4 vols., Leipzig and Darmstadt, 1836-43). The death-blow to these theories, so far as critical scholarship was concerned, came from Lobeck, who in his *Aglaophamus* (Königsberg, 1829) showed that such occult wisdom was no part of their teaching. Mysteries were numerous in Greece, and were celebrated in honor of many gods, but in only a few places did they reach a national importance. Of these the most celebrated and reverenced were the Eleusinian mysteries, connected with the worship of Demeter and Cora (or Persephone) at Eleusis (q.v.) in Attica. With these goddesses there appear in the Eleusinian cult an anonymous god and goddess (*θεός*, *theos*, and *θεά*, *thea*), Pluto, Iacchus, Triptolemus, and Eubuleus, whose connection with the worship is by no means clear. The rites and legends connected with this cult are very similar to those prevailing not long ago among the European peasants, and point clearly to a similar belief in a 'corn-spirit,' which dies and is reborn yearly. So far as can be judged, the Eleusinian mysteries consisted largely in the rehearsal before the initiated (*μύσται, mystai*) of a sort of miracle play, in which the rape of Cora, the sufferings of Demeter, and the final reunion of mother and daughter, together with the bestowal of the art of agriculture on man by Demeter, were represented in dramatic form. The initiation seems to have symbolized the redemption of the soul from the powers of the lower world and its reception by the goddess as pure. So far as can be learned from literature and art, the candidate was purified by a sacrifice, which he himself brought, and, after fasting and preparation, wandered through a series of dark and confused passages, beset by terrifying sights and sounds, but emerging at last into the light where he saw the goddesses. We know that candidates had to be initiated first into the Lesser Mysteries at Agræ, near Athens, six months before the ceremonies at Eleusis. The *Mystæ* seem to include all, while those who had been fully received are sometimes called *ἐπόπται, epoptai*, 'those who see.' As to the public ceremônial, we are better informed. The Lesser Mysteries were celebrated in the month Anthesterion (approximately February). They were accompanied, like the Greater Mysteries, by a sacred truce. The Greater Mysteries were celebrated in Boëdromion (approximately September) at Eleusis, though there was much preliminary ritual at Athens. On the 14th certain sacred relics (*τὰ ἱερά, ta hiera*) were brought from Eleusis to Athens and deposited in the Eleusinia; the next day seems to have been given to the gathering of the celebrants; on the 16th the Mystæ went in procession to the beach at Phalerum for solemn purification in the salt water; the 17th and 18th were filled with offerings and ceremonies at various sanctuaries in Athens; on the 19th, early in the day, the sacred procession escorted the image of Iacchus and the sacred relics to Eleusis. At the bridge over the Cephissus jests and gibes were exchanged, and it was evening (hence the 20th in Greek reckoning) when they arrived at the great sanctuary. The following nights and days were given up to the performance of the sacred ritual and the ceremonies of initiation, which certainly made a strong impression on the spectators. On the 23d the ceremonies closed with a solemn pouring out of water from two earthen jars toward the east and west. It is certain that no dogmatic teaching formed part of the Eleusinian worship. The chief officials connected with this sanctuary were the Hierophant, who was always from the Eleusinian family of the Eumolpidæ, and from the family of the Kerykes, the Dadouchos or torch-bearer, the Hierokeryx or herald, and the priest at the altar (*ὁ ἐπὶ βωμῷ ἱερεύς, ho epi bōmō hiereus*). In connection with the celebration a sacred truce, extending from the full moon of the previous month to the tenth day of the following was proclaimed so that the Mystæ could travel in security. Initiation was open to all ages and conditions, including even slaves, provided they were Hellenes (or later Romans), and were free from any great crime. Eleusinian mysteries were celebrated on a smaller scale at Phlius, Megalopolis, and elsewhere, while at Andania, in Messenia, they appear in combination with the Samothracian worship of the Cabiri.

Consult: Mommsen, *Feste der Stadt Athen* (Leipzig, 1898); Nebe, *De Mysteriorum Eleusiniorum Tempore et Administratione Publica* (Halle, 1886); Strube, *Bilderkreis von Eleusis* (Leipzig, 1870, 1872); Foucart, *Recherches sur l'origine et la nature des mystères d'Eleusis* (Paris, 1895), and *Les grands mystères d'Eleusis* (ib., 1900), very valuable, though the author's theory of the Egyptian origin of the mysteries is not generally accepted; Gardner, *New Chapters in Greek History* (London, 1892), and the works cited under ELEUSIS.

Next to the Eleusinian the most prominent were the Samothracian mysteries of the Cabiri or great gods. Originally these seem to have been two in number, though later we find two goddesses added, and the four, Axieros, Axiokersa, Axiokersos, and Kasmilos, were identified by the grammarians with Demeter, Persephone, Hades, and Hermes. The rites were believed to afford protection against the perils of the sea, and were doubtless in early times largely confined to seamen. Consult: Conze, *Archäologische Untersuchungen auf Samothrake* (Vienna, 1875-80), and Preller-Robert, *Griechische Mythologie*, i. 2 (Berlin, 1894).

Another sanctuary of the Cabiri lay near Thebes, where we find the deities worshiped as Cabiros and Pais, or 'boy.' The objects found seem to indicate that these mysteries were orgiastic in character. See *Athenische Mittheilungen des deutschen archäologischen Instituts*, vols. xiii. and xv. (Athens, 1888-90).

In the course of time other mysteries, such as those of Isis, Sabazios, Mithras, and other Oriental deities, spread through the Greek world, and at all times there were private sects, like the followers of Orpheus (q.v.), who professed to possess secret teachings which could insure peace and happiness in the other world to those who followed their directions here.

On the general subject of the Mysteries, consult in addition to the books named above: Petersen, *Der geheime Gottesdienst bei den Griechen* (Hamburg, 1848); Rohde, *Psyche* (3d ed., Leipzig, 1902); Aurich, *Das antike Mysterienwesen in seinem Einfluss auf das Christentum* (Göttingen, 1894).

MYSTERIES OF UDOLPHO. A novel by Mrs. Ann Radcliffe (1794). This once popular romance tells of the Castle of Udolpho in the Apennines, where terrific scenes of horror occur. The victim of these supernatural events is an English girl, Emily Saint Aubyn, who is finally rescued by her lover, the Chevalier Velancourt.

MYSTERY. The name given to a very early type of the mediæval drama, founded upon some part of the Bible narrative, and in England often used indiscriminately with that of miracle play (q.v.). The traditions of the ancient drama survived to some extent the fall of the Western Empire, and on them were modeled religious plays, intended less for acting than for reading. There is extant a Greek play entitled Χριστὸς Πάσχων (The Passion of Christ), long attributed to Saint Gregory Nazianzen, but now thought to be of much later date, which follows the structure of the ancient Greek drama. In the second half of the tenth century, Hroswitha or Roswitha (q.v.), a Benedictine nun of Gandersheim in Saxony, wishing to provide her sisters with a substitute for Terence, who was widely read by the learned throughout the Middle Ages, cast six martyrdoms in the form of the old Latin comedy. Through imitations of this kind, the classic drama may be said to have continued to exert some influence as late as 1200. But the main impetus to a revival of popular dramatic literature came from the Church. The clergy wished to provide some means of making the great events on which their teaching was based more vivid and real to their unlettered flocks. This was the more natural because the service of the Church was in its very nature dramatic. Its chief act of worship was, in no abstruse sense, a representation of the sacrifice of Christ; and both the symbolism of the ritual and the responsive nature of the liturgy shared the same character. Especially at the great festivals of Christmas and Easter it was customary to make it still more dramatic by representing the events then commemorated as actually taking place before the congregation. Traces of this procedure are found as early as the closing years of the tenth century. The words used, the directions to the performers, hymns and anthems, were at first in Latin; but as dialogue was introduced, they were naturally turned into the vernacular. In the thirteenth century, in fact, mysteries and miracle plays lost the favor of the Church. Where they were not still a part of the ritual, they were banished by various decrees from the sacred building, and the clergy were forbidden to take part in them. They passed first to the churchyard, and then to the streets and public squares, where they were performed on movable stages drawn from place to place. The actors in England were frequently members of the trade guilds, who arranged for these performances at Christmas, Easter, and Corpus Christi, supplemented by strolling players. In France they came under the control of the *Confréries de la Passion*, which were established in many of the leading towns—societies half religious, half literary, and wholly secularized by the fourteenth century. The plays devoted to the exposition of special mysteries were combined, in England at least, in an immense cycle, covering the entire range of the Scriptural narrative from the Creation to the Day of Judgment. In texts belonging to the fourteenth, fifteenth, and sixteenth centuries, four of these cycles, more or less complete, have come down to us. They are the York cycle (48 plays), the Towneley (32 plays), the Chester (25 plays), and the Coventry (42 plays); of other cycles there are fragments. The mystery plays died slowly as the regular drama came into existence. As late as 1580, we hear of one being represented at Coventry. Consult for both mysteries and miracle plays: Bates, *English Religious Drama* (New York, 1893); Hase, *Das geistliche Schauspiel des Mittelalters* (Leipzig, 1858; Eng. trans., London, 1880); Stoddard, *References for Students of Miracle Plays and Mysteries*, a classified list (Berkeley, 1887); Sepet, *Le drame chrétien au moyen-âge* (Paris, 1878); Pollard, *English Miracle Plays, Moralities, and Interludes*, with specimens (Oxford, 1890); Manley, *Specimens of the Pre-Shakespearean Drama*, arranged so as to show development (Boston, 1897); Wright, *Early Mysteries* (London, 1838); A. d'Ancona, *Sacre rappresentazioni dei secoli 14-16* (Florence, 1872); Ward, *English Dramatic Literature* (London, 1899); Jusserand, *Literary History of the English People* (ib., 1895); Petit de Julleville, *Les mystères* (Paris, 1886); Davidson, *Studies in the English Mystery Plays* (New Haven, 1892); and for reprints, besides the specimens given above, *York Plays* (ed. L. T. Smith, Oxford, 1885); *Chester Plays* (ed. Wright, London, 1843-47); *Towneley Mysteries* (ed. Raine, Newcastle, 1836); *Digby Mysteries* (ed. Furnivall, London, 1882); *Miracles de notre Dame* (ed. G. Paris and Robert, Paris, 1876-81). See DRAMA; MIRACLE PLAY; PASSION PLAY.

MYSTERY OF EDWIN DROOD. The last and unfinished novel by Charles Dickens. The first number appeared in 1870 and only six were finished when he died. The scene is a cathedral town, where live a music teacher, John Jasper, and his young nephew, Edwin Drood. Both love the same girl, Rosa. Drood suddenly vanishes, and Neville Landless is accused by Jasper of murdering him. The story breaks off, and the mystery was never solved. Notes furnished by Dickens's son-in-law indicate that Jasper was the murderer, but that Rosa finally married Tartar, a sailor.

MYSTERY OF MARIE ROGET, mȧ′rē′ rō̇′zhä′. A tale by Edgar A. Poe, published in three parts in *Snowden's Lady's Companion* (1842). It is a sequel to *Murders in the Rue Morgue*, the accounts of the murder of a beautiful Paris grisette, and a parallel, with other localities and names, of the murder of Mary Rogers at Weehawken, N. J.

MYSTICISM (from *mystic*, from Lat. *mysticus*, from Gk. *μυστικός*, *mystikos*, relating to mysteries, from *μύστης*, *mystēs*, initiate). The name given to certain forms of religious experience, in which man, transcending the ordinary limitations of time and sense, seems to hold direct communion with the Deity. Mysticism may be philosophical as well as religious, in which case its speculations are usually pantheistic in their tendency. Religious mysticism exhibits two wholly different qualities, curiously combined, viz. pure individualism and the sinking of personality. The mystic may have fervently striven to attain the exalted state of communion with God, yet when once it has been reached, conscious activity ceases, and through a sort of passive rapture the subject seems merged in the object of his yearning. Direct intuition supersedes reason. The mystic is not unconscious, yet he seems to be no longer self-conscious in the ordinary sense. The satisfaction which he feels is wholly different from that derived from ceremonial observances, for the true mystic is the opposite of a legalist. His attitude, indeed, is a protest against formalism. He feels himself to be independent of external authorities, whether of rite, creed, priesthood, or Scripture, though, of course, the religion of the Catholic mystic precludes this separation from externals.

In one or another of its forms, mysticism is a very ancient phenomenon, finding illustration in India both in Brahmanism and Buddhism, in Persia among the Sufis, and among the Greeks in Neo-Platonism. It passed over into Greek Christianity from Plotinus, through the writings of pseudo-Dionysius Areopagita (see DIONYSIUS THE AREOPAGITE), and his great commentator, Maximus Confessor (seventh century). John Scotus Erigena (ninth century) translated the pseudo-Dionysius into Latin, and thus introduced Greek mystical theology to Western Europe, where, superimposed upon the mysticism of Saint Augustine, it enjoyed increasing popularity. Monasticism proved a congenial soil for the cultivation of the mystic spirit, and some of its most perfect types are found among the monks, e.g. in the Eastern Church the Hesychastæ of Mount Athos (see HESYCHASTS), and in the Western, Bernard of Clairvaux, Francis of Assisi, and Ignatius of Loyola. The Monastery of Saint Victor, near Paris, was a very influential centre of mysticism in the twelfth century. About the same time an Italian abbot, Joachim of Floris, prophesied that the dispensation of the Spirit would soon begin. Several famous mystics appear among the Schoolmen, some of whom were also members of monastic orders, e.g. Bonaventura, a disciple of the Victorines. Amalric of Bène, a Paris doctor (died 1207), pushed his mysticism to a pantheistic extreme.

Among the Dutch mystics are Ruysbroeck, author of several spiritual tracts (died 1381), Gerhardt Groot, founder of the Brethren of the Common Life (died 1384), and Thomas à Kempis, author of the *Imitation of Christ* (died 1471). Eckhardt (died c.1327) stands in the front rank of German mystics, and among his disciples were Tauler (died 1361) and Suso of Constance (died 1366). The *German Theology*, a popular book of devotion, was published by Luther in 1517. Jakob Böhme (died 1624) belongs to the Protestant school. Among more recent German mystics none perhaps is better known than Novalis, the disciple of Romanticism (died 1801). In England we find George Fox (died 1690). Among his contemporaries, the Cambridge Platonists (q.v.), especially Cudworth, More, and Smith, were both rationalistic and mystical; George Herbert (died 1633), Francis Quarles (died 1644), Henry Vaughan (died 1695), and later William Law (died 1761) were purely mystical. What is known as Quietism (q.v.) was a movement of the same nature with whose earlier stages Saint Francis of Sales, Bishop of Geneva (died 1622), had some sympathy, and which the Spaniard Molinos (died 1696), Fénelon (died 1715), and especially Madame Guyon (died 1717) made more definite. Not a few of the most gifted and honored among mystics have been women, e.g. Saint Hildegarde (died 1178), Elizabeth of Schönau (died 1164), Saint Catharine of Siena (died 1380), and Saint Theresa (died 1582).

Certain philosophical and scientific thinkers, including, for instance, Paracelsus, Giordano Bruno, Spinoza, Hegel, and Schelling, are less properly included among the mystics. But Immanuel Swedenborg (died 1772), eminent in applied science, but still more eminent for his religious allegorizing, deserves prominent mention.

Consult Preger, *Geschichte der deutschen Mystik* (Leipzig, 1874-1881); Vaughan, *Hours with the Mystics* (7th ed., London, 1895); Inge, *Christian Mysticism* (ib., 1899); James, *Varieties of Religious Experience* (London, 1902); Görres, *Die christliche Mystik* (Regensburg, 1836); Bigg, *The Christian Platonists of Alexandria* (London, 1886); id., *Neoplatonism* (ib., 1895). See the notices of the individuals mentioned in this article.

MYSTIC SHRINE, ANCIENT ARABIC ORDER OF NOBLES OF THE. An order asserted to have been founded at Mecca, Arabia, in the year of the Hegira 25. The modern order is of comparatively recent origin. The governing body in America is the Imperial Council, with eighty-five subordinate branches, called Temples. The order is not a Masonic body, but only Masons of the thirty-second degree of the Ancient and Accepted Scottish Rite, or Knights Templars in good standing, are eligible for admission. The membership in America amounts to about 68,000.

MYTH (Lat. *mythos*, from Gk. *μῦθος*, speech, legend). A form of folk-lore (q.v.) which sets forth as an historic tale the processes of nature, or beliefs concerning cosmogony (q.v.), religion (q.v.), custom (q.v.), tradition, and the like. The sum total of myths is the material for the science of mythology (q.v.), frequently termed comparative mythology. Within this many subdivisions may be set off, as the Greek myths concerning Diana (q.v.), the Teutonic Walhalla myths (see WALHALLA), the Polynesian water-myths, or the Hindu myths regarding caste (q.v.). Myth must be distinguished carefully from fable (q.v.) and from legend (q.v.). Thus we may have the fable of Zeus and the frogs, which points a moral teaching, or the legend of Saint Christopher (q.v.), which narrates a miraculous event, which may or may not have a moral bearing, but the Zeus-myth (see JUPITER) is based on belief in a sky-god, and is thus a part of nature-worship (q.v.).

MYTHICAL ISLANDS. Fabulous lands, with which popular lore or the imagination of poets and travelers have, since the earliest times, peopled various parts of the ocean. Among the Greeks, the Islands of the Blessed (q.v.), lying far in the western ocean, were the homes of those whom the divine favor saved from the pains of death to live in eternal bliss. Later, Plato placed in the same part of the world his lost Atlantis (q.v.). Celtic mythology presents a counterpart to the Islands of the Blessed in the fairy land of Avalon (q.v.), where Arthur was carried after his last battle. Of Celtic origin, too, is the mythical land of Saint Brendan (see BRENDAN, OR BRENNANN), lying off the western coast of Africa, in search of which expeditions set out as late as the beginning of the eighteenth century. To Christian refugees from the Iberian Peninsula, at the time of the Mohammedan invasion, legend ascribed the settlement of the long sought for Island of Seven Cities (q.v.). More within the realm of fact is Marco Polo's Cipango, identified by some with Japan. The Age of Discovery was fruitful of legendary lands, cities and islands. Best known among these last were the island of Bimini, in the region of the Bahamas, containing the fountain of youth, and the island of Brazil, which owed its name to its precious dyestuffs.

MYTHOL'OGY (Lat. *mythologia*, from Gk. *μυθολογία*, from *μῦθος*, *mythos*, myth + *-λογία*, *-logia*, account, from *λέγειν*, *legein*, to say). The science of myths, either a body of more or less doubtful stories, as when we speak of Greek or German mythology, or a rational account of how all such stories originate. Every race has its own myths, and in the first sense of the word a mythology has only to enumerate and classify the special stories of each race. The second application of the term, however, comprises various theories put forward to explain myths. Thus we come to what is now called the science of mythology, which deals with the origins of such myths or popular stories.

Myths may be divided into two sets of categories, arranged either according to the intellectual status of the original myth-makers or according to the subject-matter of the myth itself. Thus we may have myths of savages, as opposed to myths of cultivated races, and we may have myths of cosmogony, as opposed to myths of heroes. In many discussions of mythology it seems to be assumed that the so-called 'savage myths' treated of the same subjects as do the 'higher myths,' only in a less cultivated manner; but this is an error. Hero-myths are sometimes called legends, to distinguish them from cosmogonic myths.

CLASSIFICATION OF MYTHS. The first important fact in mythology is that, however much we use the word mythology as if it were especially concerned with gods, the earliest mythology ignores the gods altogether. Now, if we examine the body of myths found among the most primitive people, we shall find that they are without exception concerned with the same subjects, and we may therefore draw the historical conclusion that mythology begins with the discussion of these subjects, whereas tales of gods and nature-myths are a later development. The two linked subjects thus forming the base of all mythology are the deeds of ancestors and cosmogonic explanation. It is customary to divide myths into historical and scientific, that is, myths of the past of man and myths to explain natural phenomena. But among the most primitive peoples the two sorts of myths become one. A vague tradition of the wanderings of a tribe is simply united with an explanation of a physical process, and thus the scientific myth is also historical. But there is one valid distinction to be kept in mind; that is, the distinction between such a scientific myth and a religious myth. Mythology has to do with religion only because religion is one of the many fields in which the art of telling stories has exercised itself. It does not follow, however, that a story in regard to the flood or to the way the world was made has any religious significance. The former example is a very good illustration of how the historical myth may become a religious myth. Thus in India the story of the deluge was told at first without any suggestion that the flood was a punishment of sin; later, however, it is interpreted as a 'washing out' of sin.

Another important principle in the classification of myths is the relativity of imagination in the myth-makers. This disposes of the rather crude demarcation into 'savage' and 'higher' myths. Thus the Polynesian and Melanesian mythology is almost as rich in stories of the gods as is that of Homer, but for all that the island-blacks are as savage as those of Africa, and their 'higher' mythology merely means that these savages are more imaginative than are the Mishmis and Kacharis of India, who have an active fear of devils, and a very vague idea of any other spiritual power except the ancestral ghost. An excellent illustration of mythology in its lowest stages is offered by the Central Australians. Here the whole burden of myths is concerned with the great deeds of the ancestors in the holy *Alcheringa* or 'time of old.' Of real gods there is only a Creator whose cosmogonic work is briefly described as 'cutting out the world.' The Creator made the world and the half-human ancestors of the tribes, but the mythology is concerned only with the latter. Gods, and especially tales of gods, come much later. If we may conclude that ancestor-deeds, and a somewhat adventitious and remote scientific explanation of the universe as formed by a superior being or as consisting of such a being's dismembered parts (another popular savage myth), constitute the basis of mythology, we shall no less truly find that the doings of the demons constitute the next stage. This phase of mythology is usually not developed beyond simple concrete performances. There is very little mysticism, and no system. A certain devil has had a difficulty with some member of the tribe and is either driven off or slays the man, who then becomes a devil in turn. A further stage is reached as the devil becomes more godlike, i.e. is no longer a mere mischief-maker, but a helper of man. This stage may be reached by savages, and it is characteristic of Polynesian mythology that, while mainly concerned with the doings of demons, it rises also to the conception of a kind-hearted demon, although this happens seldom.

At the stage when demons and not gods are the controlling spiritual agency, we find animal-myths in their crudest form, often, as in totemic tribes, being identical with ancestor-myths, but, again, without such identification. Thus, when the tribe is descended from an animal ancestor, or the ancestor has become an animal, the two sorts of myths merge; but myths about animals may be current without any notion of relationship between man and animal. The same is true in regard to myths about animated trees and mountains, etc. It is quite impossible to draw a sharp line between this stage and that where demons and animals and cult-heroes are elevated to the position of gods, and tales about them become part of theology.

In general we must distinguish between ancestor and cosmogonic myths, the myths of devils and of sprites, and the myths that collect about higher anthropopathic divinities. Again, not exactly cosmogonic, but historical, are the myths of floods and wanderings and of early settlements reflected in tales of hyperborean paradises. As the cosmogonic myths are early attempts to give not a religious, but a scientific or at least a logical explanation of the universe, so this class of myths may be called historical, and they may really reflect some pre-historical movement of races, though most of them are enwrapped in later fable. Thus myths of a deluge may in some cases rest on an actual flood, which as far as the tribe was concerned swept away the world. We cannot suppose, however, that any of these myths have come down to us in a pure condition. They are all accretions built up by successive generations. For this reason the higher mythology contains also the lower, though generally the more savage features in the latter have been softened down. Further, in the frequent amalgamation of tribes into a larger political unit myths often lose their original significance and are attached to quite different gods. Even without visible outward change the hero-god becomes modified in spirit, according to the changing theology. Again, as tribes merge and distribute their myths, so myths by their own charm travel from land to land, the characters being changed. Myths in an advanced stage may become purely allegorical, as when a solar culture-hero is represented as destroying barbarism under the guise of a long anthropomorphic tale, such as the epic of the Rāmāyana in India. Again, in the process of anthropomorphizing, the hero may become so human as to suggest that he was a man, and we thus arrive at the Euhemeristic explanation of all myths as tales told about human beings afterwards elevated to divine rank. Thus, in India the 'mortal gods,' or gods who had originally been men, are a recognized class, the most conspicuous member of the class being the local Crœsus called Kubera, who is usually regarded as king of the under-world wealth, a Pluto; but in this interpretation he is a god divinized out of a rich man named Kubera.

Explanation of Myths. The example just cited (and analogous cases) led to the notion that all myths were to be interpreted in this way, a view held by some rationalists in India, and favored in Greece by many thinkers, but first reduced to an 'atheistic' philosophy of mythology by Euhemerus in the fourth century B.C. In opposition to the older view that myths were to be interpreted allegorically, Euhemerus taught—whether seriously or not is now questioned by some scholars—that the gods were originally men, and that stories about men were transferred to gods, a method here and there countenanced by Plato. Herbert Spencer, who also believes that gods were at first the ghosts of men, has adopted the Euhemeristic explanation in its crudest form. He believes, for example, that there was once a girl called Dawn, and that when she died the Vedic Aryans sang to her ghost the Vedic 'hymns to Dawn'—a view consonant neither with the content of the hymns nor with the practices of the poets. At present, if we pass by Spencer's theory with the brief criticism it deserves, there are two accepted schools of interpretation. The older view is that of Max Müller. In its whole form it is quite as unhistorical as Spencer's, but it contains a truth ignored by the opposing school. Müller held that myths were nature-poetry, and that many of them in an advanced stage of evolution could be explained by what he called 'disease of language,' that is, mythology is the result of the misunderstanding, on the part of a whole people, of their inherited phraseology. Where an old poet referred to sunrise as 'the shining one' (feminine) being followed by 'the bright one' (masculine), his descendants interpreted the grammatical sex as implying sex in person and his phrase meant to them 'the (male god) Bright (sun) courts Miss Dawn,' and so, on the strength of countless errors of this sort, arose mythology, which can be analyzed into its component parts by comparing the names of gods in one language with cognate words in related languages. Müller's error lies in a too sweeping application of this theory, in his lack of appreciation of other causes leading to mythology, and in the weakness of his etymologies. But there is truth in the dictum that a misapprehension makes gods. A Vedic poet sings, "Who is the god whom we should revere?" and his sublime word is interpreted by a later generation as meaning "there is a god called Who, and we should make sacrifice to Who." Then later writers go still further and enjoin upon the priests to make two sets of offerings, one to Who and one to Whom, as distinct deities. The folk-lore explanation, which has obtained since Mannhardt and Tylor and is steadily gaining ground, rejects both Euhemerism and language-disease as factors of mythology, and seeks the explanation of the higher myth in the original conception of the lower. Kronos's brutality and *Little Red Riding Hood* are both stories popular in their day and paralleled by many like stories among savage nations to-day. Such tales are retained, toned down, symbolically explained, but in origin they belong to the tales that please savages. There is no doubt that such is the state of the case, and that *Red Riding Hood* is not a sun-myth (exposed to disease of language), but a tale that pleasantly affected peasants. The folk-lore explanation runs to accumulation of tales, however, without a radical explanation, and it ignores too much what is true in Spencer's mythology, that many tales are simply ghost-stories. Nor can it be said that the folk-lore method is successful in explaining all myths. It is an error to suppose that all myths are psychical reflections of physical or of meteorological phenomena, for much must be attributed, even among savages, to poetical fancy. But what Mannhardt has himself called 'nature-poetry' and illustrated by modern examples among the Slavs shows that personalities originally solar are sometimes transferred to poetical representatives explicable only in a solar light. The true explanation of mythology will combine the hitherto antagonistic explanations of Lang and Müller, and will also admit that Spencer's theory of ghost-mythology is at times applicable. No stereotyped formula can include all the phenomena. In the last analysis will be found folklore, language-change, and ghost-stories. All three principles are active to-day in India, and probably have always been active among all peoples in proportion to their imaginative powers. The fourth element of poetic fancy affects all the other three. Much that is looked upon as elaborated mythology is nothing but a naïve statement of what appears to the savage as everyday facts, such as the birth of men from beasts or from the elements, the birth of animals from women, metempsychosis, the intimate relations between man and all natural objects.

Bibliography. For the folk-lore theory, consult Tylor, *Primitive Culture* (London, 1871); E. H. Meyer, *Indogermanische Mythen* (Berlin. 1883); Mannhardt, *Mythologische Forschungen* (Strassburg, 1884); Lang, *Custom and Myth* (London, 1884); id., *Myth, Ritual, and Religion* (2d. ed., ib., 1899); id., *The Making of Religion* (ib., 1898); Frazer, *The Golden Bough* (New York, 1900); for the comparative school, Kuhn, *Herabkunft des Feuers und des Göttertranks* (Berlin, 1859); Cox, *Mythology of the Aryan Nations* (2d ed., London, 1882); Schrader, *Sprachvergleichung und Urgeschichte* (2d ed., Jena, 1890); Max Müller, *Contributions to the Science of Mythology* (London, 1897), which contains the fullest and final statement of Müller's views. The ghost theory is given in Herbert Spencer's *Principles of Sociology* (London, 1876-96). Special mythologies are treated by Dowson, *A Classical Dictionary of Hindu Mythology* (London, 1878); Hillebrandt, *Vedische Mythologie* (Breslau, 1891); Oldenberg, *Die Religion des Veda* (Berlin, 1894); Hopkins, *Religions of India* (Boston, 1895); Renouf, *Religion of Ancient Egypt* (London, 1880); Jastrow, *Religion of Babylonia and Assyria* (Boston, 1898); Barton, *Semitic Origins* (New York, 1902); Preller, *Griechische Mythologie* (Berlin, 1894); Gruppe, *Griechische Mythologie und Religionsgeschichte* (Munich, 1898); Wissowa, *Religion und Cultus der Römer* (ib., 1898); De la Saussaye, *Religionsgeschichte* (Freiburg, 1897); id., *Religion of the Teutons* (Boston, 1903); Gill, *Myths and Songs from the South Pacific* (London, 1876); Brinton, *Religion of Primitive Peoples* (New York, 1897).

MYTHOLOGY IN ART. That portion of art which is concerned with the representation of mythological concepts. Religious notions are symbolized at a very early stage in the history of mankind. Conceptions which can be given in vague and poetic terms in the literature, must of necessity in art be represented concretely. The first beginnings are rude and uncouth; yet they develop in the course of time into the most beautiful of all expressions of national art. They are thus important not only from the point of view of history of art, but as one of the main sources for an accurate knowledge of the history of religion. We may trace in them also in many cases the influence which one religion has exercised upon another. If, for instance, we find the bearded figure within a circle as the Iranian symbol of Ormazd, and in Assyrian sculpture see the same figure hovering over a field of battle, it is at once evident that the religious art of Assyria has influenced that of ancient Persia, and the implication follows that the actual concept of the deity of Ormazd has been modified by a Semitic deity.

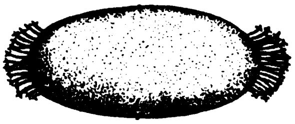
Nowhere are the distinct national characteristics of mythology so clearly set forth as in art. In the Egyptian paintings and statues of deities, we have the stiff outlines and the grotesque animal-headed figures, which stand in marked contrast to the brutal and massive religious art of Assyria and Babylonia. From the point of view of comparative religion the most perfect productions of art are as a rule inferior to the rude and archaic. It might almost be laid down as a rule that the higher the artistic merit, the less the purely religious value. The most important contributions of Assyrian art to a knowledge of its mythology are to be found not in the finished productions of the late period, but in the more ancient seal-cylinders, whose purely artistic merit is often slight. In Greece, in like manner, the early religious art is rude, but here we find in the most archaic periods traces of influence from Egypt, or again, as in certain pictures of the struggle of Hercules with the Nemean lion, an analogue too close to be accidental with Babylonian pictures of the Gilgamish cycle. Though the highest religious sentiments of a people at a given period are embodied in its art, the endeavor to make this embodiment perfect tends in the course of time to an increased purity in the type and symbolization of religious concept. This interacting process is stimulated by the fact that the statue or the painting is conceived to be in itself divine, and at later period a portion of godhood; later still it is a symbol which may indeed be a god to the vulgar, but to the cultured or to the initiated is but a representation of divinity. Artistic conceptions of divinities naturally vary, according to the character of the god represented. Thus in ancient Mexico we find beside the figure of the beneficent Quetzacoatl the horrible statue of the wargod Huitzilopochtli, on whose altar human sacrifices were offered. If the religious art of Mexico is rugged, that of India is effeminate. In India again, in harmony with the grotesque religious legends, we find strange divine figures. The monkey-god Hanuman, in harmony with his energetic character, has no touch of the effeminate about him, as has the love-god Kama, and in like manner we find the voluptuous figure of Parvati, the wife of Siva, in her kindly aspect, beside the frightful and demoniac figure of Durga, the malignant form of the same goddess. In Greece, where mythology in art was developed to its utmost perfection, we find this principle carried out in its entirety. Beside the austere Athene stands the seductive Aphrodite; with the powerful Hercules is contrasted the delicate, almost too beautiful Apollo, and over all the Pantheon towers the majestic figure of Zeus. See ART, HISTORY OF; and the various articles on National Art as well as the plates of EGYPTIAN DEITIES; HINDU DEITIES under INDIA; GREEK ART; JUPITER; LYSIPPUS; PARTHENON.

MYTILENE, mĭt'ĭ-lē'nė (Lat., from Gk. Μυτιλήνη, Turk. *Midillü*), or MITYLENE. The largest island in the Ægean Sea, also known as Lesbos (q.v.).

MYTILENE, or **MITYLENE** (modern Kastro, q.v., or Mitilini). The capital of the island of Lesbos (q.v.). It was colonized in very ancient times by the Æolians. Its situation on the southeast coast of Lesbos on a promontory that had been an island gave it two excellent harbors (Map: Turkey in Europe, F 5). Of its internal political history down to the time when Pittacus became practically dictator early in the sixth century B.C., something is to be learned from the fragments of the poetry of Alcæus (q.v.). Meanwhile the city had become the most important centre of the Asiatic Æolians and a great naval power, and had founded colonies in Mysia and in Thrace. After the Persian wars it became an important member of the Athenian Confederacy, but in B.C. 428, the fourth year of the Peloponnesian War, it rebelled against Athenian domination. Defeat after a famous struggle ended its power (B.C. 427). Mytilene fought on the side of King Mithridates in his war against Rome (B.C. 88), and after his defeat suffered for it. Consult: Leithäuser, *Der Abfall Mytilenes von Athens* (Leipzig, 1874); Cichorius, *Rom und Mytilene* (ib., 1888).

MYTILUS. See MUSSEL.

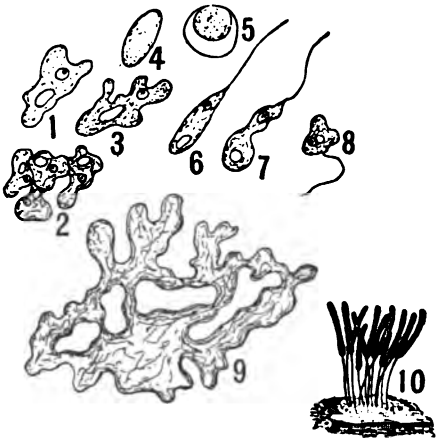
MYXINE (from Gk. μύξα, *myxa*, mucus). The single genus of the family Myxinidæ, represented by the single species *Myxine glutinosa*, the hagfish or 'borer' of the North Atlantic Coast. These eel-shaped parasitic animals, which burrow into the bodies of fishes, are extraordinary in their reproductive habits. According to Nansen, Myxine is generally or always in its young stage a male, while at a more advanced stage it becomes transformed into a female. The ovary is single, and on the right side, and there are no oviducts, the mature eggs falling into the abdominal cavity and being extruded through the peritoneal opening at the side of the vent. The eggs are few and large, and each is inclosed in an oblong horny case, with threads at each end, by which the egg adheres to some fixed object until it hatches. See HAGFISH.


EGG OF MYXINE.

MYX'ŒDE'MA (Neo-Lat. nom. pl., from μύξα, *myxa*, mucus + οἴδημα, *oidēma*, swelling). A progressive disease characterized by widespread changes in nutrition and by the invasion of the subcutaneous tissues by solid œdema, due to diminished functional activity of the thyroid gland. It has been called *cachexie pachydermique* (Charcot), *cachexia thyroidea* (Kocher), and *hydroparesie* (Féris). Myxœdema is caused by destruction of the tissue of the thyroid gland by disease, or as a result of removal of it by operation. It occurs principally in women, and is in fact an acquired cretinism in adult life. By far the greater number of cases occur between the ages of thirty-five and forty-five. In some families there is a distinct inheritance of a predisposition to disease of the thyroid gland. The disease occurs most frequently in cold climates, and is perhaps most frequent in Europe. The symptoms of the disease develop gradually, in most cases nearly a year elapsing before the disease becomes distinct. Among the principal symptoms are languor; sensibility to cold; absence of perspiration; loss of hair; decay of nails and teeth; pallor; subnormal temperature; hallucinations of sight and hearing, and even actual insanity; anæmia; indigestion; and enlargement of lymphatic glands. The treatment is to feed the patient with thyroid gland extract or dry thyroid, together with tonics, such as phosphoric acid and iron. Thyroid grafting has proved efficacious in many cases. The partial or entire thyroid of an animal is transplanted into the peritoneal cavity or into the subcutaneous tissue of the patient, to whom thyroid has been administered for a considerable time previously to the grafting, as suggested by Victor Horsley. Treatment by the administration of thyroid extract has been largely employed since it was first used in 1891 by Murray of England. The extract is made by macerating sheep's thyroids in glycerine. It must be administered with great care, degeneration of the heart or of the great vessels being an indication for very small initial dosage. In some patients profuse diarrhœa results, in others vomiting, sweating, headache, swelling of the glands about the jaw, and prostration. The remedy may be used hypodermically. After the symptoms of the disease have disappeared, the patient must take a small quantity of the thyroid extract at regular intervals as long as she lives, to maintain the improved condition. See CRETINISM. Consult: Gull, "On a Cretinoid State Supervening in Adult Life in Women," in *Clinical Society's Transactions* (London, 1874); Murray, in *British Medical Journal* (London, 1891); Virchow, in *Berliner klinische Wochenschrift* (1887); Horsley, in *Brown Lectures* (London, 1884); Osler, in *American Journal of the Medical Sciences* (Philadelphia, 1893); Gimlette, *Myxœdema and the Thyroid Gland* (London, 1895).

MYXOMYCETES, mĭk′sô-mī-sē′tēz (Neo-Lat. nom. pl., from Gk. *μύξα*, *myxa*, mucus + *μύκης*, *mykēs*, fungus). A group of organisms commonly called slime molds. Certain phases of their life history are very animal-like, but the final fructification has many plant characteristics, and as the forms are described and classified by the fructification the work has naturally fallen within the province of botany. They are here treated as one of the great groups of the fungi (q.v.). The purpose of the fructification is the production of multitudes of very minute spores. The spores germinate in moist situations on the soil and in humus, giving rise each to a motile protoplasmic body provided with a cilium (Figs. 6, 7, 8). These swarm cells swim around in the moisture, increasing in number by division (fission). After an active period they become more quiet and creep around like amœbæ (Figs. 1, 2, 3), finally approaching one another and fusing in pairs, or perhaps several together. Such fused groups become centres of attraction to many hundreds of swarmers, which contribute their substances to the common mass. The result is a large protoplasmic body, called a plasmodium (Fig. 9), which moves over the surface of the humus and into crevices like a gigantic amœba. Its food is largely bacteria and other fungi, which are taken directly into the protoplasmic body and digested, the hard and worthless portions being discarded.

Vegetating plasmodia shun the light and seek moisture. But these habits are reversed when the fructification is to be formed; the plasmodia then come to the light and take position in the driest situations that they can find. This is the time when plasmodia are most conspicuous and are frequently found on stumps, bark, and humus. The largest plasmodia may cover several square inches, but most of them are much smaller, and some are no larger than a pin-head.



MYXOMYCETES.

Chondrioderma: 1, 2, 3, amœboid stage; 4, 5, resting stage; 6, 7, 8, motile stage; 9, plasmodium stemonites; 10, sporangia.

The form of the fructifications is exceedingly various, some being large and irregular, and others with an extraordinary delicacy and complexity of structure, but the general history of spore formation is much the same. The plasmodium excretes a great deal of material (and frequently mineral matter) which forms the wall of the spore-case (sporangium) and its stalk if present (Fig. 10). A filamentous network called the capillitium may also be developed inside the spore-case, its function being to distribute the spores. The protoplasm which remains after these activities divides up into minute rounded bodies which, investing themselves with walls, become the spores. The plasmodia of slime molds have been favorite subjects of observation by physiologists, who find here the largest masses of protoplasm that can be studied.

For a general account consult: Engler and Prantl, *Die natürlichen Pflanzenfamilien* (Leipzig, 1887); and for special descriptive treatment, Lister, *A Monograph of the Mycetozoa* (London, 1894); McBride, *The North American Slime Moulds* (New York, 1899).

MYZONTES, mī-zŏn′tēz. Same as Cyclostomi (q.v.).

N

N The fourteenth letter and eleventh consonant of the Roman alphabet. This character has varied very little in form and not at all in value since the origin of the alphabet. The original letter was apparently called *nun*, which in Phœnician and in the North Semitic languages signified 'fish.' Apparently the early pictographic character represented a fish. See Alphabet.

Phonetic Character. *N* stands for the dental or alveolar nasal sound which is the equivalent to *d* and *t*. The sound is produced by a check or mute contact and sonant vibration of the vocal cords as in *d* with the addition of the opening of the nasal passage made by lowering the soft palate. The size and shape of the resonance-chamber make the difference between *n* and the other nasal letters. Under certain conditions *n* may have a syllabic or vocalic value, as in *rotten*, *forgotten*. In scientific linguistics this value is represented by *ṇ*. It is sometimes silent after *m* or *l* in the same syllable as in *damn, hymn, autumn, kiln*. Before *g, k, ch* it receives a semi-guttural or palatal coloring to harmonize with the consonant it precedes, as in *long, think, pinch*.

Source. In its historic development *n* represents an original *n* which has been preserved with great constancy through the Indo-Germanic period to the present time. Thus *night*, Gothic *nahts*, Skt. *nakti*, Lat. *nox;* or again Idg. **nevos*, 'new,' Skt. *navas*, Gk. *νέος*, Lat. *novos*, Goth. *niujis*, Ger. *neu*, Eng. *new*. In Anglo-Saxon an original Germanic *n* disappears before *s*, *f*, and þ.

As a Symbol. As a numeral N = 90 and N̄ = 90,000. In chemistry N = nitrogen; Na = sodium (i.e. natrum).

NABA, nä'bȧ. A seaport of Japan. See Nafa.

NABAB, nȧ'bȧb', Le (Fr., the Nabob). A story by Alphonse Daudet (1877), based on the career of a contemporary adventurer. Its characters are in large part actual persons thinly disguised.

NAB'ATÆ'ANS (Gk. Ναβαταῖοι, *Nabataioi*, Ar. *Nabaṭu*). An Arab people or tribe settled in various parts of the country east and southeast of Palestine, who formed during the Græco-Roman period a petty independent kingdom. Their history is known to us from classical authors, especially Diodorus and Josephus, as well as from numerous coins, and from inscriptions, dating from the year B.C. 169 to A.D. 105, which have been collected by De Vogüé (1868), Doughty (1884), Huber (1884), and Euting (1885). They are located at various places from the Hauran in the North to Madain Salah (Al-Hijr in Northern Arabia) in the South. The Arabic character of the Nabatæans is evinced by their proper names, though they used a Western Aramaic language and script, as the Northern Arabic had not yet been reduced to writing. It is uncertain whether they are to be connected with the Nabaioth, an Arabic tribe mentioned together with Kedar as a son of Ishmael (Gen. xxv. 13; xxviii. 9; xxxvi. 3; I. Chron. i. 29; Is. lx. 7) and several times referred to as *Nabaiati* in the Assyrian inscriptions of Tiglath-pileser, Sargon, and Assurbanipal. The Nabatæans are first met with about 312 B.C. at Petra as nomads, but so strongly intrenched here that both the generals sent against them by Antigonus, Athenæus and Demetrius, were unable to dislodge them. The Nabatæan kingdom arose in ancient Edom upon the ruins of the Seleucid and Ptolemaic empires. Its first prince was Aretas I., to whom the high priest Jason fled in B.C. 169. Its first king was probably Erotimus (Taim-Allat, B.C. 110-100). Obedas I. (B.C. 90) was able to hold his own against Alexander Jannæus, and Aretas III. (Philellenos) against Antiochus XII. of Cœle-Syria. The latter even conquered Damascus, but was driven out by the general of Pompey. Antony presented part of the land of the Nabatæans to Cleopatra. When Malchus I. (B.C. 50-28) refused to pay tribute, his land was overrun by Herod. War broke out between Herod and Aretas IV. (A.D. 9-40), in which the Nabatæans were successful. When Paul was in Damascus, that city must have been once again in the power of the Nabatæans (II. Cor. xi. 32). At the time of the Emperor Claudius, King Abias undertook an expedition against Adiabene, but he was beaten back. Damascus was lost to Nero in the reign of Malchus II. (48-71). The last King of the Nabatæans was Rabel II. (71-106). In 106 Cornelius Palma, Governor of Syria, made the region from Petra in the South to Bostra in the North into a Roman province. In the fourth century two provinces were created: Arabia with Bostra as a centre, and Palæstina Tertia with Petra as centre. The latest inscriptions in Nabatæan characters are those of Al-Namarah (328), Zebed (512), and Harran (568); but the language is purely Arabic. Later Arabic writers use the word Nabatæan as the equivalent of Aramæan. The importance of the Nabatæans is due to the fact that they formed a sort of buffer State against the Arabs of the desert and because their country lay in the direct line of the caravan route from Arabia to Syria. Al-Hijr was an emporium for the products of Yemen; and many mausoleums built in the rocks and beautifully carved are evidence of the riches which were concentrated here. The national temple was also situated at this place. The chief gods of the Nabatæan Pantheon seem to have been Dusares (*Dhu al-Shara*), Manat, Kais, Allat, and Hobal. Consult: Euting, *Nabatäische Inschriften aus Arabien* (Berlin, 1885); Schürer, *Geschichte des jüdischen Volkes*, vol. i. (Leipzig, 1886-90).

NABAYUGAN, nä′bȧ-yōō′gȧn. A head-hunting Malay tribe in Cagayan Province, Luzon. See PHILIPPINE ISLANDS.

NABBES, năbz, THOMAS (1605-?). An English dramatist, born in Worcestershire. His first comedy, *Covent Garden*, was produced in London in 1632-33. His second attempt, *Tottenham Court* (1633), was followed by *Hannibal and Scipio: An Hystorical Tragedy* (1635), and a comedy called *The Bride* (1638); but more talent was displayed in his masques, such as *Spring's Glory* (1638). An edition of his works was published by Bullen (London, 1887; *Old English Plays*, new ser., vols. i. and ii.).

NABHA, nä′bȧ. An eastern native State of the Punjab, India (Map: India, C 2). Area, 936 square miles. Population, in 1891, 282,756; in 1901, 297,949. Capital, Nabha.

NA′BOB, or **NA′BAB** (Hind., Ar. *nawwāb*, deputy, from Ar. *nāba*, to replace, to be a deputy). Under the Mogul Empire of India, the administrator of a province comprised in the region ruled by a *subahdar* or viceroy. The title was continued under the British rule, but gradually was applied to unofficial wealthy natives. In the United Kingdom and other European countries it is applied derisively to Euro-Indians who, having amassed fortunes in India, return to make an ostentatious display of their wealth.

NA′BONAS′SAR (Ass. *Nabu-nasir*, Nabu (or Nebo) protects). King of Babylonia (B.C. 747-734). His contemporary in Assyria, Tiglath-pileser III. (B.C. 745-727), succeeded with the help of the Aramæan hordes that at all times were a menace to Babylonian security in obtaining complete control of Babylonia, and emphasized his success by giving himself in his inscriptions the title of King of Sumer and Accad (i.e. Southern and Northern Babylonia), and by worshiping at the shrines of the Babylonian gods in the most important cities of the south: Sippar, Nippur, Babylon, Borsippa, Cuthah, Kish, Dilbat, and Erech. It is evident, therefore, that Nabonassar must have been merely a vassal to Tiglath-pileser III., but a semblance of independence was permitted to Babylonia because of a desire on the part of the Assyrian rulers to deal leniently with the old empire in the south for fear of incurring the displeasure of the Babylonian gods who were also the gods of Assyria. The history of Babylonia, therefore, in Nabonassar's reign is merely a part of Assyrian history. His name is preserved in the Ptolemaic canon, whose list of Babylonian kings begins indeed with Nabonassar. Why the beginning should have been made with this ruler is not clear. There is nothing to warrant the supposition that the Babylonians began a new era—historical or astronomical—at the time of Nabonassar, though that date was adopted as a new astronomical era by the Greeks. Equally mysterious is Berosus's statement, preserved by Syncellus, that Nabonassar first collected and then destroyed the chronicles of his predecessors. Consult Rogers, *History of Babylonia and Assyria*, vol. ii. (New York, 1900); and for the reign of Tiglath-pileser, Rost, *Keilschrifttexte Tiglat-Pilesers III.* (Leipzig, 1893).

NABON′IDUS (Ass. *Nabu-na'id*, Nabu (or Nebo) is exalted; Herodotus (i. 74, 77, 188) has erroneously *Λαβύνητος*, *Labynētos*). The last King of the Neo-Babylonian Empire, sixth in order of succession from Nabopolassar (q.v.), the founder of this empire. He came to the throne in B.C. 555 as a result of a conspiracy formed apparently by the priests of the city of Babylon against Labosoarchod (Ass. *Labashi-Marduk*), the grandson of Nebuchadnezzar (through the female line), which cost Labosoarchod his life. Nabonidus was a native Babylonian and not, as his predecessors since Nabopolassar, a Chaldean. In his inscriptions, of which a large number have been found, he appears chiefly in the light of a builder and restorer of the sacred edifices in such ancient centres as Ur, Harran, and Sippar. While he did not neglect the sanctuaries of Marduk and Nebo at Babylon and Borsippa, yet his greater devotion to other centres appears to have aroused the opposition of the priests and of the population of Babylon, and the neglect of suitable preparation to resist the threatening advance of Cyrus (q.v.), the leader of the Medes, is probably to be ascribed to internal dissensions. It would appear that Nabonidus was not even present in the city of Babylon when in the summer of 538 the Persian army marched upon the capital. His son Belshazzar (Ass. *Bel-shar-usur*, Bel, protect the King) had been placed in control, while the father's official residence was at a place called Tema, the exact location of which is not known. Babylon fell, as a Babylonian chronicle puts it, 'without battle,' and in the autumn Cyrus himself entered the city in triumph and became heir to the glorious past of Mesopotamia and the Euphrates Valley. Belshazzar was put to death, while Nabonidus was banished to Karmania. Consult: Rogers, *History of Babylonia and Assyria* (New York, 1900); and the Babylonian-Assyrian histories of Tiele (Gotha, 1886), Hommel (Berlin, 1885), and Winckler (Leipzig, 1892).

NAB′OPOLAS′SAR (Ass. *Nabu-apal-usur*, Nebo, protect the son). The founder of the Neo-Babylonian Empire, King of Babylonia B.C. 625-605. He was not of royal birth, as is indicated by the absence of any reference to his father in the inscriptions that we have of him. By his own efforts he rose to a position of supremacy over the district of Chaldæa lying to the south of Babylonia proper as far as the Persian Gulf, which had managed even during the height of the Babylonian Empire to retain a certain measure of independence, and whose separate position continued to be recognized by the Assyrian kings when Babylonia had come under the control of Assyria. At various times the Chaldæans made attempts to regain their independence, and the growing weakness of Assyria after the death of

Assurbanipal in B.C. 626 furnished the desired opportunity for the Chaldæans to reassert themselves and to extend their control from Chaldæa to Babylonia. About B.C. 607 Nabopolassar, with the aid of the Medes and the northern invaders indefinitely known as the Scythians, brought about the fall of Nineveh and the destruction of the Assyrian realm. The Neo-Babylonian Empire now became the controlling influence in Mesopotamia and the Euphrates Valley. The few inscriptions of Nabopolassar which have been found show him to have been a man of force and energy, who managed not only to maintain his position against great odds, but to hand over to his son, Nebuchadnezzar, an empire almost as extensive and as powerful as was that of Assyria in her best days. He improved and enlarged the famous temple of Marduk in Babylon, and the sanctuaries of Shamash, the sun-god, and of Belit at Sippar, and constructed a canal at the latter place to bring the waters of the Euphrates to the city walls. The Chaldæan origin of the Neo-Babylonian Empire led to the use of the term Chaldæa among classical writers for Babylonia. Consult: Rogers, *History of Babylonia and Assyria* (New York, 1900), and the Babylonian-Assyrian histories of Tiele (Gotha, 1886), Hommel (Berlin, 1885), and Winckler (Leipzig, 1892).

NABOTH. The owner of a parcel of land, described as a 'vineyard,' in Jezreel, adjoining the palace of Ahab, King of Israel. When the latter proposed to buy the land, Naboth refused to sell (I. Kings xxi. 1-14). Thereupon the Queen, Jezebel, had Naboth put to death by the elders of his city on a false accusation of treason against God and the King, and the King took possession of the land. The crime was denounced by Elijah, and the downfall of the house of Ahab and the barbarous murder of Jezebel were regarded as its just punishment (I. Kings xxi.; II. Kings ix. 21-30). The story is interesting for the hints it gives as to local customs and popular ideas in Israel in the ninth century B.C. See AHAB; JEZEBEL.

NABU, nä'bōō. See NEBO, MOUNT.

NABUA, nä'BOO-ȧ. A town of Southern Luzon, Philippines, in the Province of Camarines. It is situated in a low, marshy region occupied by rice-fields, about 20 miles southeast of Nueva Cáceres (Map: Philippine Islands, H 6). Population, in 1896, 17,789.

NABULUS, nä'bu̦-lōōs', or **NABLUS.** One of the chief cities of modern Palestine, the ancient Shechem (q.v.). It is situated about 35 miles north of Jerusalem, in a well-watered and productive valley, between the mountains Jebel esh-Shemali (Ebal) on the north and Jebel et-Tor (Gerizim) on the south. It is the seat of government for central Palestine and the corresponding region beyond the Jordan, the residence of a Greek bishop, has several mosques and Mohammedan schools, and English and Latin mission establishments. It has considerable industries, especially the manufacture of soap, and carries on a lively trade with the east-Jordan country and Jaffa. It has about 24,000 inhabitants, including the surviving remnant of the Samaritans, who occupy the southwest part of the town. See SAMARITANS.

NA'CHI. See NATCHEZ.

NACHTIGAL, näG'tê-gȧl, GUSTAV (1834-85). A German explorer, born at Eichstedt, near Stendal. He studied medicine, practiced as a military physician in Cologne, and in 1863 went to Algiers, and then became a physician in the service of the Bey of Tunis. In 1869 he joined a caravan which was dispatched to carry from the King of Prussia to the Sultan of Bornu some gifts in recognition of the latter's services to various German explorers. After a journey in the Tibbu country he set out for Kuka, the capital of Bornu, where he arrived in 1870. He made a thorough exploration of Bornu; then went to Lake Chad. Making his way to Bagirmi, he followed up the Shari River and its tributaries. In the spring of 1874 he set out for Egypt, going through Wadai, which he was the first European to penetrate. He visited Abeshr, the capital of Wadai, passed through Darfur and arrived at Cairo in November, 1874. In 1875 he returned to Europe, where his explorations had made him famous. In 1884 he visited the west coast of Africa, where his explorations resulted in the acquisition by Germany of the important colonies of Togoland, Kamerun, and Lüderitzland. Before finishing his labors, however, he was taken sick and died. His greatest work, *Sahara und Sudan*, was published in 1879-89. Consult Ruhle, *Gustav Nachtigal* (Münster, 1892.)

NACOGDOCHES, nä'kô-dō'chĕz. A city and the county-seat of Nacogdoches County, Texas, 138 miles north by east of Houston: on the Houston, East and West Texas and the Texas and New Orleans railroads (Map: Texas, G 4). It has lumber mills, cotton gins, cotton compress, cottonseed oil mill, brick plants, etc.; and, as the commercial centre of a productive cotton-growing and farming section, controls wholesale interests of importance, and a trade in cotton, produce, hides, and lumber. Population, in 1890, 1138; in 1900, 1827. Nacogdoches owes its origin to a Spanish mission, established here early in the eighteenth century. As an outpost against American encroachment it played a part in the controversy between Spain and the United States over the Spanish possessions in the Southwest. It was captured in 1812 by an American filibustering party under Magee and Gutierrez.

NADAL', EHRMAN SYME (1843—). An American author, born at Lewisburg, W. Va. He graduated at Yale in 1864, was second secretary of the United States Legation at London in 1870-71 and 1877-83, and after 1884 was for several years a member of the staff of the New York *Nation*. His publications include *Impressions of London Social Life* (1875); *Essays at Home and Elsewhere* (1882); and *Zwiebak: Notes of a Professional Exile* (1895). He also contributed in similar vein to reviews and other periodicals.

NADAUD, nȧ'dō', GUSTAVE (1820-93). A French song-writer, born at Roubaix (Nord). He was educated for commercial life, but the success of some of his songs decided him to take up song-writing as a profession. Collections of his compositions appeared in 1849, 1852, 1862, 1870, 1879-80, and 1882, and many of the songs became popular. He also wrote three operettas, *Une idylle* (1861), a novel, and *Solfège poétique et musical* (1886), *Miettes poétiques* (1888), and *Nouvelles chansons à dire ou à chanter* (1889).

NA'DEN, CONSTANCE CAROLINE WOODHILL (1858-89). An English poet, born at Edgbaston, Birmingham, January 24, 1858. She attended classes in science at the Birmingham and Midland Institute and at Mason College, and became a close student of Herbert Spencer, on whose philosophy she frequently gave lectures. She died December 23, 1889. Miss Naden published two volumes of poems: *Songs and Sonnets of Springtide* (1881), and *A Modern Apostle and Other Poems* (1887); containing pieces, as "The Pantheist's Song of Immortality," that give her an assured place among the lesser poets. Consult the *Memoir* by W. R. Hughes and others (London, 1891); *Induction and Deduction*, a prize essay, ed. by Lewins (ib., 1890); and *Complete Poetical Works*, ed. by Lewins (ib., 1894).

NA′DIR (Ar. *nażir*, similar, corresponding (i.e., to the zenith), from *nazara*, to behold, to be face to face). That point in the heavens which is diametrically opposite to the zenith, so that the zenith, nadir, and centre of the earth are in one straight line. The zenith and nadir are 90° distant from every part of the horizon (q.v.). See Zenith; Meridian Circle.

NADIR SHAH, nȧ-dēr′ shä (1688-1747). A King of Persia. He belonged to the Afshars, a Turkish tribe. He was born near Kelat, in the centre of the Persian province of Khorasan. At the age of seventeen he was taken prisoner by the Usbek Tatars, but, escaping after four years of captivity, he entered the service of the Governor of Khorasan, and soon obtained high promotion. Having, however, been degraded and punished for some real or supposed offense, he became an outlaw and for several years was the leader of a band of 3000 robbers. At this period the Persian throne was occupied by a usurper, Mir Vaiz, of the Afghan tribe of Ghilzai, who were bitterly hated by the Persians for cruelty and oppression. In favor of the rightful heir, Tahmasp II., Nadir took up arms against Malik Ashraf, the successor of Vaiz, and in token of his loyalty assumed the name of Tahmasp Kuli, or Slave of Tahmasp. Defeating the usurper in a series of engagements, he freed the provinces of Irak, Fars, and Kirman of even the semblance of Afghan domination. The assassination of Ashraf during his retreat terminated the war. Tahmasp then ascended the throne, and Nadir received for his services the government of the provinces of Khorasan, Mazanderan, Seistan, and Kirman. He was sent against the Turks in 1731, and defeated them at Hamadan, regaining the Armenian provinces which they had seized in the preceding reign. Meanwhile Tahmasp himself had been unsuccessful in his operations against the Turks. Nadir took this as a pretext to imprison the Shah, whose infant son, Abbas II., he placed on the throne in 1732. The death of this puppet, in 1736, opened the way for the elevation of Nadir himself, who was crowned as Nadir Shah, February 26, 1736. To win the support of the Afghans, the new ruler declared the Sunnite form of Mohammedanism to be the State religion instead of the Shiite, which has always been favored by the Persians. Nadir resumed the war with the Turks, and, though totally defeated in the first two battles by the Grand Vizier Asman, turned the tide of fortune in the subsequent campaign, and granted peace to the Turks on condition of receiving Georgia. He also conquered Afghanistan, and drove back the invading Usbeks. His ambassador to the Great Mogul having been murdered together with his suite at Jelalabad, and satisfaction having been refused, Nadir, in revenge, ravaged the Northwest Provinces and took Delhi, the capital of the Great Mogul, which was pillaged against his will (1739). With booty to the amount of four hundred million dollars, including the Koh-i-nur (q.v.) diamond and the famous peacock throne, he returned to the west bank of the Indus. He next reduced Bokhara and Khwarezm, restoring to Persia her limits under the Sassanids, and formed plans, which were never realized, for making Persia a maritime power. Embittered by an attempt to assassinate him in 1741, of prompting which he suspected the heir apparent, Rizakuli, whom he blinded and imprisoned, Nadir's character underwent a sudden change. Formerly open-hearted, liberal, and talented, he became suspicious, avaricious, and tyrannical. He was assassinated on June 20, 1747, and was succeeded by his nephew, Ali, who ascended the throne as Adil Shah, or the 'righteous king,' but was deposed within a year. Consult Maynard, *Nadir Shah* (Oxford, 1885).

NADLER, nä′dlẽr, Karl Christian Gottfried (1809-49). A German poet, who wrote in the dialect of the Rhenish Palatinate. He was born at Heidelberg, and studied there and at Berlin. His poems, under the title *Fröhlich Palz, Gott erhalts* (1847; 8th edition, 1882), were excellent pieces of genre verse, the drinking songs being peculiarly rollicking and musical.

NADSON, nät′sôn, Semyon Yakovlevitch (1862-87). A Russian lyric poet, born in Saint Petersburg, of Jewish extraction on his father's side. In 1878 he published his first poem, *At Dawn*. Shortly after he entered the army, but soon left it because of poor health. His volume of poems was bequeathed to the *Literary Fund*, which had advanced him a loan to go abroad. Its sale—over 50,000 copies—was unprecedented. It is now in the fourteenth edition, and a special *Nadson Fund* of 50,000 rubles has accumulated. His poetry charms by the soft melancholy of a youthful dreamer who is a prey to physical suffering.

NÆ′VIUS, Gnæus. One of the earliest Latin poets, probably born in Campania, in the first half of the third century B.C. In his youth he served in the First Punic War, but later made his appearance at Rome as a dramatic writer. He was very decidedly attached to the plebeian party, and in his plays satirized and lampooned the Roman nobles with extreme virulence. His rashness ultimately caused his banishment to Utica in Africa, where he died about B.C. 200. Besides his dramatic writings, comprising both tragedies and comedies, he wrote an epic poem, *De Bello Punico*, in the old Saturnian metre. Of the plays only a few very unimportant fragments are extant, which may be found in Bothe's *Poetarum Latinorum Scenicorum Fragmenta* (Halberstadt, 1824); Klussmann's collection of the same (Jena, 1843); Müller's *Livii Andronici et Cn. Nævi Fabularum Reliquiæ* (Berlin, 1885); or Ribbeck's *Scœnicœ Romanorum Poesis Fragmenta* (Leipzig, 1897-98). See also Sellar's *Roman Poets of the Republic* (Oxford, 1881).

NÆVUS (Lat., mole, wart, birth-mark), or Birth-Mark, Mother's Mark. A congenital mark upon the skin consisting of the product of excessive development of fibrous tissue, hair, blood-vessels, or pigment in a circumscribed area. The term is generally and perhaps more properly limited to a variety of angioma, or vascular tumor, usually of small size, composed of enlarged capillaries which communicate freely with other capillaries of the skin. The ordinary form of nævus is the *vasculosus.* This is present at birth or appears during the early months of the child's life, presenting itself as a red stain, or a diffuse flat patch, somewhat elevated above the surrounding surface. It may be a punctate spot, or may cover the side of the face, or even the neck and chest, for example. This variety is called 'port-wine mark,' 'wine stain,' *tache de feu*, or *Feuermal.* The *nævus araneus* or 'spider cancer' is not a cancer, but an angioma, consisting of a central elevated red point from which radiate dilated vessels so that there is a rough resemblance to a star. It is commonly single and occurs usually in children of about a year or two years old, and is generally situated on the nose or cheeks. The nævi of vascular variety are found in the papillary layer of the upper part of the corium, and consist of irregularly intertwined and dilated capillary vessels of new growth with free anastomosis. In some there is a layer of connective tissue found encircling the vessels, or an enormous growth of connective tissue, so that the result may resemble elephantiasis (q.v.). The treatment for the removal of nævi is surgical. Excision with the knife, ligature, transfixion of the growth with a cataract needle, compression by means of pads retained in place with a rubber band, chemical caustics, such as nitric acid or the acid nitrate of mercury, multiple linear scarification, electropuncture, and electrolysis are the means employed, the last named being the best method of procedure. Vaccination directly upon the nævus is an obsolete means of removal. Port-wine marks may be removed by creating several minute cicatrices with the electric needle. Entire removal of an elevated mass may be effected by electrolysis, as in the case of a tumor (q.v.).

NAFA, nä'fȧ, **NABA,** or **NAVA.** A seaport on the western coast of the island of Okinawa, in the Loo-choo group, Japan (Map: Japan, H 7). It is the principal seaport of the group, and exports sugar, cotton, and silk to Japan. Population, in 1898, 35,453.

NÄFELS, nā'fĕls. A village in the Canton of Glarus, Switzerland, on the Linth, four miles by rail north of the city of Glarus (Map: Switzerland, D 1). It was the scene of a famous battle, in 1388, in which 1500 natives defeated an Austrian force of four times their number. The anniversary of this battle, which freed the canton from the Austrian yoke, is still celebrated. Population, in 1900, 2500.

NAFTIA, näf'tē-ȧ, Lago, or Lago dei Palici. A small lake in Sicily, near Palagonia, in the Province of Catania. It is situated in a plain, near craggy hills, in an ancient crater, about 100 meters in diameter. At several points the water bubbles violently, sometimes rising to the height of two feet or more under the pressure of the outpouring of carbonic acid gas. The water is greenish, or turbid, and has an odor of naphtha. The atmosphere is fatal to birds attempting to fly across the surface of the lake, and to small animals which approach it to satisfy their thirst; while to lean over it is believed to produce dizziness and headache in man. The ancients regarded these phenomena with great dread. Here were worshiped by the Siculi, the pre-Greek inhabitants of the island, a pair of chthonic gods of mighty power, called commonly by the Romans Palici (Gk. παλικοί). In the great servile revolt against Rome (B.C. 104) the temple was the centre of the conspirators. Consult Freeman, *History of Sicily, I.* (Oxford, 1891).

NĀGA, nä'gȧ (Skt., serpent). In Hindu mythology, a member of a fabulous race of semi-divine serpents with human faces, but reptile forms, inhabiting the lower world, where their capital, Bhogavati, was a scene of magnificence and splendor. Sesha, the sacred serpent of Vishnu, was their king. The name Nāga was applied also to an actual race of people in Central India, perhaps so called from their worship of serpents, and this people has left historical traces, although fable and myth doubtless become mixed in allusions to the serpent race.

NAGA. A town of Cebú, Philippines, on the east coast, 11 miles southwest of Cebú. It is a port of call for steamers and coasting vessels. Population, in 1896, 15,093.

NAGANA, nȧ-gä'nȧ. A disease of live stock prevalent in South Africa, caused by parasitic Hæmatozoa, which are carried from a diseased animal to a healthy one by the tsetse-fly (q.v.).

NAGANO, nȧ-gä'nô. An inland city of Hondo, Japan, about 95 miles south-southwest of Niigata (Map: Japan, F 5). It is celebrated principally for the Buddhist Temple of Zenkoji, one of the most famous temples in Japan, founded in the latter part of the seventh century. The town is visited by many pilgrims, and carries on a considerable trade in textiles and woven goods. Population, in 1898, 31,319.

NAGĀRJUNA, nȧ-gär'jōō-nȧ, or **NĀGASĒNA,** nä'*ga*-sā'nȧ. A great Buddhist sage and teacher, the founder of the Madhyamika School of Northern Buddhism, also famous because of his religious conference or discussion with the Græco-Bactrian King Menander or Milinda (q.v.).

NAGAS, nä'gȧz. The natives of the Naga Hills in Southeastern Assam. The Nagas of Manipur and the mountains extending to the north (Patkoi, Barai) of this country seem to be Indonesians, more or less pure, while on the Lushai Hills, south of Manipur, are probably Nagas mixed with Kyens and Burmese of Arakan. The Nagas live in permanent villages, the head-men of which hold their power largely by the exercise of sacerdotal functions. Marriage is exogamous, with paternal relationship. Many interesting taboos and kindred usages are in vogue. The Nagas are best subdivided into the Angami and Kanpui of the west, who wear a petticoat or apron, the Lhota and Hot in the centre, who wear a plaid, and the Nangta, or naked, in the east. Consult Hodson, "The Native Tribes of Manipur," in the *Journal of the Anthropological Institute* (London, 1901).

NAGASAKI, nä'gȧ-sä'kē. The capital of an important prefecture of the same name and one of the principal seaports of Japan, situated on a small peninsula in the northwest of the island of Kiushiu, in longitude 129° 52′ E. and latitude 32° 44′ N. (Map: Japan, A 7). The harbor, about three miles long, is one of the safest in the East, and sufficiently deep for vessels of twenty-six feet draught. The town has water-works with filter beds, a meteorological station, schools, a theatre, and hospitals. The principal industrial establishments are the Akanoura Engine Works and several ship yards. The foreign commerce of Nagasaki amounted in 1900 to about $11,000,000, of which about $3,500,000 represented exports. The principal imports are cotton, coal, sugar, and petroleum, and the chief exports coal, rice, flour, camphor, vegetable wax, and tobacco. The shipping amounted in 1900 to nearly 2,000,000 registered tons. Nagasaki is an important coaling station. The principal countries of the world are represented at Nagasaki by consuls. Population, in 1900, 120,865, including 1705 foreigners, of whom 1144 were Chinese. The commercial importance of Nagasaki dates from the sixteenth century, when it became the stronghold of the Japanese Christians, and an important centre in the foreign trade of Japan. When the Europeans were expelled from Japan, the Dutch were permitted to maintain their factory on the islet of Deshima (q.v.). Nagasaki then became the only point of communication between Japan and Europe. It was opened to foreign commerce by the treaty of 1858.

NAGCARLÁN, näg′kär-län′. A town of central Luzon, Philippines, in the Province of Laguna (Map: Luzon, G 10). It is situated 11 miles south of Santa Cruz, and has a population of about 13,000.

NAGEL, nä′gel, ALBRECHT EDUARD (1833-95). A German ophthalmologist. He was born at Danzig; studied at Berlin under Gräfe; and after practicing in his birthplace for several years, became docent (1864) and professor (1867) at Tübingen. His most important discovery was the identity of the retinas as opposed to the theory of projection. This is explained in his book, *Das Sehen mit zwei Augen* (1861). Nagel's further writings include: *Die Refraktions- und Akkommodationsanomalien des Auges* (1866); *Behandlung der Amaurosen und Amblyopien mit Strychnin* (1871); and *Die Vorbildung zum medizinischen Studium* (1890).

NÄGELI, nā′ge-lē, KARL WILHELM (1817-91). A Swiss botanist, born in Kilchberg, near Zurich. After studying at Zurich, Geneva, and Berlin, he began in 1842 to teach botany in Zurich, was made extraordinary professor in 1848, full professor at Freiburg in 1852, in 1855 at Zurich, and finally was appointed to the chair of botany at Munich. He gave to the morphology of plants, especially cryptogams, a great impetus. He also worked upon the genera of phanerogams, pointing out the limitations of species, with especial reference to the occurrence of hybrids, and to their origin through the transformation of species. He was a somewhat voluminous writer on systematic, cytological, and morphological subjects. He discussed in his *Mechanisch-physiologische Theorie der Abstammungslehre* (1883) the causes of the transformation of species, maintaining that each species is compelled by some peculiar internal cause to develop into a new form independently of the environment, and up to a certain degree independently of the struggle for existence. See PROGRESSION.

NÄGELSBACH, nā′gĕls-bäG, KARL FRIEDRICH (1806-59). A German classical scholar and professor at Erlangen (1842). He was born in Nuremberg, and was the author of a popular *Lateinische Stylistik* (1846, and often reissued); *Die homerische Theologie* (revised ed. 1861); *Die nachhomerische Theologie* (1857). He edited the *Agamemnon* of Æschylus (1863).

NAGLER, nä′glẽr, GEORG KASPAR (1801-66). A German writer on art, born at Untersüssbach, Bavaria. Having settled at Munich as an antiquary, he began the publication of his *Neues allgemeines Künstlerlexikon* (22 vols., 1835-52), a monument of industry and careful research. Another important work is *Die Monogrammisten* (vols. i.-iii., 1857-63; vol. iv., ed. by Andresen, 1871; vol. v., ed. by Clauss, 1879); besides which he published the monographs, *Raphael als Mensch und Künstler* (1835); *Albrecht Dürer und seine Kunst* (1837); *Michel Angelo Buonarotti als Künstler*, and *Leben und Werke des Malers und Radirers Rembrandt van Ryn* (1843).

NA′GOR (African name). A West African antelope (*Cervicapra redunca*), one of the reedbucks.

NAGOYA, nȧ-gō′yȧ. The capital of the Province of Owari, Japan, in the island of Hondo, 94 miles by rail east-northeast of Kioto (Map: Japan, E 6). It formerly belonged to the House of Owari, one of the most prominent houses in Japan, whose castle, dating from the beginning of the seventeenth century, is the principal feature of Nagoya, and contains many specimens of the work of some of the best artists of Japan. Another interesting feature is the Buddhist temple of Higashi Hongwanji with beautiful specimens of wood-carving. In the vicinity of the town is the industrial settlement of Seto, where the first glazed pottery in Japan was produced in the thirteenth century, and where the first work in *cloisonné* enameling in the country was done in the nineteenth century. Nagoya is still one of the most important pottery centres in Japan, the industry employing almost its entire population. It has also extensive manufactures of cotton and silk and embroideries. Population, in 1898, 244,145.

NAGPUR, nȧg-pōōr′, or **NAGPORE**. A division of the Central Provinces (q.v.), British India, comprising the districts of Nagpur, Bhandara, Chanda, Wardha, and Balaghat (Map: India, C 4). Area, 24,127 square miles; population, in 1891, 2,982,507; in 1901, 2,716,748. There are extensive tracts of low marshland throughout the region, and the climate generally is unhealthful. In the more fertile districts, cotton, rice, maize, oil-seed and other seeds, fruits, and vegetables are largely cultivated, and the division is famous for its oranges. The chief minerals are coal, antimony, ochre, and gold. The Gonds (q.v.) inhabit the hilly sections. Nagpur, formerly a part of the great Mahratta kingdom, was ruled by rajas, sometimes called the rajas of Berar, until 1853, when the dynasty became extinct, and the territory was annexed by the British. Capital, Nagpur.

NAGPUR, or **NAGPORE**. The capital of the Central Provinces, British India, and of a division and district, 520 miles by rail east-northeast of Bombay (Map: India, C 4). It occupies an unhealthful site on the banks of the Nag, a small stream, and with its extensive suburbs covers an area seven miles in circumference. The European quarter is in the Sitabaldi suburb, centred by the fort-crowned Sitabaldi Hill. Here, also, on the north, are the bazaars and the cantonment. Several fine Hindu temples of Mahrattan architecture, handsome gardens, monumental tanks, and the tombs of the Bhonsla Rajas are notable native features. There are manufactures of silk, cotton, and cutlery, and a considerable trade in agricultural produce, salt, and European manufactured goods. Nagpur became the capital of an independent Mahratta raja in 1740. In 1817 it was the scene of an attack by Raja Appa Sahib with 18,000 troops on the British Residency. The Resident, Mr. Jenkins, who had anticipated trouble, and had managed to assemble 1350 men under Col. Scott, defeated the assailants after eighteen hours' fighting. A second battle a month later resulted in the Raja's submission and subsequent deposition. Population, in 1891, 117,014; in 1901, 127,734.

NAGUILIAN, nä′gê-lē′ån. A town of Northern Luzon, Philippines, in the Province of La Unión, situated 11 miles southeast of San Fernando (Map: Philippine Islands, E 3). Population, 10,400.

NAGY-BÁNYA, nŏd′y′-bän′yŏ. A town of Northeastern Hungary, situated among the Lápos Mountains, 90 miles east of Debreczin (Map: Hungary, H 3). It has a State college, and its chief industries are gold, silver, and copper mining. Population, in 1900, 11,169.

NAGY-BECSKEREK, bĕch′kĕ-rĕk. A town of Hungary. See BECSKEREK.

NAGY-KÁROLY, kä′rôl-y′. The capital of the County of Szatmár, Hungary, situated 43 miles by rail east-northeast of Debreczin (Map: Hungary, H 3). It has a fine church, a palace of the Counts Károlyi, a Piarist monastery, and gymnasium. Its chief products are coarse cloth, linen, and leather. Population, in 1900, 15,382.

NAGY-KIKINDA, kĕ′kên-dŏ, or GROSS KIKINDA. A town of Hungary, situated 36 miles by rail west of Temesvár (Map: Hungary, G 4). It has a higher gymnasium and an extensive trade in agricultural products and domestic animals. Population, in 1890, 22,923; in 1900, 28,843, over one-half Serbs.

NAGY-KÖRÖS, kẽ′rĕsh. A town of Hungary. See KÖRÖS.

NAGY-SZEBEN, sĕ′bĕn. A town of Hungary. See HERMANNSTADT.

NAGY-SZOMBAT, sôm′bŏt. The Hungarian name of Tyrnau (q.v.).

NAGY-VÁRAD, vä′rŏd. A town of Hungary. See GROSSWARDEIN.

NAHANT′. A town in Essex County, Mass., on a peninsula extending into Massachusetts Bay; reached by stage from Lynn (four miles), and in summer by steamers from Boston (ten miles) (Map: Massachusetts, F 3). It has a public library with 13,500 volumes. Nahant has been for years a favorite place of summer resort for Boston business men, and has many handsome seaside residences. Population, in 1890, 880; in 1900, 1182. The site of Nahant is claimed to have been the landfall of the Northmen. It was visited in 1614 by Capt. John Smith, and in 1622 was granted to Capt. Robert Gorges. Until 1853, when it was incorporated as a separate town, Nahant was a part of Lynn. Consult Hurd, *History of Essex County, Massachusetts* (Philadelphia, 1888).

NAHARRO, nå-är′rô, BARTOLOMÉ DE TORRES. A Spanish poet and dramatist, born at La Torre, near Badajoz, toward the end of the fifteenth century. He lived at Rome and subsequently at Naples, where he published his collected works under the title *Propaladic* (1517), and dedicated them to Ferdinand d'Avalos, the husband of Vittoria Colonna. His plays have action, character, and plot, and are of historic value; Naharro is called the creator of Spanish comedy. He also wrote ballads, sonnets, and epistles. It was some time before his plays became known in Spain, and the first Spanish edition of them did not appear until 1520. But during the following century his works were very popular, although, owing to his manner of describing the clergy, the later editions were expurgated.

NAHR-EL-ASI, när′ĕl-ä′sê. A river of Syria. See ORONTES.

NAHUATLAN (nå-wät′lån) **STOCK.** An American linguistic group centred about the southern part of the central plateau of Mexico, but with isolated tribes farther to the south, almost to the Isthmus of Panama. The Nahuatlan stock, in the commonly accepted scope of the term, includes the Nahua proper or Aztec (q.v.) in and adjoining the valley of Mexico (States of Mexico and Puebla), the Tlascaltec (Tlaxcala), the Cuitlateco (Michoacan), the Cora, the Huichol (Jalisco), the Acaxee (Sinaloa and Durango), the Alaguilac, the Pipil (Guatemala and Salvador), the Niquiran (Nicaragua), and the Segua (Costa Rica), with numerous subtribes and dialects. Traditional and linguistic evidence makes the Nahuatlan emigrants from the north, who acquired most of their culture from contact with the superior Mayan and Tarascan civilization after establishing themselves in the southern part of the peninsula. As their social condition advanced, the simple primitive system of ruling chiefs developed in some cases, particularly among the Aztec, into a regular hereditary monarchy. Descent and inheritance, both of office and property, were in the male line, but land was held by the clan, and marriage was regulated by gentile laws of kinship. Agriculture was the basis of national existence and was governed by strict laws, while the arts of weaving, pottery, and architecture reached a high degree of perfection. Gold, silver, and copper were worked, and a bronze alloy has been reported, but the ordinary tools and implements were still of stone or obsidian. Religious rites were observed with elaborate and imposing ceremonials, conducted by priestly orders of both sexes, which controlled also the education of the children. At Tenochtitlan or Mexico, the capital of the Aztec Empire, thousands of captives were annually devoted to the bloody rites of human sacrifice and cannibalism in honor of the god of war. Literature was extensively cultivated in the form of pictograph records and rituals, which were painted in brilliant colors upon books of maguey paper or dressed skins, very similar to those in use among the Maya. The calendar, which was the common property not only of the southern Nahuatlan nations, but also of several neighboring peoples, recognized the year of 365 days, and may have been of Maya origin, although developed along different lines. The Nahuatlan are now represented by nearly two million people, most of whom, although subjugated and to a certain extent Christianized, still occupy their ancient territories in nearly their ancient fashion, having adopted but little of the newer civilization in the place of that destroyed by the conqueror. The principal sources of information upon the history and civilization of the Nahuatlan tribes are: Sahagun, *Historia general de las cosas de Nueva España* (Mexico, 1829-30), and Prescott, *History of the Conquest of Mexico* (New York, 1843). See CORTÉS; MEXICO; MONTEZUMA; and tribal headings.

NAHUEL-HUAPI, nå-wäl'wå-pē', or TIGER LAKE. A lake on the eastern slope of the Andes Range in Argentina, on the boundary between the territories of Neuquen and Rio Negro (Map: Argentina, C 12). It is 75 miles long, with an average width of 10 miles and an area of 309 square miles. It contains a number of islands covered with luxuriant vegetation, and its banks are fertile and well watered. It receives many streams, and discharges into the Atlantic Ocean through the Rio Negro.

NAHUM. The seventh of the minor prophets according to the usual arrangement. Nothing is known of his life except what may be gathered from the notice in the first verse of his prophecy, where he is called 'the Elkoshite.' Where Elkosh was is uncertain. It has been located in Galilee and in Assyria; a third identification is with Beit Jibrin (Eleutheropolis) in the Shephelah. Nahum's prophecy consists of two parts, besides the introductory verse: (1) A psalm (i. 2-ii. 2), which describes the majesty of God and His punishment of His enemies in somewhat general terms; and (2) the prophecy proper (ii. 3-iii. 19), which foretells the doom of Nineveh. The style is full of animation and fancy, and, at the same time, clear and rounded. The text is in part corrupt. The date of the prophecy cannot be fixed exactly, but must have been later than the capture of Thebes in Egypt (the "No" of iii. 8; see NO-AMON), by Asshurbanipal, B.C. 664-663; and it must have been before the fall of Nineveh, about B.C. 606. The recent investigations of Bickell and Gunkel have established with certainty traces of an original acrostic arrangement in the psalm, and this artificiality points to a late date for this part of the book; it fits in with the conditions existing during the Persian rule in Palestine, when the religious community of Jerusalem was struggling against great odds, and may have been prefixed by an editor to the genuine prophecy of Nahum as an appropriate introduction. If this be the fact, it would be quite in accordance with the free treatment to which older discourses were subjected by post-exilic compilers. Consult the commentaries mentioned in the article MINOR PROPHETS; Bickell, *Beiträge zur semitischen Metrik* (Vienna, 1894); Gunkel, in *Zeitschrift für alttestamentliche Wissenschaft*, vol. xiii. (1893); Nestle, in *Zeitschrift des deutschen Palästinavereins*, vol. i. (1878); Davidson, "Nahum, Habakkuk, and Zephaniah," in the *Cambridge Bible for Schools and Colleges* (Cambridge, 1896).

NAHUYS VAN BURGST, nä'hois vån bo͞orGst, HUBERT GERARD, Baron (1782-1858). A Dutch colonial soldier and geographical author, born in Amsterdam. In 1809 he went to Batavia, where he entered the army, and fought against the English in Bengal. In 1814 he was appointed commissioner to the Prince of Java. Nahuys was pensioned in 1830, and nine years afterwards returned to Holland, settling at Breda. His writings, which are of no small geographical importance, include: *Schets van Benkoelen op de westkust van het eiland Sumatra* (1826) and *Beschouwingen over Nederlandsch-Indië* (1847; 2d ed. 1848).

NAIADS, nā'yădz (Gk. Ναΐδες, *Naïdes*, Νηϊάδες, *Nēïades*, from νᾶν, *nan*, to flow; connected with Lat. *navis*, Gk. ναῦς, *naus*, Skt. *nâu*, ship). In Greek mythology, the nymphs of the springs, and hence also of rivers. Caves, especially with trickling water, were sacred to them and believed to be their dwellings. Owing to the medicinal qualities of some springs, the Naiads naturally appear as healing divinities, and as divination was associated with the water, they became prophetic. Under their influence the prophet became inspired or even mad. See also NYMPH.

NAIANT, nā'ănt, or **NATANT,** nā'tănt (OF. swimming). An heraldic term applied to a fish when borne horizontally across the shield in a swimming position. See HERALDRY.

NAIL (AS. *nægel*, OHG. *nagal*, Ger. *Nagel*, nail, Goth. *ga-nagljan*, to nail; connected with OChurch Slav. *nogŭtĭ*, Lith. *nagas*, Skt. *nakha*, nail). The terms nail, claw, and hoof are popular names for different developments of the same epidermal formation. All are horny secretions formed from the outer layer of the skin, primarily to protect the tip of the digits in the higher vertebrates. Nails have retained this function, while claws have become specialized as weapons of offense or defense, and hoofs are specialized to protect the whole of the terminal joint of the digit. Hoofs are usually thick, heavy, and blunt, and are best developed where the number of digits is reduced; they are characteristic of the great group of herbivorous animals known as Ungulata, and reach their highest development in the horse. Nails are flattened, usually thin, and more or less rounded at the end. They are present in some reptiles, in certain birds (as the grebes), and in many mammals, especially the monkeys and man. Compare HORN.

HUMAN NAILS. These are the elastic, horny plates placed as protective coverings on the dorsal surface of the terminal phalanges of the fingers and toes. Each nail consists of a root, or part concealed within a fold of skin; a body, or exposed part attached to the surface of the skin; and a free anterior extremity called the edge. The skin below the root and body of the nail is termed the matrix, from its being the part from which the nail is produced. This is thick and covered with highly vascular papillæ, and its color is seen through the transparent horny tissue. Near the root the papillæ are smaller and less vascular; hence the portion of nail corresponding to this part is of a whiter color; from its form, this portion is termed the lunula. The chemical composition of the nails is given in the article HORN. According to the observation of Beau, the finger-nails grow at the rate of about two-fifths of a line in a week, while the toe-nails only grow with about one-fourth of that rapidity. The general state of health influences the growth of nails, and after illness a deficient formation of horny matter may result, shown by the production of a groove across the nail. The breadth and position of this groove indicate roughly the period and duration of the illness. An inflammation of the matrix of the nail is called *onychia*, and an acute inflammation of the tissues about the nail is termed *paronychia* or *whitlow*. When a nail has been removed by violence, or has been thrown off in consequence of the formation of matter (pus) beneath it, a new nail is speedily formed, provided the matrix has not been seriously injured.

There is a very common and troublesome affection popularly known as *ingrowing nail*. Its most usual seat is the great toe. It does not in reality arise from any alteration of the nail, but from the adjacent soft parts being constantly pressed by the use of tight shoes against its edge. These parts become swollen and inflamed; suppuration ensues, and an intensely sensitive ulcer is formed, in which the nail is imbedded. In obstinate cases, it is not infrequently necessary to remove a portion of the nail, an operation which may be done under local anæsthesia without pain.

NAILS. Slender pieces of metal, tapering toward and sometimes pointed at one end, and with flattened or rounded heads. Nails are made of many different materials, as copper, zinc, brass, iron, or steel, but the bulk of the nails in ordinary use are made of steel wire. Iron nails, in turn, may be either wrought, cut, or cast, or made from wire.

Until almost the close of the eighteenth century all nails were hand-made. In France for nearly a century light nails for carpenter work have been made of wire, but until 1850 they were made by hand with a hammer. The hand-made nail was pinched in a vise, with a portion projecting. A few blows of a hammer flattened one end into a head. The head was beaten into a counter sunk in the vise, thus regulating its size and shape. In Northern Europe, Britain, and America nails were made, at first, by forging on an anvil. The iron used for hand nail-making was first formed into nail-rods, which were sold in bundles. The nail-rods were prepared either by rolling the malleable iron into small bars of the required thickness or by the much more common practice of cutting plate iron into strips by means of rolling-shears. In colonial days the making of nails from these rods was a household industry among the New England farmers.

To America belongs the distinction of having first made cut nails by machinery, and with the advent of machine-cut nails the household industry of nail-making rapidly declined. Of these early inventions, the only one that has survived is that patented in 1786 by Ezekiel Reed, of Bridgewater, Mass. At the close of the eighteenth century twenty-three patents for nail machines, or improvements thereto, had been granted in the United States, and their use had been generally introduced into England, where they were received with enthusiasm. In 1883 cut nails were first made of steel.

The manufacture of tacks was also a household industry in New England till well into the nineteenth century. The wire was pointed on a small anvil; it was then placed in a vise, worked by the foot, which clutched it between jaws furnished with a gauge to regulate the length. A certain portion was left projecting, which was beaten by a hammer into a flat head. New England, and particularly the city of Taunton, Mass., is now the centre of the tack-making industry in the United States.

Wire nails were first made in the United States by William Hersel, of New York, in 1851 or 1852. In 1875 Father Goebel, a Catholic priest, came to Covington, Ky., from Germany, where the art of making wire nails was practiced. Goebel began the manufacture of wire nails at Covington, and in 1876 the American Wire and Screw Nail Company was established under his leadership. At first the nails were made by hand, but soon a French machine was imported. In this machine the nails were held in dies to form the head. The blow of the hammer which produced the head was caused by a board or single leaf spring suspended from a ceiling, against which the machine, in rotating, pushed a cam. The release of the latter produced the blow.

For a time the wire nails were made with barbs, that they might hold more securely, and the new industry grew but slowly. In 1876, at the Centennial Exhibition, the company received a silver medal over French and German competitors. This called the attention of the trade to the article, and two other firms at once took up its manufacture. By 1885 there were twenty-six firms in the business, and the wire nail had been adopted by many manufacturers. Since then their use has rapidly increased.

Two types of wire-nail machines are described in Smith's *Treatise on Wire*. (See *Bibliography* at end of article.) In one type "The wire is automatically straightened from the coil and fed into the machine, where dies grip it, while a pair of nippers cuts the wire off in suitable lengths, when it is automatically pointed and headed. The latter operation is effected by means of the spring-bolt mechanism operated by a cam of the main shaft and remaining inoperative until a sufficient length of wire has been fed to the machine for the next nail. The cutting and pointing are performed in one operation." In the second type, the heads are formed by steady pressure instead of intermittent striking.

The older process of making cut nails is, in general, as follows: The ore, whether hematite or magnetic, is smelted in a blast-furnace, run into pigs, puddled, squeezed, and, if need be, hammered, rolled in the puddling-ball train, and cut to lengths. These are then fagoted—that is, piled so as to break joints—reheated to a white heat, drawn, passed through the nail-plate train, and the sheets, of the required width and thickness, allowed to cool. It is next cut across its length (the width of the sheet being usually about a foot) into strips which are a little wider than the length of the required nail. These plates, heated by being set on edge on hot coals, are seized in a clamp and fed to the machine, end first. The pieces cut out are alternate, and slightly tapering, of course, with the fibre, and are squeezed and headed up by the machine before going into the trough.

In 1897 the wire nails produced in the United States amounted to 8,997,245 kegs of 100 pounds each. The output of cut nails for the same year was 2,106,799 kegs. American wire nails are largely exported to Europe and to other parts of the world. In 1898 the total number of cut-nail and cut-spike works in the United States was 55; the total number of wire-nail works was 79.

The accompanying table shows the export of nails from the United States for the past decade.

NAILS EXPORTED FROM THE UNITED STATES

(From the Statistical Abstract for 1900, prepared by the Bureau of Statistics, under the direction of the Secretary of the Treasury)

YEAR	Cut		Wire, wrought, horseshoe, and all other, including tacks		Wire		All other, including tacks	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
1891	11,723,727	$283,839	1,768,433	$156,858				
1892	12,197,669	273,191	2,056,267	160,239				
1893	15,604,347	330,554	2,300,501	158,093				
1894	16,736,643	330,118	3,233,776	180,607				
1895	16,895,428	283,646	4,367,267	210,192				
1896	20,730,260	428,630	8,031,297	321,055				
1897	26,476,585	519,471	9,941,714	357,541				
1898	32,310,399	612,234	....	....	22,894,099	$458,787	4,308,082	$245,722
1899	32,869,265	604,215	....	....	51,193,312	973,434	4,619,843	285,427
1900	24,915,866	647,711	....	....	84,635,468	2,124,528	4,341,249	278,709

Consult: Swank, *History and Manufacture of Iron in All Ages* (Philadelphia, 1892); Smith, *Treatise on Wire, Its Manufacture and Uses* (London and New York, 1891).

NAIN, nä'ĭn (Gk. Ναΐν). A town in Galilee, mentioned in Luke vii. 11-17 as the scene of Jesus' miracle of raising a widow's son from death. The site is now occupied by a miserable mud village (modern name *Na'in*), but ruins near by show that once a city of some size existed on the spot. The situation on the slopes of 'Little Hermon,' about six miles southeast of Nazareth, is beautiful, commanding a view of the plain of Esdraelon, Mount Carmel to the southwest, Mount Hermon to the northeast, and of the varied landscape of Central Galilee.

NAIN SING (?-1882). A Hindu explorer in Central Asia. He was born at Numaon; was trained by a Colonel Montgomerie for exploring work, and in 1856 and 1857 was employed in Kashmir and Ladak by the Schlagintweits. His journey to Lhasa (1865-66) was rewarded by the Royal Geographical Society; in 1867 he explored the gold mines of Thok Jalung, and he went with Sir Douglas Forsyth to Yarkand in 1873. His most important journey was from Leh across the unexplored plateau of Tibet in 1874-75, marking its many lakes, to Lhasa, and thence to Calcutta. For a description, with map, of this expedition, consult the *Geographical Magazine* of 1876.

NAIPALI (nī-pä'lē) **LANGUAGE.** The Indian language spoken in Nepal. This dialect approaches in general structure more closely to Hindi than to any other of the modern Indian vernaculars. Thus, as examples showing the affinity of Naipali to the New Indian dialects, may be cited Naipali *pāk*, 'ripe,' Bengali *pākā*, Hindi *pakkā*, Sindhi *pakō* (Skt. *Pakva*); Naipali *mahaingō*, 'costly,' Hindi *mahaingā* (Skt. *mahārgha*); Naipali *ḍhīlō*, 'loose,' Hindi *ḍhīlā* (Skt. *śithila*); Naipali *dūt*, 'milk,' Hindi *dudh*, Panjabi *dudd* (Skt. *dugdha*). In inflection also there are parallels, as Naipali *gar chum*, 'I do,' Gujarati *karuṁ chuṁ*. Distinctive marks of Naipali are the occasional aspiration of medial consonants (e.g. *aghi*, 'before,' Hindi *agē*, Prakrit *aggē*, Skt. *agrē*), softening of initial surds (e.g. Naipali *garanu* 'to make,' Hindi *karnā*, Skt. *kar*), and the use of an agential case as the active subject of a passive voice (a curious phenomenon widespread in the modern Indo-Iranian languages), in *-le* corresponding to the Hindi *-nē* (e.g. Naipali *dūtlē*, '[by the] milk,' Hindi *dudhnē*). The language has a number, possibly one-fifth, of loan-words from its Tibeto-Burman neighbors, but has maintained itself on the whole with considerable purity. It has a very scanty literature written in the Devanagari character.

Consult: Turnbull, *Nepali Grammar, and English-Nepali and Nepali-English Vocabulary* (Darjiling, 1888); Hoernle, *Comparative Grammar of the Gaudian Languages* (London, 1880).

NAIRN, nârn. The capital of Nairnshire, Scotland, a royal and Parliamentary burgh, 15 miles northeast of Inverness, at the mouth of the river Nairn (Map: Scotland, E 2). It is noted for the excellence of its sea-bathing and artificial baths. It manufactures rope and twine. Population, in 1891, 4500; in 1901, 5100.

NAIRNE, nârn, CAROLINA (OLIPHANT) (1766-1845), Baroness. A Scotch song-writer, born at Gask, Perthshire. In 1806 she married her second cousin, Major William Murray Nairne (afterwards sixth Lord Nairne); lived in Edinburgh till her husband's death (1829); afterwards in Ireland and on the Continent; and returned to Gask, where she died. Between 1821 and 1824 she contributed songs to *The Scottish Minstrel* of R. A. Smith. As a song-writer, she is highly esteemed. Particularly beautiful are "Land o' the Leal," "Caller Herrin'," "The Laird o' Cockpen," and "The Auld House." Consult: Rogers, *Life and Songs of Lady Nairne* (Edinburgh, 1869); Kington Oliphant, *Jacobite Lairds* (Grampian Club, 1870).

NAIRN'SHIRE. A county in the northeast division of Scotland, bounded by the Moray Firth and the counties of Inverness and Moray (Map: Scotland, E 2). Its area is 195 square miles, of which about 26,000 acres are under cultivation. There is considerable agricultural activity, and the county is known for its cattle-breeding. Nairn is the only town of importance. Population, in 1801, 8300; in 1851, 10,000; in 1891, 9155; in 1901, 9300.

NAIRS, nä'ẽrz. The inhabitants of Malabar, in Southwestern Hindustan. They are a conglomerate of different castes and tribes, and in many cases contrast sharply with the Dravidians by their fine type, their light complexion, and their thin and prominent nose. They seem to have some linguistic and somatological affinities with the Indo-Aryans. They are probably a mixed race of Aryans and Malayalas. By all writers they are described as a tall people, prepossessing in their physical characteristics and their general bearing, and gracious in manner. Many of the women are quite pretty. The history of the Nairs begins with the invasion of the ancient Hindus and the establishment of a Brahman aristocracy—a conflict between these privileged classes and the democratic masses ended in victory for the latter and laid the foundations of the prosperity of the Nairs in the thirteenth century. Islam of a sort is in vogue, together with the older Hinduism. Through all these changes the peculiar marriage system, which has made the Nairs of special interest to ethnologists, has remained unchanged. This system, often called 'the Nair family,' is polyandry (often adelphic) with matriarchal joint family, though polyandry and polygamy may exist side by side or be inextricably mixed. The wealthy tend to be polygamous, the poor polyandrous. Consult: E. S. Schmidt, "Die Nairs," in *Globus*, vol. lxviii. (Brunswick, 1895); Fawcett, "Nayars of Malabar," in *Bulletin of the Madras Government Museum*, vol. iii. (Madras, 1901).

NAISSANT, nā'sänt (Fr., being born). A term applied in heraldic blazon to an animal depicted as coming forth out of the middle—not, like *issuant*, out of the boundary line—of an ordinary. See HERALDRY.

NA'JA (from Hind. *nāg*, Skt. *nāga*, snake). A genus of elapine venomous serpents of the tropical parts of the Old World, which includes the cobras. The typical species is the common hooded cobra (*Naja haje*) of Africa, called 'asp' in the north and 'spy-slange' or spitting-snake among the Dutch of South Africa. Other species are the cobra di capello and hamadryad. See COBRA; HAMADRYAD; PROTEROGLYPHA.

NAJAC, nȧ'zhȧk', EMILE, Count de (1828-89). A French dramatic author, born at Lorient (Morbihan). Except for a short time spent in a Government position, he gave himself entirely to the writing of farces, texts for operas, and vaudevilles, sometimes in collaboration, and sometimes alone. Among these are: *Un mari en 150* (1853); *La fille de trente ans* (1859, with Scribe); *Le capitaine Bitterlin* (with About, 1860); *Un mariage de Paris* (with About, 1861); *Nos gens* (with About, 1866); *Bébé* (with Hennequin, 1877); *Nounou* (with Hennequin, 1879); *Divorçons* (with Sardou, 1880); and *Le fiacre 117* (with Millaud, 1886).

NAKAMURA MASANOWO, nä'kȧ-mōō'rȧ mä'sȧ-nō'wô (1825-?). A Japanese scholar, born in Yedo. He went to England in 1866 and remained there for two years, returning home on the outbreak of the Revolution. Thenceforth until his death he labored perseveringly in the interest of modern education. His schools and translations exerted wide influence, and his services were recognized by posthumous honors conferred by the Emperor.

NAKED BAT. A large Malayan, long-tailed, emballonurine bat (*Chiromeles torquatus*), remarkable in having the skin entirely hairless except for a fringe of hairs about the neck. It has a projecting, pig-like snout and a thick tail. It inhabits the forests of Java, Sumatra, and Borneo, where it appears only at night. Its most curious feature is the presence of a pouch or pocket of skin on each side of the body under the arms, which is present in both sexes, and contains the mammæ. In this pouch the young are carried while suckling. Consult: Dobson, *Catalogue of Cheiroptera in the British Museum* (London, 1878); Horsfield, *Zoölogical Researches in Java* (London, 1828). See Plate of BATS.

NAKHITCHEVAN, nä'ĸė-chĕ-vän'. A former town in the Government of Ekaterinoslav, Russia, situated on a hill on the right bank of the Don, 2½ miles from Rostov-on-the-Don, with which it is now incorporated. It has manufactures of silk, woolen, and silver goods, and has a considerable trade in jewelry and precious stones with Constantinople, Turkestan, Circassia, and Astrakhan. The town was founded by Armenians from the Crimea in 1779, and is the see of the Russian Greek-Armenian Patriarch. Population, in 1897, 29,312, mostly Armenians.

NAKONG (African name). One of the 'harnessed' antelopes of South-Central and East Africa, called also 'Speke's antelope,' 'sitatunga,' and *Tragelaphus Spekei*. It is peculiar for its perfectly uniform grayish color when mature. It formerly gathered in herds, and was one of the most highly prized of the smaller species. See Plate of GAZELLES AND SMALL ANTELOPES.

NAKSHATRA, nȧk-shä'trȧ (Skt. *nakṣatra*, star, luminary; of doubtful etymology). A Sanskrit term used in the Vedic period in the sense of star. At a later time it was applied to the asterisms lying in the moon's path, or to the mansions in which the moon was supposed to rest in its path. The number of these asterisms was reckoned originally at 27, later at 28; and mythology transformed them into the daughters of Daksha, who became the wives of the moon. The French astronomer Biot endeavored to show that the Hindu system of the Nakshatras was derived from the Chinese *sien*; but this theory won little favor. The arguments later advanced warmly favored the Indian origin of the system of the Nakshatras. Weber sought for Babylonian influence to explain the Nakshatras and some support has been given to this view. Consult Thibaut, "Astronomie, Astrologie und Mathematik," in Bühler, *Grundriss der indo-arischen Philologie* (Strassburg, 1899).

NAKSKOV, näks'kôv. A town of Denmark, situated on a fiord of the west coast of the island of Laaland (Map: Denmark, E 4). It is the terminus of the Laaland Railroad, and has a harbor with considerable shipping and an active trade in grain. Population, in 1901, 8317.

NALA, nä'lȧ. A legendary king of ancient India whose domain was Nishadha, apparently a district between the modern Oudh and Berar. The story of his marriage with Damayanti, the daughter of King Bhima of Vidarbha (modern Berar), together with the events which followed in consequence of his passion for gambling, the loss of his kingdom, his desertion of wife and children, the final reunion with them, and the restoration of his fortunes, forms one of the most romantic episodes of the *Mahābhā-*

rata (q.v.). This episode, entitled the *Nalōpākhyānam,* or Story of Nala, has often been separately edited and translated; as an edition of the Sanskrit text, together with Dean Milman's translation, by Monier-Williams (Oxford, 1879); a versified rendering by Sir Edwin Arnold, *Indian Idylls* (Boston, 1883); a translation into German prose by Kellner, *Nala und Damayanti* (Leipzig, 1886), and several others.

The subject of Nala's career was a favorite theme with the Hindus. One of these, the Sanskrit *Nalōdaya,* or Rise of Nala, describes in four cantos the restoration of Nala's fortunes. This artificial poem is ascribed to Kalidasa, but it probably belongs to a much later age. It is a remarkable specimen of the so-called Kavya style of artificial composition, abounding in elaborate metrical devices, alliterative versification, and intricate rhythms, complicated constructions, and pedantic imagery. It has been edited by Benary (Berlin, 1830), by Yates (Calcutta, 1844), and by Vidyasagara (ib., 1873). An excellent German translation, imitating the artificial devices of the original, was made by von Schack, *Stimmen vom Ganges* (2d ed., Stuttgart, 1877).

To the same Nala cycle belongs the *Nāishadhīya*, or *Nāishadha-Carata,* Adventures of Nala of Nishadha, written in twenty-two cantos by one Sri-Harsha, who belongs to the latter half of the twelfth century of our era. An edition of this, with the Sanskrit commentary of Narayana, was published by Röer (Calcutta, 1855), and Swadatta (Bombay, 1894).

NAMANGAN, nä'män-gän'. A district town in the Territory of Ferghana, Russian Turkestan, situated on the canal of Yangi (fed by the Narym), about 45 miles northwest of New Margelan, the capital of the territory (Map: Asia, Central, M 1). The chief occupations are cotton-ginning and the manufacturing of soap, leather, etc. The trade in cotton, fruit, and animal products is important. Population, in 1897, 61,906, including only a few Russians.

NAMAQUALAND, nȧ-mä'kwȧ-lănd, LITTLE. A division of Cape Colony bordering on German Southwest Africa (Map: Cape Colony, D 6). It has an area of 19,154 square miles, with a population of 16,800 in 1891. It is important on account of its copper deposits. The chief town is Port Nolloth on the coast.

NAMAYCUSH, năm'ȧ-kŭsh (North American Indian name). The lake or Mackinaw trout (*Christivomer namaycush*), the largest of the Salmonidæ. It is closely related to the chars, from which it differs slightly in the character of the vomerine teeth. It is a very good food-fish and is the second in commercial importance of the fish of the Great Lakes. Extreme weights of 125 pounds have been reported, but the average is from 15 to 20 pounds. Its food is fishes and a great variety of other things. The spawning season is during September and November. The namaycush occurs in the Great Lakes, and in the inland lakes of New York and Northern New England, where the local names 'longe' and 'togue' are applied to it. It is also found in the headwaters of the Fraser and Columbia rivers, and the streams of Vancouver Island. A deep-water variety, called siscowet (q.v.), is found in Lake Superior. Its flesh is fatter and less desirable as food. See SALMON; TROUT; and consult authorities there cited. See Plate of TROUT AND GRAYLING.

NAM DINH, näm dēn'y'. A city of Tongking, French Indo-China, situated 40 miles southeast of Hanoi, on the Tongking River, 30 miles from the sea (Map: French Indo-China, E 2). It lies in the most fertile region of the delta, and is prosperous and well built, with broad, paved streets. It is the seat of a French resident, and the intellectual centre of Tongking. It is almost as important commercially as Hanoi, has numerous well-stocked shops, regular boat service on the river, and a brisk trade in rice, silk, cotton, and indigo. Population, about 30,000.

NAME (AS. *nama*, Goth. *namō*, OHG. *namo*, Ger. *Name;* connected with Lat. *nomen*, Gk. *ὄνομα*, *onoma*, Ir. *ainm*, OPruss, *emnes*, OChurch Slav. *ime*, name, and with Lat. *gnoscere*, Gk. *γιγνώσκειν*, *gignōskein*, Skt. *jñā*, Ger. *kennen*, Eng. *know*). In law, a word or words employed to designate a person, place, or thing. In early times in England the Christian name was the only one recognized by the law, and surnames were mere words of description to identify one person from another of the same Christian name. This practice was confirmed and received legal sanction by a statute (1 Henry V., c. 8), called the "Statute of Additions," which provided that not only the name of an individual should be inserted in a writ or indictment, but his estate or degree, his calling or business, and the town or district in which he resided. By reason of the above custom and the statute, many persons who had not otherwise adopted surnames were known by the name of their calling, place of residence, or by some other characteristic. Thus, George, the smith, became George Smith, and John of Wessyngton became John Wessyngton or Washington.

The middle name or initial of a person is generally regarded as of no importance, and not a part of his legal name. Therefore the omission of it in a legal instrument or proceedings is not considered an error, except in a few jurisdictions. In general a person's Christian name should be written out, and in some States the mere initial of the Christian name, together with the surname, has been held insufficient under statutes requiring the names of persons to be subscribed to certain instruments, as a petition for a highway.

Owing to the almost infinite variety of surnames and the consequent difficulty in spelling them properly, the courts have adopted a rule known as *idem sonans* (the same sound), by which they determine whether or not an incorrect spelling of a name is a fatal error in legal documents. Briefly stated, the rule provides that where a name is not correctly spelled, if it sounds identically like the name intended to be written, it will be held sufficient, the error in spelling being disregarded. Thus the surnames Preyer, Prior, and Pryor have been held to be *idem sonans*. This rule is followed as to legal instruments and transactions generally, but where a name in an instrument varies in some irregular manner from the common method of spelling a name identically the same in pronunciation, the necessity for departing from such a doctrine is apparent, as in the case of such as Jaeger and Yaeger, which may be pronounced so as to sound alike, and a person searching against the name of Jaeger would naturally not find the record of the conveyance under Yaeger; and accordingly the courts may hold that the public is not bound by constructive notice in such a case.

There are statutory provisions in some jurisdictions requiring the registration of fictitious trade names, where persons adopt them and do not do business under their correct names. Corporations are usually required to adopt names which are not identical with those of other corporations in the same State. At common law there is no property right in a name, but the United States Statutes provide for protection in the use of trade names to a certain extent, and courts of equity will sometimes interfere to enjoin the wrongful use of the business name of another, to prevent fraud. See COGNOMEN; MISNOMER; TITLE; TRADE-NAME; TRADEMARK.

NAMUR, nȧ′mụr′. A province of Belgium, bounded on the north by Brabant and Liège, on the east by the Province of Luxemburg, on the south by France, and on the west by Hainault (Map: Belgium, C 4). Area, 1390 square miles. The province is traversed through the centre by the Meuse River. Its surface is partly level, partly hilly, and in part densely forested. The soil is very fertile, and agriculture is the chief occupation, though a large proportion of the population is engaged in mining and allied industries. About 750,000 tons of coal are mined yearly, and the province is rich in iron, lead, sulphur, alum, and marble. Population, in 1900, 346,512. Namur appears as a county as early as the tenth century, and came later successively under the counts of Hainault and Flanders, and the dukes of Burgundy, finally constituting one of the seventeen provinces of the Netherlands.

NAMUR. The capital of the Province of Namur, Belgium, at the confluence of the Sambre and Meuse, 35 miles southeast of Brussels (Map: Belgium, C 4). Two bridges across the Meuse connect it with the extensive suburb of Jambes, and several bridges span the Sambre, connecting it with the suburb of Salzinnes. An extensive circle of nine detached forts has revived its former military importance, and there are large cavalry barracks in the town. Among many fine churches is the Renaissance Cathedral of Saint Aubin, built in 1751-67, and noted for the beauty of its statues, carvings, and paintings. The Archæological Museum has a valuable collection of Roman and Frankish antiquities, and an art gallery is attached to the Hôtel-de-Ville. Namur is an important industrial centre, with iron and brass foundries, and is known for its manufactures of cutlery, glass, leather, and bronze art objects. The city was taken by the forces of Louis XIV. in 1692, and three years later was besieged and captured by William III. It was taken by the French in 1746, and restored to Austria in 1748. For a third time it fell into the hands of the French in 1792. Population, in 1900, 32,333.

NANA, nȧ′nä′. One of the Rougon-Macquart series of novels by Emile Zola (1880). It is a study of a courtesan in whom are depicted the fruits of an evil heredity and their reflex influence on society.

NANAIMO, nȧ-nī′mȯ. A town and port of Vancouver Island, British Columbia, Canada, on Departure Bay, on the east coast (Map: British Columbia, E 5). It is opposite Vancouver town on the mainland, with which it has daily steamboat communication. It has a safe and commodious harbor, and is the centre of the coal-mining industry of British Columbia, its coal fields having an area of 200 square miles. It also has large lumber mills. The town dates from the erection of the Hudson's Bay Company block-house in 1833. It was incorporated in 1874, and has municipal gas, electric lighting, and water works, telephone system, etc. The United States is represented by a consular agent. Population, in 1891, 4595; in 1901, 6130. Consult Bell, *Canadian Mining Manual* (Montreal, 1893).

NANA SAHIB, nä′nȧ sä′hĭb (c.1820-?). A Hindu, one of the leaders of the Sepoy mutiny of 1857. He is said to have been the son of a Brahman from the Deccan, and his real name was Dhundu Pant. He was born about 1820, and was adopted as a son in 1827 by Baji Rao, the childless ex-peshwa of Poona, whose estate, which amounted to more than a million dollars, he inherited. He was refused, however, the annual pension of eight lacs of rupees, or about four hundred thousand dollars, which had been granted Baji Rao during his lifetime. This rankled in his mind, although he was allowed to retain some of the state of a native prince, a retinue of 200 soldiers, with three field-pieces, and a fortified residence at Bithur, 10 miles west of Cawnpore. He had long maintained an agent in England, Azim Ulla Khan, who told him tales of British weakness. When, therefore, the mutiny broke out in May, 1857, Nana Sahib offered to assist the English, but treacherously placed himself at the head of the mutineers in Cawnpore. The European troops were induced, on June 25th, to capitulate to Nana Sahib, who promised they should be sent down the Ganges in safety. They embarked on boats provided for them, but had no sooner done so than a murderous fire was opened upon them. The sepoys were ordered to shoot the men, but to spare the women and children, who were removed to a house in Cawnpore. On July 15th Sir H. Havelock, who had advanced from Allahabad, defeated the sepoys in two engagements, one within eight miles of Cawnpore; and Nana Sahib thereupon directed that the women and children should be put to death and that their corpses should be cast into a well, which is now marked with a beautiful statue in their memory. A long series of engagements against Nana Sahib followed, in which he was always the loser, and he was ultimately driven beyond the English frontier into Nepal, where he probably perished in the jungle.

NAN-CHANG-FU, nȧn′chȧng′fo͞o′. The capital of the Province of Kiang-si, China, situated at the head of the delta formed by the Kan-kiang at its entrance into the Po-yang lake, about 175 miles southeast of Hankow (Map: China, E 6). It is an important centre of the porcelain trade. Population, estimated at 100,000.

NANCY, näɴ′sē′. The capital of the Department of Meurthe-et-Moselle, France, and an important railroad junction, 220 miles east of Paris, and 94 miles west of Strassburg, on the left bank of the Meurthe, six miles above its junction with the Moselle (Map: France, N 3). It is a strongly fortified and well-built city, with fine squares, broad streets, and imposing edifices.

The city owes much of its architectural ornamentation to Stanislas Leszczynski, King of Poland, who resided here as Duke of Lorraine. His statue stands in the Place Stanislas, the most important square in the city, surrounded by imposing edifices, including the theatre, the Hôtel-de-Ville, and the Episcopal Palace.

The Hôtel-de-Ville, dating from the seventeenth century, contains a fine ballroom with mural paintings by Girardet. The Ducal Palace is an attractive example of the Gothic style and holds the Musée Lorraine, a collection of historical and other antiquities. The cathedral is a creation of the famous Mansart. Nancy has seven fine triumphal arches, the most elaborate one being the Porte Royal, constructed under Louis XV. Among other structures of note are the Gothic Church of Saint Epvre, an ancient Gothic castle, and the Palais du Gouvernement, now used for military purposes.

Nancy has a university (see below), a noted school of forestry (the only one in France), one of the two French hypnotic schools, an important hospital, a seminary, a botanic garden, and a public library of over 100,000 volumes and 5000 MSS. Attached to the school of forestry is a valuable forestry museum.

The situation of Nancy on the Eastern Canal and the Canal Marne-au-Rhin gives it a large trade. Its principal manufactures are embroidery, hardware, boots and shoes, straw hats, woolen goods, and agricultural implements. The great breweries here are among the most important in France. In art industries the city furnishes many unique features and varieties. Not a few of the artistic specialties in furniture and in printing in France originated here. To facilitate traffic, a belt line railway has been built. Population, in 1891, 78,110; in 1901, 102,559.

Charles the Bold was overwhelmed and slain before the gates of Nancy in 1477 in battle against René of Lorraine and his Swiss mercenaries. Nancy was the seat of the dukes of Lorraine down to 1766, in which year it came to France. The town has greatly grown in general importance since the loss of Alsace-Lorraine by France, large numbers of Alsatians coming here to live.

NANCY, University of. One of the leading universities of France, founded originally at Pont-à-Mousson. It had its inception in the papal bull of 1572, issued at the instance of the Cardinal of Lorraine, and consisted at first of two faculties: Theology and Arts. It was surrendered to the Jesuits to combat heresy. A law faculty was added in 1582 and a medical faculty in 1598. The University maintained a steady growth and in 1608 its attendance reached about 2000. This growth was checked by the wars of the seventeenth century. In 1768 it was removed to Nancy by the order of Louis XV. During the stormy days of the French Revolution it went down with the rest of the French universities, but was not reorganized at the establishment of the University of France. In 1852, at the instance of forty municipalities a rectorate was established, and in 1854 the faculties of Letters and Science were organized. In 1864 the faculty of Law and in 1871 the faculty of Medicine, consisting mostly of professors who had come over from Strassburg University, were established. Until 1896 these were known as Facultés de Nancy and were under the control of the University of France, but with the dissolution of that university, Nancy became autonomous. In 1902 the University of Nancy consisted of the faculties of Law, Medicine, Mathematics, Natural Science, and Philosophy, and the School of Pharmacy. It also included the chemical, serotherapic, electrotechnic, and agriculture institutes and the "Etudes Coloniales." The attendance in 1902 was 1130. The library contains about 38,000 volumes.

NANDA DEVI, nŭn′d*a* dā′vē. A peak of the Himalayas (q.v.).

NANDU, năn′dōō. The Brazilian name of the South American ostrich. See Rhea.

NANEK, nä′nĕk, or **NANAK**, nä′nȧk (1469-1538). Founder of the religious sect of Sikhs (q.v.). He was born at the village of Talwandy, now called Nankana, on the bank of the river Ravi, near Lahore, India, and was a Kshatriya in caste. In his youth he showed a tendency toward mysticism. He was at first a shepherd, and afterwards became a Government official, in charge of the State's granary. He visited all the sacred places of India for the purposes of formulating the religious system he wished to introduce among his neighboring tribes. He spent two years in the town of Livanobbhon, where he associated himself with Kabir, the founder of a monotheistic sect. It was due to the influence of Kabir, whom Nanek often quotes in his book, that he determined to found a similar sect. Having previously made pilgrimages to Mecca and Medina, he returned to India, where he compiled the great work known as the *Adi-Granth*. For many years he traveled widely, and proclaimed everywhere the doctrines of his new religion. He preached the abolition of caste, the unity of God, and the obligation to lead a pure life, and soon had a large following. Upon his death, which occurred at Kirtipur on the Ravi River, his disciple Lina (or Labona) assumed the leadership of the sect. Ten apostles, or 'gurus,' as they are termed, are traced from Nanek down to Govind Sinh in 1708, with whom the succession stopped.

NANGASAKI, năn′gȧ-sä′kē. A seaport of Japan. See Nagasaki.

NANINI, nȧ-nē′nē, Giovanni Maria (c.1540-1607). An Italian composer, born at Tivoli. He opened the first public school of music ever controlled by an Italian musician in Rome. The famous Palestrina and a nephew, Bernardino, were two of his assistants. He succeeded Palestrina as *maestro* at Santa Maria Maggiore in Rome, and in 1577 became a member of the Papal Choir. Three years before his death he was appointed *maestro di cappella* of the Sistine Chapel. A six-part motet, *Hodie Nobis Cœlorum Rex*, composed by him, is sung annually on Christmas morning in the Sistine Chapel. Some of his most important works remain in MS. and are the private property of the Sistine Chapel and the Vatican Library. His printed works include motets, madrigals, canzonets, and church pieces, most of which examples are regarded as representing the best of the Palestrina period. He died at Rome.

NANKEEN′ CLOTH. A fabric formerly imported extensively from China, and said to be the manufacture of Nanking; the color, a yellowish buff, being a favorite one. In the middle of the nineteenth century this material was much used for clothing, especially for trousers. Lately nankeen has been largely superseded by ordinary cotton, artificially colored to imitate the genuine fabric.

NANKING′ (Chin., Southern Capital.) The capital of the Province of Kiang-su, China, and seat of the viceroy for the three provinces of Kiang-su, Kiang-si, and Ngan-hwei. It is 194 miles northwest of Shanghai, near the Yang-tse River, latitude 32° 40′ N., longitude 118° 47′ E. (Map: China, E 5). It was made the capital of the Empire and called Nanking in 1368, but was the capital only until 1403. Its official name, given by the Manchu Dynasty, is Kiang-ning. It is an ancient city, having been the capital as far back as A.D. 317-582. It has been famous as a literary centre and for its fine arts, manufactures, and monuments. It was captured by the Tai-pings in 1853, who held it for more than a year. They destroyed the beautiful porcelain tower from fear of its geomantic influences, and so injured the city that it has not yet recovered fully. The first British treaty was signed in Nanking in 1842. Its present importance in part is from its military college, arsenal, and factories for the making of war material. It is a centre of missionary activity. The climate is exceedingly unhealthful. The population is variously estimated at from one-quarter to one-third of a million inhabitants. It was opened to foreign trade in 1899, but its commercial importance is insignificant, owing to the proximity of Chinkiang (q.v.). In the vicinity are the famous Ming tombs.

NAN′-NING′. A treaty port of Southern China, in the Province of Kwang-si, situated at the head of navigation on the Yu-kiang River, 320 miles west by south of Canton (Map: China, C 6). It is one of the principal trading stations near the southern frontier, and lies on the route of the proposed railroad from Hanoi to Canton. Population, 40,000.

NANNINOSE (corruption of American Indian *mananosay*), or **MANNINOSE.** A local name in use along the South Atlantic coast for the soft clam (*Mya arenaria*). See Clam.

NANSEN, năn′sen, Fridtjof (1861—). A Norwegian Arctic explorer and naturalist, born near Christiania, Norway. He was educated in the university of his native city, and was trained as a zoölogist. In his twenty-first year he undertook a trip to East Greenland waters for zoölogical specimens; the same year he was appointed curator in the Natural History Museum at Bergen. He became known to the world as the first man to cross the ice cap of Greenland, an adventurous journey from the east to the west coast, undertaken in 1888, which he described in two volumes, *The First Crossing of Greenland* (1890). He spent the winter of 1888-89 among the West Greenland natives, which resulted in a volume on *Eskimo Life* (1893). After his return to Norway he was appointed curator in the Museum of Comparative Anatomy at the Christiania University. From his twenty-third year he was constantly planning for the great journey into the polar regions, upon which he did not embark till nine years later. He had unusual natural and acquired qualifications for the work, and his winter among the Eskimos was of inestimable value to him in his later experiences.

Nansen inferred, partly from the appearance in Greenland of a pair of trousers which had been left upon the ice south of Siberia when the *Jeannette* was abandoned, partly from the presence in Greenland of driftwood from Siberia, and partly from the experience of other explorers, that a ship driven with the ice by prevailing winds might drift from above Siberia across the pole. The weight of Arctic authority did not support this plan; nevertheless, with the assistance of the Government and private citizens Nansen built and equipped the Arctic exploring vessel *Fram* (Forward), left Norway in 1893, skirted the north coasts of Europe and Asia, put into the polar pack ice near the New Siberia Islands on September 22, 1893, and drifted northwest till March 14, 1895. On that day, with a single companion, Lieutenant Johansen, he left the *Fram* frozen in the pack and started toward the Pole with dog sledges. On April 7, 1895, he reached latitude 86° 4′ N., within 272 statute miles of the North Pole, and 184 miles nearer to it than any man had ever been before him. Further progress was impossible, and he retreated to Franz Josef Land, where he and Johansen spent the winter in a snow hut, living on Arctic game. In the spring they started southward for Spitzbergen, but fortunately found the winter camp of the Harmsworth expedition under Jackson, and returned home on the ship of that party in the summer of 1896. Meanwhile the *Fram* drifted around to the north of the Franz Josef Land Archipelago, reaching the latitude of 85° 57′, then blasted her way southward to open water, and reached the coast of Europe within a week of Nansen's arrival there. The scientific results of the expedition were very great, and were published in a series of reports. Nansen also wrote *Farthest North*, a popular description of the expedition. His achievements were recognized by many geographical societies, which conferred their highest honors upon the explorer. He made extensive lecture tours in Europe and the United States.

Nansen failed to find any form of life above the 84th parallel. His discovery of a wide sea of oceanic depth, north of the New Siberia Islands, overthrew the theory of the prevailing shallowness of the Arctic Ocean. He found that, owing to the predominance of water in the far North, the temperatures there were higher than along the north coast of Asia. He discovered no land except a few little islands near the Asian coast: and the free movement of the ice masses driven, as Nansen observed, by the winds in every direction, has led geographers to conclude that there is no large land near the North Pole. See Polar Research.

NANTEL′, Guillaume Alphonse (1852—). A Canadian advocate, journalist, and politician, born at Saint Jérôme, Quebec. He was educated at Sainte Thérèse de Blainville, was admitted to the bar, and after several years of practice established at Saint Jérôme the colonization newspaper *Le Nord*, whose publication he continued until 1887. From 1887 to 1892 he was editor of *La Presse* at Montreal, and in 1897 established the weekly journal *Le Monde Canadien*. In 1882 he was returned by Terrebonne to the Quebec Assembly, and in 1886, 1890 and 1892 was reëlected by acclamation. From 1891 to 1896 he was Minister of Public Works. He became a director of the Great Northern Railway and of the Northern Colonization Railway, and published in the interests of colonization *Notre nord-ouest provincial* (1888).

NANTERRE, näɴ'târ'. A town of France in the Department of Seine, situated a few miles north of Paris, near Saint Denis. According to the tradition, it is the birthplace of Sainte Geneviève, the patron saint of Paris. Population, in 1901, 9214; of commune, 14,140.

NANTES, näɴt. An important seaport town, capital of the Department of Loire-Inférieure, France, situated on the right bank of the Loire, at its confluence with the Erdre and the Sèvre-Nantaise, both navigable streams (Map: France, E 4). It is about 250 miles by rail southwest of Paris. Besides railways, there is communication with the interior by steamers on the Loire. The city is handsome and well built. Among the numerous striking and beautiful buildings, the chief are the Cathedral of Saint Pierre and the old castle, dating from 938. The Bourse is a modern building and one of the finest in France. There are a public library containing 200,000 volumes, a museum of paintings, a museum of natural history, an ecclesiastical college, several learned societies, and three theatres. A very beautiful promenade, formed by the Cours Saint Pierre and the Cours Saint André, extends from the Erdre to the Loire. It is planted with four rows of trees, bordered with lines of palatial houses, and ornamented with statues. On the right bank of the river there are six miles of quayage. Formerly vessels of 200 tons only could reach the port, vessels of greater burden unloading at Paimbœuf, or Saint-Nazaire, but a ship canal on the left bank now admits large sailing vessels and steamers directly to Nantes. In the manufacture of sugar Nantes stands next to Paris and Marseilles. Its ship-building industry and its tobacco factories are also very important. There are also iron, copper, and lead foundries, oil and soap works, food-preserving establishments, saw mills, and manufactures of railroad material, of cotton and woolen goods, chemicals, and cement.

Nantes, anciently Condivincum, was founded before the Roman conquest. It took its present name from that of a Gallic tribe, the Namnetes. It was the capital of the Duchy of Brittany, and its history until the fifteenth century is a record of struggles with successive invaders in defense of its independence. In 1491 the duchy was united to France by the marriage in the castle of Anne of Brittany to Charles VIII., King of France. The castle also witnessed the signing of the famous Edict of Nantes (q.v.) by Henry IV. in 1598. From the fifteenth century the commerce of the town began to have a great development, and in the seventeenth and eighteenth centuries its prosperity increased on account of the slave trade, but in 1790 Nantes had declined greatly in importance. During the Revolution it was the scene of the *noyades* and other atrocities of the infamous Carrier (q.v.). The population, which showed a falling off in 1880 and in 1890, in the last decade advanced again, and in 1901 Nantes had 132,990 inhabitants. Consult Maillard, *Nantes et le département au XIXème siècle* (Nantes, 1896).

NANTES, EDICT OF. The name given to the famous decree signed in the city of Nantes by Henry IV. of France, April 13, 1598, which secured to the Protestant portion of his subjects partial freedom of religion. The document consisted of ninety-two patent or public articles and fifty-six secret or close ones, and among its chief provisions were the following: the proclamation of a full amnesty; the granting of liberty of conscience to the Huguenots; the permitting to Huguenot chiefs and noblemen of public religious exercises attended by themselves, their families, and the families of their dependents. In addition the Huguenots were to be allowed to establish new churches, except in Paris and the surrounding districts, and in the royal residences; and to maintain universities, or theological colleges, of which the Huguenots had four, those at Montauban, Saumur, Montpellier, and Sedan. Adherents of the reformed faith were also to be eligible to all civil offices and dignities; but they were obliged outwardly to celebrate the festivals of the Catholic Church, and to pay tithes to the Catholic priesthood. In each Parlement a *chambre de l'édit* was created to take cognizance of all cases arising out of the act and to supervise its working. Owing to the difficulties and delays in registering the Edict of Nantes, it was not published until a year after it had been signed by the King. It remained in force until revoked by Louis XIV., October 22, 1685. See HUGUENOTS.

NANTEUIL, näɴ'tẽ'y', ROBERT (1630-78). A celebrated French engraver, born at Rheims. He studied in his native city under Nicolas Regnesson. About 1645 he went to Paris, and there worked in crayon and pastel for some time before he took up the graver again. His plates having come to the King's notice, he was appointed designer of the Cabinet (1658). He is credited with the decree of 1660, dated from Saint Jean de Luz, by which engraving was raised to an equality with painting and set apart from the purely mechanic arts. He left about three hundred plates, which include portraits of many of the celebrities of the time. Consult Duplessis, *Histoire de la gravure en France* (Paris, 1861).

NAN'TICOKE. A former important Algonquian tribe of Maryland. They were noted for their dark complexion and peculiar customs and ceremonies, from which they acquired the reputation of being a tribe of sorcerers. Their power was broken by the Iroquois in 1678. In 1707 they had seven villages, and in 1722 their principal village still contained about one hundred inhabitants and was the seat of an 'empress,' who ruled over all the neighboring Indians. The whole tribe then numbered about 500. Soon afterwards they began a gradual removal to the Iroquois country, and settled in several villages on the eastern branch of the Susquehanna, in southern New York, although a portion of them continued to reside in their old country. In 1753 a part of those on the Susquehanna became incorporated with the Iroquois, but the majority removed to the Ohio and joined the Delaware tribe, with which they became completely merged. There are still several score of mixed-blood Nanticoke in southern Delaware.

NAN'TICOKE. A borough in Luzerne County, Pa., eight miles west-southwest of Wilkesbarre; on the Susquehanna River, and on the Pennsylvania, the Lackawanna, and the Central of New Jersey railroads (Map: Pennsylvania, E 2). It is chiefly engaged in mining and preparing for market anthracite coal, but has also hosiery mills, a canning factory, etc. Settled in 1850-55, Nanticoke was incorporated in 1874; it is governed under the charter of that date, which provides for a burgess, elected every three years, and a unicameral council. Population, in 1890, 10,044; in 1900, 12,116.

NANTUCK'ET. A town and the county-seat of Nantucket County, Mass., co-extensive with Nantucket Island and several small outlying islands; 60 miles southeast of New Bedford, with which it has steamboat communication (Map: Massachusetts, G 5). Nantucket is widely noted as a summer resort, presenting much of picturesque and historic interest. It was formerly the seat of a great whaling industry, but at present the community is engaged principally in fishing, agriculture, and the coastwise trade. The town, including within its corporate limits several villages, contains the Athenæum (public library), Admiral Sir Isaac Coffin's Lancastrian School, and Muskeget Park. The government is administered by town meetings. Population, in 1890, 3268; in 1900, 3006.

In 1659 the first settlers, headed by Thomas Macy, came to the island and settled at Madeket, the present site of Nantucket not having been chosen until 1673. Consult Hinchman, *Early Settlers of Nantucket, Their Associates, and Their Descendants* (Philadelphia, 1901).

NANTWICH, nănt'ĭch. A market-town in Cheshire, England, on the Weaver, 20 miles southeast of Chester (Map: England, D 3). The parish church, one of the finest country churches in England, was restored in 1864. Nantwich was famous in former times for its brine-springs and salt-works. Shoes, gloves, cotton goods, and ale are manufactured. The town owns its water supply and markets. Nantwich dates from the Roman period, and was formerly called Halen Gwyn—the white salt town. Population, in 1891, 7400; in 1901, 7700.

NANTYGLO, năn'tĭ-glō, and **BLAINA,** blā'nȧ. A town in Monmouthshire, England, 7½ miles southwest of Abergavenny (Map: England, C 5). It has important coal-mining and iron industries. Population, in 1891, 12,400; in 1901, 13,500.

NAOGEORG, nä'ō-gȧ-ōrg', THOMAS (1511-63). A German Protestant dramatist, whose name in the vernacular was Kirchmeyer. He was born at Hubelschmeiss, near Straubing; possibly studied at Tübingen; and in 1535 became pastor. His Latin poems, all animated by the most bitter opposition to the Papacy, include the dramas, *Pammachius* (1538); *Incendia seu Pyrgopolinices* (1541); *Mercator seu Indicium* (1541); and the satiric poem *Regnum Papisticum* (1553). These were often rendered into German, and were long popular, as were his weaker biblical dramas, *Hamanus* (1543); *Hieremias* (1551); and *Judas Iscariotes* (1551).

NAOROJI, nou'rō-jē, DADABHAI (1825—). The first Indian member of the British House of Commons. The son of a Parsi priest, he was born at Bombay, and educated in the school of that city which afterwards became the Elphinstone Institution. He was appointed professor of mathematics and of natural philosophy there in 1854, but after 1855 he lived chiefly in England. He was instrumental in founding the East India Association in 1867, and three years afterwards he succeeded in having certain positions in the civil service opened to native Indians. In 1874 he was made Prime Minister to the Prince of Baroda. From 1885 to 1887 he was a member of the Bombay Legislature, and he was president of the Indian National Congress in 1886 and in 1893. He was a liberal member of Parliament for Central Finsbury in 1892-95, and in 1895 was appointed a member of the royal commission to inquire into Indian affairs. His publications include: *England's Duties to India* (1867); *The Wants and Means of India* (1870); collected articles published in 1887; and *Poverty and Un-British Rule in India* (1901).

NA'OS (Gk. *ναός*, Attic *νεώς*, from *ναίειν*, *naiein*, to dwell). The central chamber of a Greek or Græco-Roman temple. See CELLA; PRONAOS.

NAPA, nä'pȧ. A city and the county-seat of Napa County, Cal., 46 miles northeast of San Francisco; on the navigable Napa River, and on the Southern Pacific Railroad (Map: California, B 2). It is the seat of a State Hospital for the Insane, and has attractions of beautiful scenery and special features of interest in Napa Soda Springs, Napa Redwoods, Calistoga Hot Springs, and petrified forests. The leading industries are fruit-growing and the manufacture of tanned leather, shoes, gloves, and woolen goods. At Napa Junction there are Portland cement works, the vicinity having extensive deposits of cement rock. Settled in 1847, Napa was incorporated in 1863. The present government is administered under a charter of 1893, which provides for a mayor, elected every two years, and a unicameral council. Population, in 1890, 4395; in 1900, 4036.

NAP'ANEE. A town and port of entry, Lennox County, Ontario, Canada, at the mouth of the Napanee River, on the Bay of Quinté, 23 miles west of Kingston. It has a station on the Grand Trunk Railway and is the terminus of the Bay of Quinté and Napanee Railway. It is a grain-trading centre and the seat of a United States consular agent. Population, in 1891, 3433; in 1901, 3143.

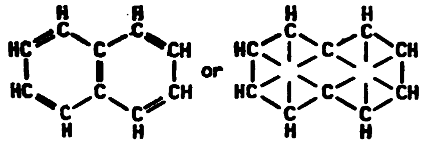
NAPATA, nȧ-pä'tȧ. The ancient capital of Ethiopia (q.v.), mentioned in inscriptions as early as B.C. 1450, and later the seat of independent kings. It was rivaled by Meroë (q.v.) after the Persian period. For the ruins of the city, destroyed by Petronius, see BARKAL.

NA'PERVILLE. A city in DuPage County, Ill., 30 miles west of Chicago; on the DuPage River, and on the Chicago, Burlington and Quincy Railroad (Map: Illinois, D 2). The city, chiefly a residential place, has the Nichols Library, and is the seat of Northwestern College (Evangelical Association), established in 1861. There are quarries, a furniture factory, and a fly-net factory. The electric-light plant is owned and operated by the municipality. Naperville was settled in 1830, and was incorporated in 1857. Population, in 1890, 2216; in 1900, 2629.

NAPH'TALI. According to Gen. xxx. 7-8, the fifth son of Jacob, and the second born to him by Bilhah. In the actual history of the Hebrew Confederation, the tribe Naphtali plays but a minor part. Its territory lay in the north, bordering on the Sea of Galilee. According to Judges iv. 6, Barak came from Kedesh in Naphtali, but it is doubtful whether the addition 'Naphtali' is correct here, though both the clans Naphtali and Zebulon were involved in the struggle against the King of Hazor. (See DEBORAH.) According to Josephus (*Wars*, iii. 3, 2) the Naphtalites were men of valor. Their dangerous position as a border tribe made them among the first to fall into the hands of Assyria (B.C. 734; cf. II. Kings xv. 29). In the religious development of Israel the tribe plays no part, but in the post-exile period Tiberias (q.v.), on the western shore of the Sea of Galilee, comes into prominence, and after the destruction of Jerusalem it became one of the centres of Jewish learning.

NAPHTHA (Lat., from Median Pers. *νάφθα*, Av. *napta*, Pers. *naft*, moist; connected with Lat. *Neptunus*, *Neptune*, name of the sea-god). A term originally applied to an inflammable liquid which exudes from the soil in certain parts of Persia. Subsequently the use of the term spread to include some of the more volatile oils found in Europe and even in America. The product of the oil fields of Southern Russia is usually called naphtha, although it differs in no way from the ordinary grades of petroleum. Naphtha properly includes the lighter oils which pass off first in the distillation of petroleum, the gravities ranging from 90 to 62 degrees Beaumé. Pennsylvania crude oil contains from 8 to 20 per cent. of naphtha. In the refining of such naphtha several products are obtained by fractional distillation, those which pass off first, namely rhigolene and cymogene, are gases at ordinary temperatures and are seldom saved. The next product is known as gasoline, a material largely used in machines and for illuminating purposes. After this come stove naphtha and gas naphtha, the latter being the base of much of the illuminating gas now made. Petroleum naphtha is often treated with chemicals to deodorize it. Naphtha may also be obtained in the distillation of wood and coal tar. See PETROLEUM.

NAPH′THALENE (from *naphtha* + *alcohol*), $C_{10}H_8$. A crystalline solid chemical compound of carbon and hydrogen, found abundantly in coal-tar (q.v.). The crystalline mass obtained from this source is pressed, warmed with a little strong sulphuric acid, and then distilled in a current of steam or subjected to a process of sublimation. When thus obtained in the pure state, naphthalene melts at 80° C. (176° F.), and boils at 218° C. (424° F.). It has a peculiar characteristic odor, is insoluble in water, but freely soluble in ether and in hot alcohol. It is largely used in the manufacture of coloring substances and to some extent also as an enricher for ordinary illuminating gas. The molecule of naphthalene is composed of two rings of carbon atoms, with hydrogen atoms attached to them, and its constitution is represented by either of the following graphic formulas:



A number of interesting derivatives of this hydrocarbon are obtained by the action on naphthalene of chlorine, nitric acid, etc. The most important derivatives commercially are the so-called sulphonic acids. By acting on naphthalene with an excess of sulphuric acid, we obtain naphthalene-sulphonic acid, $C_{10}H_7SO_3H + H_2O$, from which, by substitution processes, a large number of compounds are produced, many of these finding employment in the color and dye industry.

NAPIER, nā′pĭ-ẽr. The capital and chief port of Hawke's Bay County and Provincial District, North Island, New Zealand, on the east coast (Map: New Zealand, F 3). Wool is the chief export; there are also large exports of timber, canned and frozen meats. The principal public buildings comprise an Anglican cathedral, town hall, and athenæum. It has railway communication with Wellington and New Plymouth. Population, in 1901, 9015.

NAPIER, nāp′yẽr *or* nȧ-pēr′, Sir CHARLES (1786-1860). A British admiral. His father was the Hon. Capt. Charles Napier, R. N., second son of Francis, fifth Lord Napier. He was born at the family seat, Merchiston Hall, Stirling, Scotland. At thirteen he went to sea as a naval volunteer. In 1808 he received the command of the *Recruit*, 18 guns, serving in the West Indies. He became a post-captain, but being thrown out of active service, volunteered in the Peninsular Army, and was wounded at Busaco. In 1814 he was ordered to America, and took an active part in the operations against Baltimore. In 1829 he received the command of the *Galatea*, a 42-gun frigate, and was employed 'on particular service' on the coast of Portugal. He accepted the command of the fleet of Dom Pedro, the father of the young Queen, Maria da Gloria, in the struggle against her uncle, Dom Miguel, and by defeating the Miguelite fleet, hastened the downfall of the usurper. He was made admiral-in-chief of the Portuguese navy, but soon returned to England. In the war between the Porte and Mehemet Ali, he organized a land force, with which he stormed Sidon, and defeated Ibrahim Pasha among the heights of Mount Lebanon. He took part in the naval attack on Acre. He next blockaded Alexandria, and concluded a convention with Mehemet Ali. For these services he was knighted, and in 1847 he received the command of the Channel Fleet. When the Russian War broke out, he was sent out to command the Baltic fleet, but had to content himself with a prudent and successful blockade of the strongly fortified ports, which somewhat disappointed public expectations of more daring achievements. He twice sat in Parliament, and, until his death, labored with success to reform the British naval administration. He was a man of great personal courage and decision of character, but selfish, vainglorious, and arrogant. These traits are strongly marked in his works: *The War in Portugal* (1836); *The War in Syria* (1842); *The Navy: Its Past and Present State* (1851). Partiality marks the biography by his stepson Gen. Elers Napier, *The Life and Correspondence of Admiral Sir Charles Napier* (London, 1862).

NAPIER, Sir CHARLES JAMES (1782-1853). A celebrated British general, son of Col. George Napier. He was born at Whitehall, August 10, 1782, and in his twelfth year received a commission in the Thirty-third Infantry. His first military experience was in Ireland in 1798. His next active service was in Spain during the Napoleonic wars, and he commanded the Fiftieth Infantry at Coruña, where he was wounded and taken prisoner. Marshal Ney dismissed him on parole, and he went to England, but returned in 1810 to the Peninsula after having been exchanged. At Coa he fought as a volunteer and had two horses killed under him. At Busaco a shot in the face broke his jaw and injured an eye; but he recovered in time to be present at the battle of Fuentes de Oñoro and the second siege of Badajoz, both in 1811. In the summer of 1813 he was with the fleet under Beckwith, and afterwards under Cockburn, engaged in desultory operations on the coast of the United States. In 1815 he took part in the storming of Cambrai, and marched into Paris with the allied armies. From 1822 to 1830 he was Resident (Governor) of Cephalonia, one of the Ionian Islands, the affairs of which he administered with great energy and intelligence. In 1841 he was ordered to India to take command of the army at Bombay. The most splendid service of his life now began, and resulted in the conquest of Sindh against great odds. In the battle of Miani, 1843, Napier with about 2000 troops attacked a strongly posted native force ten times as great, and defeated it, killing more than 6000 men. Thereupon all the ameers surrendered with the exception of Shir Muhammed, who brought 25,000 men into line of battle at Hyderabad. In three hours Napier's little army of 5000 men gained a decisive victory, and a few days afterwards the English general was master of Sindh. The Governor-General, Lord Ellenborough, made him Governor of the conquered territory, but though his administration was very successful, as were also various campaigns against the hill tribes, Napier retired in 1847, after having quarreled with the directors of the East India Company. During the Sikh war of 1848-49 he again went to India, but arrived too late to take part in the conflict. After having put down a mutiny among the native soldiers, he returned to England in 1850, having had another quarrel with the directors. He retired to the Hampshire Downs, near Portsmouth, busying himself with literary labors. There he died on August 29, 1853. Napier was a man brave to rashness, quarrelsome with his superiors, but beloved by his soldiers, and one of the most remarkable of the military men of his time. Consult: Bruce, *Life of General Sir Charles Napier* (London, 1885); Butler, *Sir Charles Napier* (ib., 1890). His brother, Sir William Francis Patrick Napier (q.v.), has also written of him.

NAPIER, Sir FRANCIS (1819-98). An English diplomat, born at Thirlestane, in Selkirkshire. He entered the diplomatic service in 1840, was attaché at Vienna and at Constantinople, secretary of legation at Naples, envoy to Washington and The Hague, and ambassador to Saint Petersburg (1860-64) and to Berlin (1864-66). From Berlin he was transferred to India as Governor of Madras, and there labored incessantly and wisely, especially in behalf of public health during the famine in Ganjam. In 1872, after serving temporarily as Governor-General of India, he returned to England and was created Baron Ettrick of Ettrick.

NAPIER, JOHN (1550-1617). A Scotch mathematician, born at Merchiston, near Edinburgh. He was educated at Saint Andrews and probably also abroad. His natural pugnacity of character often involved him in difficulties with his neighbors and tenants. In 1594 he published his *Plaine Discovery of the Whole Revelation of Saint John* (2d ed., London, 1611), in which he sought to prove that the Pope was Antichrist. In somewhat the same spirit, ostensibly to defend his country from "the enemies of God and true religion," he made some secret inventions, including burning-mirrors, a piece of artillery, and a chariot of metal, none of which had any more merit than his theological contributions. Napier's fame rests on his mathematical discoveries, and he is chiefly known as the inventor of logarithms (q.v.). In his earlier investigations he seems to have been considering the subject of imaginary roots, and he refers to this as an important algebraic secret. The idea of logarithms seems to have occurred to him as early as 1594, and thenceforward the rest of his life was spent in developing the idea and computing logarithmic tables. He also invented some mechanical devices for computation known as 'Napier's rods.' (See CALCULATING MACHINES.) By means of these, multiplication and division can be performed, and square and cube roots extracted. He was also the inventor of a number of formulas in trigonometry, known as 'Napier's circular parts.' (See CIRCULAR PARTS.) Napier was one of the first English writers to make any valuable contribution to mathematics, and his discoveries mark an epoch in the history of science. His chief writings are: *De Arte Logistica* (written in 1573, published in 1839); *Mirifici Logarithmorum Canonis Descriptio* (1614 and subsequent editions; Eng. trans., 1616 and 1857); *Mirifici Logarithmorum Canonis Constructio* (1619; Eng. trans. 1889); *Rabdologiæ seu Numerationis per Virgulas Libri Duo* (1617). Consult: Mark Napier, *Memoirs of Napier* (Edinburgh, 1793); Earl of Buchan, *Life of Napier* (ib., 1787). A complete edition of Napier's works appeared in Edinburgh in 1839. A bibliography of Napier's works, by Macdonald, may be found in the English translation of the *Mirifici Logarithmorum Canonis Constructio* mentioned above.

NAPIER, ROBERT (1791-1876). A Scotch marine engineer, born at Dumbarton. He was for a time apprenticed to his father, a blacksmith, and afterwards went to Glasgow, where in 1815, after working for Robert Stevenson, he set up a smithy, with two apprentices. In 1823 he built his first marine engine. In 1830 he supplied engines for the Glasgow Steam-Packet Company, and ten years later he supplied the Cunard Company with engines for their first four steamers. He added shipbuilding to the construction of engines in 1841, and built more than 300 vessels for the Government, and the larger companies.

NAPIER, ROBERT CORNELIS, Lord Napier of Magdala (1810-90). A British soldier, born at Colombo, Ceylon. He studied at the East India Company's military college at Addiscombe, and at the royal engineering school at Chatham, and from 1828 to 1845 was chiefly employed on the public works. In the latter year, however, he participated in several battles of the First Sikh War. During the Second Sikh War (1848-49) he again saw active service, and at its close was appointed civil engineer to the board of administration of the Punjab, in which capacity he inaugurated and partly carried out a comprehensive scheme of public improvements. During the summer and fall of 1857, at the time of the Mutiny, Napier distinguished himself in the movements which resulted in the relief of Lucknow. Later he also planned the recapture of that place. In June, 1858, he coöperated with Sir Hugh Rose in the latter's operations against the insurgent forces under Tantia Topi and the Ranee of Jhansi; and on the 29th, after Sir Hugh's departure, he took the chief command in Central India. In August he coöperated with Brigadier-General Smith in the capture of Paori; in December, with slight loss to himself, destroyed Ferozeshah's army and in April, 1859, captured Raja Man Singh of Narwar and Tantia Topi. Subsequently he was appointed military member of the council of the Governor-General and aided in the amalgamation of the national army and that of the East India Company. Lord Elgin's (q.v.) sudden death left him Acting Governor-General for a short time. In 1868 he commanded the English expedition sent to Abyssinia and stormed the royal stronghold of Magdala. On his arrival in England Queen Victoria created him Baron of Magdala. The next year he was appointed commander-in-chief in India. Six years later he returned to Europe, and in 1883 was raised to the rank of field-marshal. Consult Markham, *History of the Abyssinian Expedition* (London, 1869), and Escott, *Pillars of the Empire* (London, 1879).

NAPIER, Sir WILLIAM FRANCIS PATRICK (1785-1860). An English general and historian, born at Celbridge, Kildare, Ireland, December 17, 1785. He was a brother of Sir Charles James Napier, the conqueror of Sindh, and a cousin of Sir Charles Napier, the English admiral. Entering the army as ensign in the Royal Irish Artillery (1800), he became captain of a regiment in Sir John Moore's brigade (1804); took part in the siege of Copenhagen (1807); went with his regiment to Spain (1808); and for his bravery in the Peninsular campaigns was appointed lieutenant-colonel (1813). Later he became colonel (1830); then Lieutenant-Governor of Guernsey (1842), and general (1859). He was knighted in 1848. Napier passed his last years at Scinde House, Clapham, where he died February 10, 1860. Napier gained an immense reputation by his *History of the Peninsular War* (6 vols., 1828-40). This work, which aimed to tell the truth, led to a long controversy with the officers who had taken part in the campaigns. It is, however, believed to be an impartial statement of facts. His *History of Sir Charles Napier's Administration of Scinde* (1851) is written in his boldest style. Consult the *Life* by Lord Aberdare (London, 1864).

NAPIER'S RODS, or BONES. See CALCULATING MACHINES.

NA'PLES (It. *Napoli;* anciently, *Neapolis*). The largest city and the second seaport of Italy, capital of the Province of Naples, formerly the capital of the Kingdom of the Two Sicilies, situated on the western coast of the Peninsula, at the foot of encircling hills, on the north side of the Bay of Naples, in latitude 40° 51′ N., and longitude 14° 16′ E. (Map: Italy, J 7). It is about five miles long and three miles broad. The climate is mild, although the variations in temperature and humidity, owing to alternating winds from the north and south, are often great and sudden. The thermometer ranges from 26° F. in January to 97° in July, the average winter temperature being 50°, the average summer temperature 75°. Fogs are rare and snow seldom falls. The rainy season lasts from the end of January to the beginning of April. The heat of summer is tempered by the sea wind that blows until about 2 o'clock in the afternoon. Vesuvius acts as a great natural barometer: when its smoke blows toward Capri, fair weather is always expected.

The far-famed situation of the city on the sea, amid its amphitheatre of hills, can be compared perhaps only with that of Constantinople. Across the bay to the south is visible the historic island of Capri; on the eastern shore are villas, vineyards, and orange groves grouped around tiny cities, while over all towers Vesuvius with ominous grandeur. The environs in general are unsurpassed for loveliness and the great variety of interest they present. Sorrento, Capri, Ischia, and the Phlegræan district are localities that delight the sightseer. Other striking attractions are the former monastery of the Camaldolites (q.v.), and the hill of Posilipo with its multiple associations and its fine streets offering magnificent views.

Architecturally Naples is by contrast surprisingly poor. The ancient and commercial part of the city lies east of a line drawn from Capodimonte through Sant' Elmo to Castello dell' Ovo, and is divided from north to south by the Via Roma.

The modern and western part, where are nearly all the principal hotels, is bordered on the south by the famous Riviera di Chiaia along the bay in a curved course of three miles. Here the Villa Nazionale stretches away—a splendid park dating from 1780. It is embellished with lordly allées, statues, and miniature temples. It contains the well-known aquarium of Naples, which is filled with a great variety of extraordinary fish—frutti di mare. It is, in fact, a school established for the scientific investigation of the aquatic fauna and flora of the Mediterranean. The public squares or larghi of Naples are adorned with fountains and obelisks; and within the precincts of the city are several highly prized springs of fresh mineral waters.

The handsome Renaissance Porta Capuana is justly celebrated. The castles are numerous. Among the principal ones are the Castello Nuovo, called the Bastille of Naples, somewhat similar to the Tower of London, and adorned with a fine triumphal arch erected in honor of Alfonso of Aragon; the Castello Sant' Elmo, commanding a magnificent view from the ramparts; and the historic egg-shaped Castello dell' Ovo. The last was begun in 1154. It is situated on an islet connected with the mainland, and is one of the conspicuous features. Near it is the street Santa Lucia—the centre of the noisy Neapolitan life, particularly of the lower classes. Women engaged in domestic duties, naked children, and peddlers of all sorts present a unique spectacle here in a city characterized by festivals and processions and bustling traffic. The neighboring royal palace is of modern construction. It has an imposing façade decorated with rich statues. The interior is uninteresting.

Of the nearly four hundred churches none is very striking. The cathedral, dedicated to Saint Januarius, contains the celebrated vials in which the liquefaction of the saint's blood is alleged to take place on three annual festivals. The church also contains the tombs of Charles of Anjou and Pope Innocent IV., besides numerous fine paintings and statues. San Martino is an interesting religious precinct, with its belvedere, cloisters, and museum. In the monastery attached to the Church of Santi Severino e Sosio are deposited the valuable archives of the former Neapolitan kingdom, consisting of some 40,000 manuscripts, the earliest dating from 703.

Naples is far richer in archæological than in architectural interest. The Museo Nazionale contains an immense and unsurpassed collection of frescoes, paintings, mosaics, sculptures, antiquities, coins, medals, and inscriptions, including objects excavated at Herculaneum and Pompeii. Among its rarest, most celebrated possessions are the Farnese Bull, the Farnese Hercules, the Mosaic of the Battle of Alexander, the Pompeiian frescoes, and a valuable collection of bronzes and vases.

The splendid Galleria Umberto Primo was completed in 1890 at great expense.

At the head of the educational system is the university (q.v.). There are also an engineering school, an Oriental institute, an astronomical observatory, a botanical garden, several unions for the study and diffusion of many leading branches of knowledge, a marine school, and a royal conservatory of music. The charitable institutions are numerous, on an extensive scale, and richly endowed. Besides that of the university there is the National Library, with over 350,000 volumes, 200,000 pamphlets, and about 8000 manuscripts. Naples has many good playhouses. The San Carlos is one of the largest and most famous of opera houses. The marionette theatres and the theatres where the famous Neapolitan Pulcinella is to be seen are a never-failing source of entertainment.

Naples is one of the most important manufacturing centres in Italy. Ships, locomotives and cars, and stationary engines are built; and glass, cotton, wool, gloves, perfumery, linen and silk products are manufactured. The extensive steel works are chiefly in the hands of English firms. Copies of ancient vases and bronzes, lava articles, and coral and tortoise-shell goods are also largely dealt in. The commerce of Naples is even more important than are its industries. It has regular communication by steamers with nearly all parts of the world. The harbor has been much improved in the last decade. The tonnage of vessels entering was 3,356,435 in 1900, an increase of nearly 1,700,000 tons during the decade. The chief articles of import are coal, iron and steel (Great Britain, Germany, and Belgium), grain (Russia and India), lumber (Austria-Hungary), cotton (United States and India), wool, leather, oils, and wines (France), and chemicals (Germany and Great Britain). The leading exports are wine and brandy, dried and subtropical fruits, nuts, paper, and hemp. The total value of the imports in 1900 was $11,594,567, showing an increase of nearly $2,800,000 since 1898. The exports for 1900 were valued at $20,916,631.

Half of the population of Naples, including the countless lazzaroni and trovatori, were huddled together in the slums in ancient unsanitary buildings that crowded narrow, crooked streets, until the cholera epidemic of 1884 aroused the whole country. In 1885 the Italian Parliament voted $20,000,000 toward a systematic renovation which, when entirely completed, will cost city and nation not less than $100,000,000. A new water supply was at once introduced from the mountains near Avellino, 50 miles away, and plans were elaborated for a new sewer system, for new streets, new squares, and new buildings. Of 271 old streets 144 were to be abolished and 127 widened; the habitations of 90,000 people were to be destroyed, and the density of the population reduced from 645 to 280 per acre. The work so far has been done on contract by private companies, and the resale of street frontage on the new business streets has to some extent reimbursed the Government. The water-works are owned by a private company. The population of Naples in 1901 was 563,731.

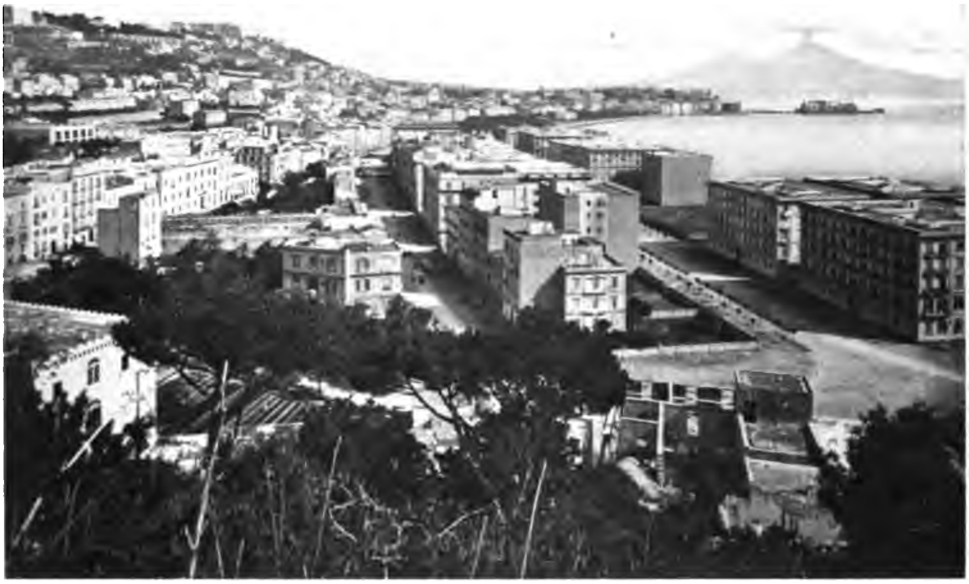
Consult: Colletta, *History of the Kingdom of Naples*, translated by Horner (Edinburgh, 1858); Beloch, *Kampanien. Geschichte und Topographie des antiken Neapel* (2d ed., Berlin, 1890); Del Balzo, *Napoli e i Napolitani* (Milan, 1884); Forbes, *Rambles in Naples* (New York, 1886); Hare, *Cities of Southern Italy* (London, 1883); Waters, *Naples* (Boston, 1894); Pellet, *Naples contemporain* (Paris, 1894); Rolfe, *Naples in the Nineties* (London, 1897); Whitehouse, *The Collapse of the Kingdom of Naples* (New York, 1899); Norway, *Naples Past and Present* (New York, 1901); Rispoli, *La provincia e la città di Napoli* (Naples, 1902).

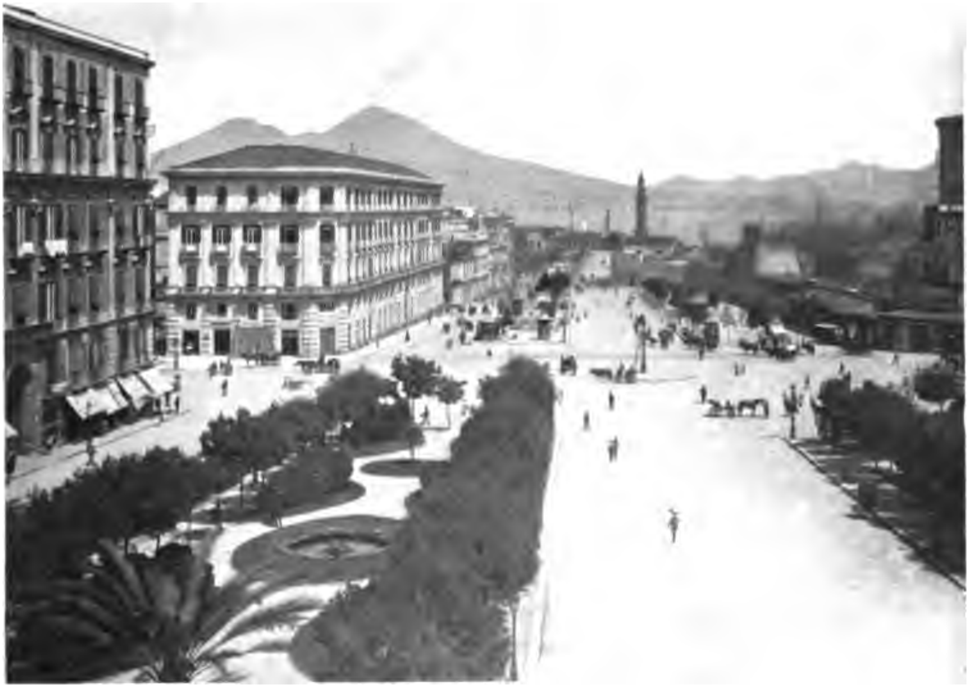
NAPLES, Bay of. A bay of the Mediterranean Sea on the southwest coast of Italy (Map: Italy, J 7). It is 20 miles wide from Cape Miseno on the northwest to Point Campanella on the southeast, and extends inward about 10 miles. The bay is famous for its beautiful scenery, the view including the city of Naples, Castellamare, and the other towns and villages along the shores, dominated by Mount Vesuvius on the east, while at the entrance to the bay are the lovely islands of Ischia and Capri.

NAPLES, Kingdom of. See Two Sicilies, Kingdom of the.

NAPLES, University of. An Italian university, founded in 1224 by the Emperor Frederick II. It was reformed or reconstructed at least three times before 1266, when Charles I. of Anjou finally placed it on a sound footing. Among its earliest and most brilliant scholars was Thomas Aquinas, who lectured here during its short but brilliant revival about 1272-74. It was reorganized in 1780, and since the incorporation of Naples with Italy, 1860, it has increased remarkably in numbers and influence. It had in 1901 a budget of over 900,000 lire and more than 5100 students, chiefly in law and medicine. Its library contains about 160,000 volumes and 30,000 pamphlets.

NAPO, nä′pō. A tributary of the Upper Amazon. It rises on the slope of Mount Cotopaxi in Ecuador and flows southeast, emptying into the Amazon near the eastern boundary of Ecuador after a course of 750 miles (Map: Ecuador, C 4). In its upper course it flows in a steep incline through a rough and rocky valley, but after emerging from the mountains it traverses a vast





NAPLES
VIEW OF THE CITY FROM THE TOMB OF VERGIL (UPPER)
PIAZZA DEL MUNICIPIO (LOWER)

forest-covered plain, almost unexplored, and sparsely inhabited by savages. The Napo is navigable for steamers nearly 400 miles, but the natural wealth of the region, including gold, sarsaparilla, and rubber, is but little exploited.

NAPO'LEON. A village and the county-seat of Henry County, Ohio, 35 miles southwest of Toledo; on the Maumee River, the Miami and Erie Canal, and the Wabash and Detroit and Lima Northern railroads (Map: Ohio, B 3). It is of some importance as an industrial centre, its chief manufactured product being flour. The water-works and electric-light plant are owned by the municipality. Population, in 1890, 2764; in 1900, 3639.

NAPOLEON I., *Fr. pron.* nȧ'pô'lȧ'ôɴ' (Napoleon Bonaparte) (1769-1821). Emperor of the French, born at Ajaccio, on the island of Corsica, August 15, 1769. The family of Buonaparte (as the name was spelled until 1796) was of Tuscan origin, but had been settled in Corsica since 1529. The parents of the future Emperor were Carlo Maria de Buonaparte and Letizia Ramolino, a descendant of a good Florentine family. Napoleon was the fourth child and the second son. After a few months spent in learning French in a school at Autun, he entered the military school at Brienne on April 23, 1779, and there remained until he was transferred to the great military school in Paris in September, 1784. Just a year later he received his commission as second lieutenant in La Fère Regiment of Artillery, which was stationed at Valence. He served with this regiment until 1791, but passed the greater part of his time (1786-88 and 1789-91) on furlough in Corsica, where he took part in the patriotic movement under Paoli. He was in Paris during the events of August 10, 1792, when the mob of Paris attacked the Tuileries, and on August 30th attained the rank of captain in the army. He returned to Corsica, but this time he had a falling out with Paoli and identified himself with the French Revolutionary Party on the island. The defeat of this party compelled Napoleon and the other members of his family to escape and take refuge in France in June, 1793. As yet Napoleon had shown little indication of his genius and of the mighty career he was destined to lead. Self-contained and gloomy, he had made scarcely any friends except Bourrienne. He had mastered his profession of arms, had shown a capacity for intrigue, and had learned to rely upon himself. In his long leisure hours he had devoted himself faithfully to books of a solid character. He was in the beginning an enthusiastic admirer of Rousseau, and his earliest writings, which date from the Valence period, reveal an amount of sentiment that is strangely unlike the man who later squandered human lives by the hundred thousand in order to gratify his ambition. Buonaparte rejoined his regiment in Southern France, participated in the occupation of Marseilles by the Revolutionary forces, and then marched to Toulon to take part in the siege of that town. As *chef de bataillon* in the Second Regiment of Artillery he was practically in charge of the artillery during the siege operations, and won for himself golden opinions from the commissioners of the Convention with the army. One of these commissioners was Robespierre's younger brother, Augustin, whose intimate friend and confidant Buonaparte now became. His conduct at Toulon won him promotion to the rank of general of brigade, but his relations with the younger Robespierre and his outspoken Jacobinism caused his imprisonment after the coup of the 9th Thermidor. An old Corsican acquaintance, Saliceti, was one of the commissioners of the Convention in the south of France at this moment and intervened on behalf of the young artillery officer. Marmont, who was in position to help Buonaparte at this time, said that he did so because he saw "there was so much future in his mind." He was released on August 20, 1794, and after further misfortunes he turned up in Paris, where he found temporary employment in the topographical bureau.

The Convention was now drawing to a close, but was forced to face one more insurrection, one antagonistic to the new Constitution of the Year III. (See French Revolution.) The work of defending the Convention was intrusted to Barras (q.v.), who selected as his second in command Buonaparte, whom he had seen at Toulon, and whom he now found in Paris half fed and shabbily clothed, awaiting the next turn of the wheel of fortune. "From the first," says Thiébault, "his activity was astonishing; he seemed to be everywhere at once: he surprised people by his laconic, clear, and prompt orders: everybody was struck by the vigor of his arrangements, and passed from admiration to confidence, and from confidence to enthusiasm." With the 'whiff of grape shot' he swept the Parisian mob from the streets on the 13th Vendémiaire (October 5, 1795). The Convention came to an end, the Directory took its place with Barras as one of the Directors, and Buonaparte succeeded Barras as commander of the Army of the Interior. Barras welcomed the young hero of the hour to his salon, where the grace of person and charm of manner of a young Creole widow, Josephine de Beauharnais, aroused in Buonaparte passionate admiration and love. Despite a disparity of six years in their ages, the influence of Barras brought about a marriage on March 9, 1796. Meanwhile the favor of another Director had brought to Buonaparte a much more important command in the army. Buonaparte had visited the Genoese Riviera in 1794, and at the Topographical Bureau he had taken the opportunity to prepare a plan of campaign in Northern Italy, which he now perfected and presented to Carnot (q.v.), who admired it and ordered its execution. Schérer, the general of the Army of Italy, replied that if the Directors wanted the plan carried out they could send down the man who devised it to do it. He was taken at his word; Buonaparte was appointed to the command, and left Paris two days after his marriage, arriving at Nice in March, 1796.

At this moment, after the treaties of Basel, France was still at war with England, Austria, and Sardinia. England was no longer a factor in the military situation on the Continent; Austria had been attacked only in Southern Germany, while on the Italian frontier France had done nothing except to make intermittent attacks on Sardinian territory. Italy was made up of patches of Austrian territory and of petty States under Austrian influence, which offered a rich spoil for the conqueror. The main body of the Austro-Sardinian army was at Montenotte, occupying the pass between the Maritime Alps and the Apennines at the headwaters of the Bormida and the Tanaro, two affluents of the Po. One road followed the latter northwest to Turin, the other road followed the Bormida to the northeast to Milan; between the two was an almost impassable mountain country. A successful blow would compel the Sardinians to retreat on their capital, Turin, and the Austrians on Milan, their headquarters in Italy, without hope of reuniting their forces. This army of 52,000 men was somewhat scattered and could not be used in full force at any one point, and many of the men were sick. The French Army of Italy was no better off. There were 42,000 poorly equipped, worse clad, and unpaid men scattered in detachments along the Riviera from Nice to Savona. Their new commander, Buonaparte, was a slender, delicate-looking youth of twenty-six, who was known only for some skill shown in handling artillery at Toulon and in Paris. Rumor said he owed his appointment to a discreditable intrigue between Josephine and Barras. Certainly there was little to promise one of the greatest military campaigns in all history, the most dazzling success of modern times. Bonaparte (as he now spelled his name) from the moment of his arrival took hold of things with the grasp of an experienced general skilled in the management of men. His address to his army kindled their imagination: "Soldiers, you are half-starved and half-naked; the Government owes you much, but can do nothing for you. I am about to lead you into the most fertile valleys of the world; there you will find flourishing cities and teeming provinces; there you will reap honor, glory, and riches. Soldiers of the Army of Italy, will you lack courage?" Reënforcements arrived which raised the army to about 50,000 men, whom Bonaparte concentrated at Savona. The campaign opened at Montenotte on April 11th. Three successive attacks compelled the Sardinians under Colli to retreat toward Turin, while the Austrian commander, Beaulieu, fell back toward Milan. Bonaparte pressed on against Colli, and, though he had no power to negotiate, compelled him to sign the armistice of Cherasco (April 28th), which gave France military control of Piedmont and left Bonaparte free to attack Beaulieu. From this moment Bonaparte showed the Directory that they had no ordinary general to deal with. He did not wait for orders. He did things and then reported; he preferred no requests, but presented demands coupled with an ultimatum. Immediately after the signature of the armistice with Colli, Bonaparte reassembled his forces, which had scattered to forage and plunder, and prepared to attack Beaulieu, who had retreated across the Po and the Ticino. Beaulieu expected Bonaparte's attack near Pavia. The French commander turned his flank, seized Piacenza on May 7th, and compelled Beaulieu to retreat across the Adda, leaving Milan to the French. Bonaparte pursued the retreating Austrians and defeated them at the bridge of Lodi across the Adda, on May 10th. After this battle it is said the troops gave Bonaparte the endearing name of the Little Corporal; from this time they were thoroughly devoted to him. Bonaparte promptly occupied Milan and there displayed his characteristic qualities. He appealed to the popular enthusiasm, and led the Milanese to believe that he was their deliverer. He established a temporary administration, welcomed artists and writers, and showed an interest in the University of Pavia. On the other hand, he extorted a war contribution of 20,000,000 francs and seized and sent to Paris numerous literary and art treasures. The young general did not dally. In a few days he was again pushing on against the Austrians, and on June 3d the siege of Mantua was begun. This strongly fortified town was the key to Northern Italy. While the siege was in progress Bonaparte paid his respects to the Dukes of Modena and Parma, to the Grand Duke of Tuscany, and to the Pope, each of whom he compelled to buy peace with large sums of money and with treasures of art and literature. The Austrians raised army after army for the relief of Mantua, but in vain. The first, under Wurmser, advanced from Tyrol in three divisions, and compelled the raising of the siege of Mantua by Bonaparte, who marched to meet the Austrians and defeated them at Castiglione on August 5th. Wurmser made a second attempt by the valley of the Brenta, but was defeated at Bassano on September 8th, and driven into Mantua, the siege of which was resumed by the French. Alvinczy, by the way of the Brenta, and Davidovich, by the way of the Adige, brought the second Austrian army into Italy, planning to concentrate 60,000 men at Verona. Bonaparte had to meet them with about 40,000, and at Caldiero, on November 12th, he met a severe check; but, driven to desperation, he put forth superhuman efforts, and after three days of fighting defeated the Austrians at the bridge of Arcole and forced them to retreat. Alvinczy, from the wreck of his army and with reënforcements, created the third Austrian army and advanced southward between Lake Garda and the Adige. Bonaparte hastened to meet him, seized the important strategic position at Rivoli, repulsed Alvinczy on January 14, 1797, and hurled him back into Tyrol. Turning back on Mantua, Bonaparte captured at La Favorita two days later an important detachment of Alvinczy's force which by a flank movement had almost succeeded in reaching Mantua. Wurmser surrendered Mantua on February 2d. In this famous campaign of 1796 Bonaparte relied on three important maxims to which he held fast throughout his career: divide for foraging, concentrate for fighting; unity of command is essential for success; and time is everything. Quickness to divine his enemy's plans; a thorough knowledge of geography which produced combinations that were executed with bewildering audacity; an ability to get a maximum amount of marching and fighting out of an army of young veterans who were poorly shod and clad and ill-fed; and the loyal support of his subordinates, Augereau, Masséna, Joubert, Lannes, Marmont, Victor, Murat, and Junot, combined to enable Bonaparte to conquer Northern Italy for France. The campaign of 1797 was an act of colossal audacity. With less than 50,000 men Bonaparte drove the Archduke Charles and the Austrians from Italy, forced the passes of the Alps in March, and pressed on directly for Vienna without waiting for Moreau (q.v.) to coöperate. At Leoben, within one hundred miles of Vienna, he signed preliminaries of peace with Austria on April 18th.

Bonaparte the conqueror began to take wider views of the part he was to play, and played it with a boldness and a skill that dazzled France into complaisancy. He organized the Italian conquests into the Cisalpine Republic and con-

NAPOLEON I.

FROM AN ENGRAVING OF A PORTRAIT BY DAVID

stituted the Genoese dominions into the Ligurian Republic; he sent Augereau as his secret agent to conduct the military operations of the coup d'état of the 18th Fructidor (see FRENCH REVOLUTION); he lived and acted like a monarch in Northern Italy; and finally, disregarding the express orders of the Directors, he negotiated with Austria the Treaty of Campo Formio (October 17, 1797). Austria gave up her former Belgian possessions and Lombardy, and received most of the territories of the extinguished Republic of Venice. Bonaparte now returned to France, but the Directors were afraid of him and sought to rid themselves of him by dispatching him on some out-of-the-way or hazardous enterprise. It was evident to him that a direct attack upon France's one remaining foe, England, could not succeed, and he suggested instead the campaign in Egypt. The Oriental dream was always before his eyes, and throughout life influenced his policy. He saw in India the source of England's power, and he determined to attack India. He negotiated with Tipu Sultan, a determined foe of the English, and, as the easiest route to India was by the Red Sea, he proposed to conquer Egypt as a steppingstone to India. An expedition was fitted out with the utmost secrecy at Toulon, and on May 19, 1798, he set sail with a large fleet carrying 35,000 men. He stopped on the way to capture Malta. On July 1st he landed in Egypt and occupied Alexandria on the next day. Advancing into the desert, he encountered and defeated the famous Mameluke cavalry in the battle of the Pyramids on July 21st, and three days later entered Cairo. Desaix was detached to conquer Upper Egypt, and Bonaparte devoted himself to consolidate his conquests. On August 1st-2d, however, Nelson destroyed his fleet in Abukir Bay, and Turkey declared war and planned to recover Egypt. Taking the offensive at the beginning of 1799, Bonaparte invaded Syria, captured Jaffa, and laid siege to Acre. Junot fought an engagement with the Turks near Nazareth, and Kléber found himself attacked by thirty thousand of them at the foot of Mount Tabor on April 15th, but was rescued by the opportune arrival of Bonaparte. Returning to Acre, Bonaparte found that he was unable to take the place by storm, and having lost five thousand men in fighting or from the plague, he ordered a retreat. Arriving in Egypt, he met another Turkish force, which had landed near Alexandria, and defeated it on July 25th. News from France told of the infidelity of Josephine, and of the evil plight of France under the decadent Directory, which was being attacked by the newly formed Second Coalition of the Powers of Europe against France. On the night of August 22d-23d, leaving Kléber in command, Bonaparte escaped from Alexandria, and evading the English ships, landed at Fréjus on October 9, 1799.

On reaching Paris he speedily took council with the members of his family and after a scene with Josephine forgave her, though he did not forget her offense. Councils with Talleyrand, Sieyès, and other important men of affairs followed, but most of all with his brother Lucien, who was now president of the Council of Five Hundred. Plans were speedily devised, and on November 9, 1799, the famous coup d'état of the 18th Brumaire took place. The Directory was overthrown, the Council of Five Hundred dispersed, and a provisional government composed of Bonaparte and two of the late Directors, Sieyès and Roger Ducos, installed. Sieyès (q.v.) expected to be the managing head of the new combination, but at the first meeting found that Bonaparte had everything in his own hands. In a few weeks the Provisional Government drew up and promulgated the Constitution of the Year VIII., which, in spite of its elaborate provisions for the Legislature and the other parts of the Government, really intrusted all power to Bonaparte, who became First Consul (December 24, 1799). Having arranged the more important details of the administration and restored internal peace by the pacification of the Vendée, he turned his attention to the military situation. The victory of Masséna at Zurich on September 25-26, 1799, had freed France from the danger of invasion by the Second Coalition, but Italy and Southern Germany were once more in the hands of the Austrians, and Masséna with a French army was shut up in Genoa. Bonaparte suddenly and with the utmost secrecy gathered a new army for the invasion of Italy. Instead of taking the expected course of advancing along the Riviera as in 1796 and raising the siege of Genoa, he took his army, whose existence was unknown to the Austrians, across the Great Saint Bernard Pass and occupied Milan on June 2, 1800. The surprised Austrian General Melas endeavored to gather his forces and save himself. A detachment under Lannes defeated an Austrian detachment at Montebello on June 9th, but on the 14th Bonaparte found himself forced to face the main Austrian army of 31,000 men at Marengo with only 18,000, and with difficulty saved himself from complete defeat. The opportune arrival of Desaix after the battle was really over led to a renewal of the fight, to the astonishment of the Austrians, who were driven from the field. The campaign of Marengo was a masterpiece, but the honors of the victory itself belong to Desaix, who bought it with his life, and to Lannes, Bessières, and the younger Kellermann. Melas evacuated all of Italy west of Mantua, but Austria was not ready to make peace until she had been defeated by Moreau at Hohenlinden (q.v.) on December 3d, and Macdonald had crossed the Splügen and threatened Vienna. Negotiations were then opened between Cobenzl and Joseph Bonaparte, and on February 9, 1801, the Treaty of Lunéville was signed. England was now the only remaining foe of France. England forced the French to evacuate Egypt and captured Malta; while Bonaparte forced Naples and Portugal to abandon the English alliance. The faint-hearted Addington Ministry in England signed preliminaries of peace with France on October 1, 1801, and on March 27, 1802, Cornwallis and Joseph Bonaparte signed the Treaty of Amiens, which gave France complete peace for the first time in ten years. The diplomatic genius of Bonaparte shines brightly in these treaties, which enabled him to make real gains for France such as all the wars of Louis XIV. had failed to obtain. He carefully hid many things in these treaties for future use, which enabled him to appear as the pacificator and reorganizer not only of France, but of Europe, and as the founder of a great colonial empire. Seeds for future war were as carefully sown, which were to bring forth fruit at the appropriate season.

Bonaparte had shown himself the greatest master of the art of war, and one of the shrewdest of diplomats, when at thirty years of age he undertook the duties of a ruler, law-giver, and administrator. His greatness lay in the universality of his genius and in his inordinate capacity for hard work. Further, he was able to command the services of many men of extraordinary ability, and to make their work his own. His reorganization of the Government of France was accomplished in a few months and comprised enough achievements of the first order to have established the enduring fame of several statesmen. This tremendous activity so stirred and inspired his officials that they said "the gigantic entered into our very habits of thought." With Gaudin he reorganized the treasury department, regulated the assessment and collection of the taxes, and organized the Bank of France. With Chaptal he reorganized the local administration with the prefects and subprefects responsible to the central authority, the Council of State. The schism between the Catholic Church and the constitutional clergy was healed and the Catholic Church restored to its old-time place in France, by the negotiation of the Concordat (q.v.) with Pius VII. in 1801. The Lutherans, the Calvinists, and ultimately even the Jews were brought into similarly close relations with the State. The educational system was reconstructed, especially in the matter of secondary schools and of technical education. The work was completed by the establishment in 1808 of the University of France, which comprised the whole teaching force of the Empire. The establishment of the Legion of Honor in May, 1802, provided a means of recognizing services to the State. The greatest triumph was the codification of the laws of France. (See CODE NAPOLÉON.) All these acts revealed Bonaparte as a master workman who deftly joined together in a perfect whole the many parts which numerous craftsmen had wrought out with difficulty in the days of the Revolution.

France had lost her colonial empire in the eighteenth century, and it was the fond hope of Bonaparte that he might restore it and thus rival England in commerce and upon the seas. To this end he began a series of enterprises which embraced every quarter of the globe—North and South America, Africa, India and the East, and Australia. He secured the cession of Louisiana from Spain, and sent an army to recover Haiti, where the blacks had successfully risen against their oppressors. In all these schemes he was checkmated by England, but on the Continent of Europe he was hindered by nothing more serious than protests in reaping the fruit of the wars of the French Revolution. He reconstituted upon the new French lines the Batavian Republic, the Cisalpine Republic (which became the Italian Republic), and the Ligurian Republic (1801-02). He extended the bounds of France, which already had the Rhine, the Pyrenees, and the Alps as her frontiers, by the unjustifiable annexation of Piedmont and Parma in 1802. He was actively concerned in the reorganization of Switzerland and of Germany in 1803. The Treaty of Aranjuez (March 21, 1801) bound Spain to France, while Portugal, the faithful ally of England, was humbled by the Treaty of Badajoz (September 29, 1801).

Bonaparte's colonial schemes were frustrated by yellow fever, which destroyed General Leclerc and his army in Haiti and forced the Consul to sacrifice Louisiana to the United States (1803) and abandon his dream of empire beyond the seas. Pique at this disappointment hastened Bonaparte into the predetermined rupture with England. A *casus belli* was found in the question of Malta, which England refused to surrender in accordance with the terms of the Treaty of Amiens. Mortier occupied Hanover, of which George III. was King. Gen. Gouvion Saint-Cyr was ordered to occupy the Kingdom of Naples, an ally of England, to offset the occupation of Malta. The French army was mobilized in six divisions and stationed along the Channel from Ostend to Brest. War existed from May 16, 1803, but actual hostilities did not begin until over two years later. In the meantime England recalled Pitt to office (May, 1804). Pitt's great service consisted in securing allies and in forming the Third Coalition against France. In this work he was aided by Bonaparte's blunders, the most notable of which was the execution of the Duc d'Enghien (March 21, 1804), in retaliation for the Royalist plots of Pichegru and Georges Cadoudal. On the day of Pitt's return to power, Bonaparte was offered the title of Emperor by the French Senate, and on December 2, 1804, he was crowned Emperor as Napoleon I. at Paris in the presence of Pope Pius VII. On May 26th, 1805, he was crowned at Milan King of Italy. A few days later followed the last of his series of aggressions, which provoked Austria and Russia into the alliance with England, the annexation to France of the Ligurian Republic (June 4). A month later Russia and England signed their alliance against Napoleon, and on August 9th they were secretly joined by Austria. Sweden, Portugal, and Naples were practically, though not formally, parties to this coalition.

For two years Napoleon had been dallying with a scheme for the invasion of England. In the camps along the Channel he had organized, equipped, and drilled his famous Grand Army, composed largely of veterans of the wars of the Revolution, and at Boulogne special preparations had long been under way for an attack upon England. The summer of 1805 seemed the propitious time for the attack, and Napoleon made elaborate dispositions for obtaining naval control of the Channel and for the transportation of an army of 160,000 men from Boulogne to the Kentish coast. The French fleet under Villeneuve, however, was outmanœuvred and outfought by the English under Cornwallis, Calder, and Nelson. By the middle of August, 1805, the scheme had become impossible of execution. Napoleon, however, had foreseen this possibility; his other acts had already provided him with another chance to employ his army, and he had worked out in his mind the plan of his most brilliantly successful campaign, that of Austerlitz. On August 29th the Army of England was officially denominated the Grand Army and divided into seven corps under Bernadotte, Marmont, Davout, Soult, Lannes, Ney, and Augereau, with the cavalry under Murat, and the Imperial Guard under Bessières, in all about 220,000 men under the personal command of the Emperor, with Berthier as chief of staff. War was declared against Austria on September 25th, and the next day the movement of the

Grand Army into Southern Germany began. On the part of Austria, the Archduke Charles, with over 90,000 men, the best general and the largest army, was intrusted with operations in Italy, where 50,000 French troops were under the command of Masséna, while the smaller Austrian army under the command of the Archduke Ferdinand and General Mack, invaded Bavaria and occupied the untenable line of the Danube and the Iller with headquarters at Ulm. This move left Austria almost bare of troops. Making a feint at repeating Moreau's tactics of 1796 in attempting to turn Mack's left, Napoleon ordered the actual attack to be made on the right. Bernadotte and Marmont occupied Munich, Davout and Soult seized Augsburg, while Ney and Lannes occupied Günzburg and operated to the north of Ulm. Mack made three fruitless attempts to extricate himself, but after defeats at Wertingen, Memmingen, and Elchingen (October 14th), he was forced to capitulate with 33,000 men on October 20th. Though the Archduke Ferdinand escaped, Napoleon's forces were thus able to advance directly to Vienna, which he occupied on November 13th. The Russian forces which had been advancing to support Mack were forced to fall back into Bohemia, where the various divisions were united under the command of Kutusoff and joined by part of the Austrian forces. Napoleon marched northward to meet them, and on December 2d won his greatest victory, Austerlitz. The campaign of Ulm and Austerlitz was won by Napoleon's knowledge of the value of time, the whirlwind rapidity of his movements, and the precision of his combinations. The battle of Austerlitz was won by a masterly use of artillery. The vanquished Emperor Francis I. of Austria humbled himself before Napoleon in the Treaty of Pressburg (December 26th) and consented to large cessions of territory, including the former Venetian dominions, Tyrol (which was given to Bavaria), etc. The overthrow of Austria resulted in the formal dissolution of the old Holy Roman Empire (August 6, 1806).

What Austerlitz was for Napoleon on land, Trafalgar was for England on the sea. After a brief rest at home, Nelson had been ordered out to attack Villeneuve, who with the combined French and Spanish fleets sailed out of Cadiz and met Nelson off Cape Trafalgar. England's greatest sea-fighter won the greatest naval battle of the century, but lost his life (October 21, 1805). After this the French were able to do nothing at sea, and the ports of both France and her allies were generally blockaded by the English fleets. England was undisputed mistress of the seas, while Napoleon began to remake the map of Europe as though he were the undisputed master of the Continent. The most important changes during the year 1806 were the formation under his protection of the Confederation of the Rhine, the establishment of his brother Joseph as King of Naples, and of his brother Louis as King of Holland, and the creation of the Grand Duchy of Berg for his brother-in-law Murat. The death of Pitt (January 23, 1806) led to negotiations between Napoleon and Fox, the new Foreign Secretary. These negotiations, as well as those with Russia, came to naught, and to Napoleon's surprise this failure was coupled with the decision on the part of Frederick William III. of Prussia to make war upon him. Single-handed Prussia undertook to meet Napoleon, who, as soon as he foresaw that war was inevitable, acted with the same vigor as in the previous year. The Prussian army under Prince Hohenlohe-Ingelfingen and Charles William Ferdinand, Duke of Brunswick, was drawn out in a line eighty-five miles in length, extending from Gera westward to the borders of Hesse-Cassel with the bulk at Erfurt. Napoleon left Paris on September 25th and assumed charge of the campaign at Würzburg on October 2d. On the 10th Prince Louis Ferdinand was defeated and slain in a skirmish at Saalfeld; on the 14th Napoleon surprised the Prussian army in its attempt to concentrate, and in person defeated Hohenlohe at Jena, while Davout defeated Brunswick at Auerstädt. Murat and Lannes pursued Hohenlohe and forced him to surrender at Prenzlau (October 28th), while the other remnants of the Prussian army and the fortresses surrendered without a blow. Saxony, which had acted as the ally of Prussia, went over to Napoleon, and later received as reward the Duchy of Warsaw. From the Prussian capital Napoleon issued the Berlin Decree, which, with the Milan Decree of 1807 and other decrees, was directed against English commerce. See CONTINENTAL SYSTEM.

Prussia, though vanquished, continued weakly the struggle in her eastern provinces, where Bennigsen and the Russians were ready to join in the contest. Murat occupied Warsaw, then Prussian territory, in November, 1806. In December Napoleon entered the ancient Polish capital and was greeted as the restorer of Polish liberties. The French having gone into winter quarters, Bennigsen hoped to surprise them and destroy them before they could again take the field, and accordingly attacked Ney and Bernadotte, but their successful resistance defeated the plan and Napoleon in person pursued Bennigsen, who retreated toward Königsberg and overtook him at Eylau (q.v.). The ensuing battle (February 7-8, 1807) was a butchery, not a victory. Napoleon hurried up reënforcements to renew the struggle in the spring. Sebastiani, the French Ambassador at Constantinople, persuaded the Sultan to declare war against Russia. Gardane was sent to stir up Persia to like action. Mortier induced the Swedes to treat with France. The campaign for Königsberg began early in June and was marked by the indecisive action of Heilsberg (June 10) and the defeat, four days later, of the Russians under Bennigsen at Friedland (q.v.). On June 25th the Czar and Napoleon held their famous conference of Tilsit (q.v.) on a raft moored in the Niemen. By the Treaty of Tilsit, Prussia was humbled even more than Austria had been at Pressburg, while the Czar became the ally of Napoleon and began to plan with him the division of the world between them.

Though England, under the Ministry of All the Talents, had behaved very badly toward Prussia and Russia, she remained the one steadfast foe of the French Emperor, and pursued without wavering her policy of opposition to Napoleon. At Tilsit Napoleon bound the Czar to enforce the Continental System against England, and then began the task of compelling all the lesser Powers to adhere to the system. There were to be no neutrals. Portugal, the constant ally of England, was the first victim. By the Treaty of Fontainebleau Napoleon joined with Spain to dismember that kingdom, and in November, 1807, a French army under Junot occupied the country with little trouble, the royal family having already started for the New World to establish a temporary capital at Rio de Janeiro. The year 1808 witnessed the unfolding of Napoleon's designs against Spain. Gradually, in spite of all treaties, French troops were sent across the Pyrenees, where they quietly took possession of various fortresses. Spain was suffering from the family troubles of the Bourbon monarch, and it suited Napoleon's purpose to make use of them and to order the advance of a French army under Murat toward Madrid. This movement precipitated the fall of the Bourbons. Charles IV. was compelled by a popular uprising to abdicate in favor of his son, Ferdinand VII. (March), and a little later father and son, at a meeting with Napoleon at Bayonne, were forced to renounce the Spanish throne. On June 6, 1808, Joseph Bonaparte was proclaimed King of Spain. For an account of the struggle in Spain and Portugal, see PENINSULAR WAR.

In Austria Francis I. had called to office as his chief minister Count Philip Stadion, who, with the aid of Archduke Charles, devoted himself to the task of preparing Austria for another struggle with Napoleon. The misfortunes of Napoleon in Spain and the urgency of England, which offered liberal subsidies and active coöperation, determined the Austrians to try their fortunes once more in the spring of 1809. In April Archduke Charles opened the war by invading Bavaria, while another force under Archduke John invaded Italy. Napoleon reached the scene promptly and in the five days' fighting (April 19th-23d) around Ratisbon completely defeated the Austrian plan of campaign and forced Archduke Charles to retreat toward Vienna, which the victorious Emperor entered on May 13th. He then crossed the Danube and attacked the Archduke, who had taken up strong positions in the villages of Aspern and Essling. Two days of hard fighting (May 21st-22d) failed to give Napoleon any decided advantage, and he found himself and his army practically prisoners on the island of Lobau in the Danube. With his accustomed vigor he ordered up reënforcements and reorganized the troops under him. On July 5th Napoleon left the island of Lobau and on the 6th defeated the Archduke Charles in a great battle at Wagram. On October 14th was signed the Treaty of Schönbrunn (q.v.), by which Austria was forced to make large cessions of territory to the overbearing conqueror. From 1809 to 1812 the main strength of the French Empire was devoted to continuing the struggle in the Peninsula. A number of isolated events in other parts of Europe, however, made the period important. In pursuance of the Treaty of Tilsit, the Czar robbed Sweden of Finland (1808), and in the same year the French seized Swedish Pomerania. The next year the Swedish Kingdom was the scene of a revolution. Gustavus IV. was deposed and his uncle placed on the throne as Charles XIII. Marshal Bernadotte, the brother-in-law of Joseph Bonaparte, was elected heir to the childless monarchy and intrusted with the government of the kingdom. (See CHARLES XIV.) Denmark had likewise been marked to suffer on behalf of Napoleon's Continental System; but in this instance he was forestalled by England, which seized the Danish fleet in September, 1807. After the Treaty of Tilsit a kingdom of Westphalia was carved out for Jerome Bonaparte in Germany, and numerous changes made in the Confederation of the Rhine. Napoleon enlarged his own empire by the annexation of Tuscany (1807), the Papal States (1809), Holland (1810), Valais, and the German coastline to Lübeck (1810). He also kept the Illyrian provinces, which had been wrested from Austria, for himself. Naples was transferred to Murat after the choice of Joseph as King of Spain. Pope Pius VII., the same pontiff who had consecrated Napoleon as Emperor in 1804, was carried away as a prisoner and kept in confinement. The new Cæsar must have an heir to his empire, and accordingly Josephine, to whom the Emperor was greatly attached, was divorced and a marriage arranged in 1810 with the Archduchess Maria Louisa of Austria, daughter of the Emperor Francis, who bore Napoleon one son, the King of Rome (1811). From Napoleon's policy England profited as much as did France, for the whole commerce of the seas was under her control and she had seized the colonies of France and all those of the countries under French control or influence that she saw fit. During the years from 1809 to 1815 England furnished the inspiration and the sinews of war for every campaign against Napoleon, but it was only in the Peninsula that she was directly responsible for the conduct of the campaign, which was carried on with desperation on both sides till the French were driven beyond the Pyrenees in 1814.

For three years after Wagram Napoleon did not in person conduct a single military operation. Family affairs and the administration of his great empire occupied all his attention. During these years many changes were taking place which presaged the downfall of the great conqueror. Austria was very cautiously strengthening her position under the skillful direction of Metternich. The regeneration of Prussia under Stein, Scharnhorst, and Hardenberg is one of the most notable events of the nineteenth century. Russia was never content with the French alliance, and the enforcement of the Continental System was causing great suffering and discontent, and the Czar Alexander was beginning to lose his enthusiastic admiration for Napoleon, who had offended him by concluding a matrimonial alliance with Austria without waiting for an answer to his request for the hand of a grand duchess in marriage, and, most of all, by the annexation of Oldenburg to France. The estrangement was increased by the Cæsarism of Napoleon, who could no longer endure the existence of even a friendly rival. Alexander, duly warned of Napoleon's intentions, turned to England and in 1812 entered into a close alliance with her. With Turkey he negotiated the Peace of Bucharest (May 28th), and with Sweden not only peace, but alliance (April 5th). Napoleon left Paris early in May, and went direct to Dresden, where he took care to bind Prussia, Austria, and the other German States more closely to his cause. Then he entered Poland, where he regulated the internal affairs and supervised the mobilization of his army. On June 22d he issued a declaration of war against Russia. The passage of the Niemen was begun on June 24th, and by the end of the month Napoleon had 400,000 men across the Russian frontier. The Czar had between 250,000 and 300,000 men under arms, but only about one-half of this number ready to face Napoleon under Barclay de Tolly and Bagration, who conducted a Fasian campaign. Napoleon found the country devastated and abandoned as he advanced, with no enemy to make a stand against him. Like Charles XII., a century earlier, he was being lured to his ruin. At Smolensk (August 17th-18th) the French encountered the first serious resistance. Napoleon as he advanced had to leave large bodies of troops along his line of march, and he detached a large force to the northward to capture Mitau and Riga and threaten Saint Petersburg. Russian discontent became pronounced as the people saw Barclay de Tolly and Bagration permitting Napoleon to advance unresisted on their ancient capital, Moscow. The two generals allowed themselves to be superseded by Kutusoff, who chose his ground, and on September 7th offered battle to the French at Borodino (q.v.). It was the bloodiest battle of the century, the losses probably aggregating 40,000 on each side. The loss to Napoleon, who could obtain no reënforcements, was fatal, but still he pressed on and entered Moscow (September 14th) only to find himself robbed of the fruit of victory by the terrible conflagration which broke out two days later. With a folly that seemed madness, Napoleon lingered in the city until October 19th before beginning the retreat. The hard-fought drawn battle of Malo-Yaroslavitz (October 24th) compelled Napoleon to retreat by the same desert road on which he had advanced, instead of by a more southerly route through country not yet devastated by war. Sufferings from the cold and from lack of food were intensified by the constant presence of the Russians on the flanks and in the rear. The expected supplies were not found at Smolensk, and the sufferings of the French reached their terrible climax at the crossing of the Beresina (November 26th-28th), where thousands perished in spite of the heroic efforts of Oudinot and Ney. A week later Napoleon turned over the command to Murat and hastened to reach Paris and organize a new army before the news of the great disaster should become known in Western Europe. Ney, the bravest of the brave, in command of the rear-guard, protected the retreat, but only 20,000 out of the 400,000 who had crossed the Niemen in June recrossed it in December. The disaster, however, was greater than the mere loss of an army of 400,000 men. Napoleon had lost his prestige, and henceforth Castlereagh, the English Foreign Minister, and the Czar Alexander supplanted Napoleon as controllers of the destinies of Europe. The Czar advanced into Eastern Prussia, where he installed as Governor the ex-Minister Stein, who placed himself at the head of a great Prussian patriotic rising against Napoleon. Driven by this outburst of national spirit, Frederick William III. signed an alliance with the Czar at Kalisz (February 27, 1813). Austria, under Metternich, hesitated between Napoleon and Alexander and offered to mediate. Napoleon sent into Germany a new army made up of conscripts and of troops withdrawn from Spain, and on April 29th, at Weimar, assumed the direction of the campaign of 1813, which he had decided to fight on the line of the Elbe, where Eugène de Beauharnais and Davout were struggling to check the Russians and repress the Prussians. Successes at Lützen and Gross-Görschen (May 2d) on the great plain around Leipzig enabled Napoleon to occupy Dresden as his base of operations, and advance to Bautzen, where he defeated the Allies on May 20th-21st.

Napoleon should have followed up this movement with vigor, but he hesitated because of the untrained condition of his army and of the attitude of Austria. Bernadotte, after the Treaty of Stockholm with England (March 3d), had landed at Stralsund, prepared to take an active part in the overthrow of Napoleon, whom he had learned to hate bitterly. Moreau, the only surviving French rival of Napoleon, was summoned from America to act as chief adviser of the Allies. England signed new treaties with Prussia and Russia (June 14th-15th), and the Czar and Metternich signed at Reichenbach (June 27th) a secret treaty, by which Austria bound herself to join the Allies if Napoleon did not accept her proposals before the expiration of the truce, on August 10th. This was equivalent to a treaty of alliance, for it was certain that the Congress of Prague would accomplish nothing. On August 10th the Austrian army under Schwarzenberg began operations in Bohemia in concert with the allied army under Blücher in Silesia. The victory of Wellington at Vittoria (June 21, 1813) encouraged the Allies and made a great victory an absolute necessity to Napoleon, who promptly took the offensive and attempted to force a battle with Blücher near Görlitz and crush him and then turn against Schwarzenberg. Blücher evaded battle and Schwarzenberg advanced to attack Dresden. Napoleon reached Dresden just in time, and on August 26th-27th won his last great victory. (See DRESDEN, BATTLE OF.) For the moment Dresden was saved, but the success was more than offset by the defeats inflicted upon his subordinates, Oudinot at Grossbeeren (August 23d), Macdonald on the Katzbach (August 26th), Vandamme at Kulm (August 29th-30th), and Ney at Dennewitz (September 6th). The losses of Napoleon during the ten-days' campaign were almost overwhelming and irretrievable, while reënforcements speedily made good the losses of the Allies. Napoleon failed to appreciate that the line of the Elbe had become untenable from the moment that Austria joined the Allies, and instead of falling back of the Rhine and offering to negotiate, he continued to struggle to hold Dresden. Constant rains and bad roads had been an important factor in the August campaigns and prevented Napoleon, in spite of his boundless energy and activity, from accomplishing anything in September. This failure was fatal, for in October the Allies, who had defined their relations in the Treaty of Toplitz (September 19th), took the offensive and developed their campaign with such skill that Napoleon was completely deceived until they had nearly completed their dispositions. Blücher, unperceived, crept around Napoleon's left, got in touch with Bernadotte, and advanced toward Leipzig from the north, while Schwarzenberg was advancing from the south toward the same place. Napoleon left Gouvion Saint-Cyr to hold Dresden and hurriedly concentrated all available forces to protect Leipzig and hold his lines of communication. For three days (October 16th, 18th, and 19th), 'the Battle of the Nations' raged around Leipzig, and on the last day the French were driven out of Leipzig in a disastrous rout. (See LEIPZIG, BATTLES OF.) Napoleon retreated hastily behind the Rhine, stopping only to destroy, at Hanau (October 30th), the army of Bavaria, which had recently joined the Allies. Napoleon made a serious mistake in leaving able lieutenants with large garrisons to hold the great German fortresses, thus depriving himself of the assistance of Rapp, who held Danzig with 8000 men; Davout, who was shut up in Hamburg with 12,000 men, and many others. These places were besieged and captured by the Allies during the ensuing months, but the bulk of the allied army pressed on toward Paris. Blücher with the Prussians and part of the Russians crossed the Rhine at Caub (December 31st) and began the invasion of France; Schwarzenberg, with the Austrians and the rest of the Russians, entered France by the way of Basel. To meet this double invasion, Napoleon could only muster a small army. This he interposed between Blücher and Schwarzenberg, whom he defeated in turn. Blücher's army was dispersed in the battles of Brienne, Champaubert, Montmirail, and Vauchamps, between January 29th and February 14, 1814, while divisions of Schwarzenberg's army were severely worsted at Nangis (February 17th) and Montereau (February 18th).

This first defensive campaign of 1814 is one of the most brilliant defensive fights in military history. The military genius of Napoleon never shone more brightly, though the dulling of his political sense made his failure inevitable. With a little army of worn out and defeated men, reënforced by a few hastily collected and untrained conscripts, he thrust himself between two vastly superior forces against which he hurled himself alternately with such swiftness, skill, and violence as to shatter the hostile armies and frustrate the plans of the opposing generals. Finally, worn out, he had to succumb to the overwhelming numbers of the foe and to the inseparable obstacles of time and space.

Napoleon, who had refused to accept the proposals of Frankfort submitted by the Allies on November 9, 1813, now sent Caulaincourt to meet their representatives in the Congress of Châtillon (February 3-March 19, 1814), but with instructions to 'sign nothing.' The Allies once more defined their relations to one another in the Treaty of Chaumont (March 1st), brought up new troops, and prepared to crush Napoleon. Napoleon's second defensive campaign of 1814 was a brilliant failure—a stubborn struggle against the inevitable. The first blows were struck at Blücher on March 7th and 9th at Craonne and Laon, but failed to interrupt Blücher's campaign seriously. An attack upon a part of Schwarzenberg's army at Arcis-sur-Aube met with no better success, and so Napoleon turned to the eastward to threaten Schwarzenberg's line of communication. But the great disparity of forces enabled the Allies to neglect this movement and to concentrate on Paris. Schwarzenberg and Blücher arrived before Paris on March 30th, and after hard fighting with Marmont, Mortier, and Moncey, occupied the French capital. The Emperor arrived just a few hours too late to strike a blow in defense of his capital, and could only make an obstinate attempt to renew the struggle south of Paris, but Ney and the other marshals finally forced him to listen to reason (April 4th) and to bring the campaign to a close. In the southwest, Soult had been driven from position to position and was about to lose his last battle at Toulouse. Suchet had withdrawn from Spain too late to help Soult; Augereau at Lyons had failed to disturb Schwarzenberg's left flank. In Italy Murat had deserted to the enemy, negotiated with Austria, and turned the Neapolitan army against Eugène Beauharnais, the Viceroy of Italy, who faithfully and ably faced the triple danger of Murat's treachery, the invasion of the Austrians, and the occupation of Genoa by an English force under Lord William Bentinck. On April 11th Napoleon, the Emperor of the French, formally abdicated at Fontainebleau in favor of his infant son, the King of Rome.

In the stipulations with the Allies, Napoleon was allowed to retain the title and state of Emperor, but was to be detained as a prisoner on the island of Elba. The relations between the newly restored Bourbons and the Allies were settled by the First Treaty of Paris on May 30th. The changes which had taken place in Europe since the outbreak of war in 1792 had been such that the old order could not be restored, and accordingly a Congress of the Powers was summoned to meet at Vienna to make the necessary new arrangements. These were completed on June 9, 1815. But in the meantime Napoleon had left Elba, landed in France on March 1st, made his way to Paris, reëstablished his power, gathered a new army and advanced to attack the Allies, whose representatives at Vienna planned at once to place new armies in the field and overthrow him a second time. (See HUNDRED DAYS.) The campaign, which lasted only a week, included Napoleon's defeat of Blücher at Ligny (q.v.) on June 16th, Ney's fight with Wellington at Quatre-Bras on the same day, and the final overthrow of Napoleon on the field of Waterloo (q.v.) by Wellington and Blücher on June 18, 1815. After this last battle Napoleon fled to Paris, where he abdicated a second time on June 22d. For a few days he hesitated between dreams of again playing a part in France and plans for an escape to America. The first was preposterous, the second impossible, and on July 15th he surrendered himself to Captain Maitland on board the English ship *Bellerophon*. The Allies under Blücher had entered Paris a second time on July 7th and made the final adjustments for the settlement of Europe in the Second Treaty of Paris on November 20th. Napoleon was taken to England, and after some deliberation his request to be permitted to settle in England was refused. He was transferred to the ship *Northumberland* and on October 16th landed on the island of Saint Helena. In his captivity he was accompanied by his faithful friend Bertrand, and by Gourgaud, Montholon, Las Cases, and a number of other individuals of minor importance. In 1816 Sir Hudson Lowe, a British soldier, arrived as Governor of the island. Napoleon's chief occupations as a captive were his quarrels with Lowe, and his monologues with Gourgaud and Montholon, which they wrote out and submitted for correction to the Emperor. These documents form a partial autobiography, valuable not for its facts, but for the light which it sheds upon Napoleon's character. Napoleon gave himself up to long periods of gloom and humored himself in the most inexcusable obstinacies when a more rational behavior would have improved his health and rendered his surroundings more agreeable socially. Cancer of the stomach, which had carried off his father, and which was to cause the death of two of his sisters, was slowly undermining his health, and on May 5, 1821, he breathed his last at the set of sun. He was buried with military honors upon the island, but in accord with his own request, his remains were in 1840 taken from the island, attended by the faithful Bertrand, and under the direction of Louis Philippe placed in a magnificent sarcophagus beneath the Dome of the Hôtel des Invalides in Paris.

John Holland Rose has perhaps given the most correct summary of the qualities which made Napoleon great: "He was superlatively great in all that pertains to government, the quickening of human energies, and the art of war. His greatness lies, not only in the abiding importance of his best undertakings, but still more in the Titanic force that he threw into the inception and accomplishment of all of them—a force which invests the storm-blasted monoliths strewn along the latter portion of his career with a majesty unapproachable by a tamer race of toilers. After all, the verdict of mankind awards the highest distinction, not to prudent mediocrity that shuns the chance of failure and leaves no lasting mark behind, but to the eager soul that grandly dares, mightily achieves, and holds the hearts of millions even amidst his ruin and theirs. Such a wonder-worker was Napoleon. The man who bridled the Revolution and remolded the life of France, who laid broad and deep the foundations of a new life in Italy, Switzerland, and Germany, who rolled the West in on the East in the greatest movement known since the Crusades, and finally drew the yearning thoughts of myriads to that solitary rock in the South Atlantic, must ever stand in the very forefront of the immortals of human story."

BIBLIOGRAPHY. An excellent *Life* in English is Rose, *Life of Napoleon I.* (New York, 1901). Of the numerous other works on the life and times of Napoleon, the more important are: Bignon, *Histoire de France sous Napoléon* (14 vols., Paris, 1829-50); Thibaudeau, *Le Consulat et l'Empire* (10 vols., ib., 1834-35); Thiers, **Histoire de la Révolution française* (10 vols., ib., 1823-27); **Histoire du Consulat et de l'Empire* (21 vols., ib., 1845-61); Lanfrey, **Histoire de Napoléon* (5 vols., ib., 1869-75), which ends at 1811; Fournier, †*Napoleon I., eine Biographie* (Leipzig, 1886-89). For the early life of Bonaparte: Iung, *Bonaparte et son temps* (Paris, 1880-81), and Chuquet, *La jeunesse de Napoléon* (ib., 1897-99), are the most important. For the personal life of Napoleon, Lévy, *Napoléon intime* (Paris, 1892); Masson, **Napoléon et les femmes* (ib., 1893); *Napoléon et sa famille* (6 vols., ib., 1897-1903); *Napoléon chez lui* (ib., 1893); and *Napoléon inconnu* (ib., 1895), are the most valuable. On the military genius of Napoleon the most accessible are: Ropes, *The First Napoleon* (Boston, 1885) and *Campaign of Waterloo* (New York, 1893); Sargent, *Napoleon Bonaparte's First Campaign* (Chicago, 1894) and *Campaign of Marengo* (ib., 1897); Houssaye, *1814* (Paris, 1888) and *1815* (ib., 1894-99); and York von Wartenburg, †*Napoleon als Feldherr* (Berlin, 1885-86). For naval affairs: Mahan, *Influence of Sea Power Upon the French Revolution and Empire* (London, 1893). For ecclesiastical affairs: Haussonville, *L'Eglise romaine et le premier Empire, 1800-14* (Paris, 1868-70), may be cited. For the relations with the Germanic States the most notable works are Oncken, *Das Zeitalter der Revolution, des Kaiserreichs und der Befreiungskriege* (Berlin, 1884-86); Bailleu, *Preussen und Frankreich, 1795-1807* (Leipzig, 1887); Beer, †*Zehn Jahre österreichischer Politik, 1801-10* (ib., 1887); Wertheimer, *Geschichte Oesterreichs und Ungarns im ersten Jahrzehnt des neunzehnten Jahrhunderts* (ib., 1884-90). For relations with Russia, Bogdanovitch, *Histoire du règne d'Alexandre Ier* (Paris, 1869-71); Tatisheff, *Napoléon et le Tsar Alexandre* (ib., 1891). For relations with Spain, Gomez de Arteche, *Guerra della Independencia* (1868 et seq.). For relations with Italy, Tivaroni, *Storia critica del risorgimento italiano*, vols. i.-iii. (Turin, 1889-91). For relations with England and the United States, Adams, *History of the United States, 1801-17* (9 vols., New York, 1889-91). For original documents consult the files of the *Moniteur;* the volumes of the *Archives parlementaires; Napoléon I., Correspondance* (32 vols., Paris, 1858-70); and the new volumes of Napoleon's correspondence published recently by Lecestre and by Brotonne. Of great value are many of the writings by and on the contemporaries of Napoleon, such as his marshals, notably Davout, Marmont, and Soult; his ministers, notably Talleyrand, Savary, and Chaptal; his generals and subordinates, espepecially Dumas, Foy, *Jomini, *Marbot, Ségur, *Thiébault, and Vandamme; his brothers Joseph, Lucien, Louis, and Jerome, and his stepson Eugène de Beauharnais; personal attendants like Bourrienne, *Meneval, Las Cases, and Montholon; minor officials and others, notably *Miot de Melito, *Pasquier, Roederer, Ouvrard, Lavalette, Vitrolles, and Mme. de Rémusat. Of great value are also similar works by or on the Prussians, Hardenberg, Stein, Scharnhorst, Gneisenau, and Clausewitz; the Austrians, Metternich, Gentz, and the Archduke Charles; the English, Castlereagh, Canning, Nelson, Wellington, and Napier; and the Russian, Barclay de Tolly.

NAPOLEON II. Son of Napoleon I. See REICHSTADT, DUKE OF.

NAPOLEON III., CHARLES LOUIS NAPOLEON BONAPARTE (1808-73). Emperor of the French. He was the third son of Louis Bonaparte, King of Holland, and of Hortense Beauharnais. (See BONAPARTE.) The law of succession enacted under the First Empire gave the crown, in default of direct descendants of the Emperor, to the sons of either Joseph or Louis Bonaparte. Joseph being childless, the sons of Louis became heirs apparent of the Napoleonic pretensions. Louis Napoleon was born April 20, 1808, in Paris. He spent his boyhood with his mother at her Château of Arenenberg in Switzerland, and at Augsburg, where he studied in the gymnasium. After the death of the elder of his brothers he returned to France with his mother, but they were expelled by Louis Philippe, went to England, and thence returned to Switzerland. The death of the Duke of Reichstadt (July 22, 1832), only son of the first Napoleon, left Louis Napoleon the representative of his family, and thereafter the restoration of the Napoleonic Empire became his fixed idea. During the next four years his published works kept him before the French people. Among them were: *Rêveries politiques; Projet de constitution; Deux mots*

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*These are also in English translations.
†These are also in French translations.

à M. de Chateaubriand sur la duchesse de Berri (in verse); and *Considérations politiques et militaires sur la Suisse.* In 1836, believing in the weakness of the July monarchy, he undertook at Strassburg a *coup* which was so absurd a failure that it covered him with ridicule. He was sent to America, but returned to Europe on account of his mother's illness. She died October 3, 1837, and soon afterwards the French Government asked for his expulsion by Switzerland. He went to London, where, in 1838, he published the *Idées Napoléoniennes,* which had considerable circulation in France. In 1840 he made at Boulogne his second attempt to bring about a military uprising in his favor, but this was as complete a failure as its predecessor. He was imprisoned in the fortress of Ham, where he wrote several works, some political articles, and had a share in editing the *Dictionnaire de la conversation.* He escaped from Ham, May 25, 1846, and made his way to the Belgian frontier and thence to England. He hastened back to France when the Revolution of 1848 broke out, but, although he professed devotion to the Provisional Government, he was distrusted and asked to leave the country. Notwithstanding his promise to do this, he obtained an election to the National Assembly for Paris and three other departments. He took his seat on June 13, 1848, but resigned on the 15th, after a stormy debate, and left France. He was, however, elected from five departments in September, and returning became a candidate for the Presidency. He received 5,500,000 votes in the election of December 10, 1848, his closest opponent, General Cavaignac (q.v.), having 1,500,000. He entered upon his office on December 20th. His Presidency was a continuous contest with the majority in the Assembly, who continued to doubt the sincerity of the President's devotion to the Republic. This disturbed condition was ended by the coup d'état of December 2, 1851, a thoroughly Napoleonic stroke, carried out with blunt disregard for law or political honesty, by the President himself, assisted by Morny, Maupas, and Saint-Arnaud. The cost of success was the establishment of a repressive tyranny maintained by military force. France submitted to the new ruler, who promised to restore the glories of the past. On December 20th-21st the President was reëlected for ten years by more than seven million votes, practically without opposition. He had revived the plebiscite, used with such effect by his uncle—a plebiscite so managed that the issue was a foregone conclusion. In the same way, when he had himself proclaimed Emperor, as Napoleon III., just a year after the coup d'état (December 2, 1852), it was made to appear that this also was in accordance with the popular will. The new Emperor had studied his uncle's methods and attempted to imitate him as far as circumstances and his own ability would permit, but he only won for himself the name of Napoleon the Little. He possessed ability, but it was that of the politician rather than of the statesman. He lacked the dash and rapidity of decision which were the chief elements in accomplishing the vast schemes of the first Napoleon. Napoleon III. hesitated in deciding upon a policy and in carrying it out when once determined. Conspiracies against him developed as early as 1853 and three attempts were made to assassinate him, by Pianori and Bellamare in 1855, and by Orsini (q.v.) in 1858.

Napoleon III. was looked upon coldly by the 'legitimate' sovereigns of Europe, but the aim of his foreign policy was to make France again dominant in European affairs and himself the general arbiter of the Continent. To check the similar pretensions of Nicholas I. of Russia in Eastern Europe, he joined England in protecting Turkey against Russian aggression, and France took the leading part in the Crimean War (q.v.). The pacification which followed and the adjustment of the Eastern Question (q.v.) were arranged by a congress at Paris. (See PARIS, TREATIES OF.) The three Eastern Powers, Russia, Prussia, and Austria, which were the strongholds of legitimacy and autocracy, as against the democracy of France and England, were Napoleon's natural opponents. In the Crimean War he administered a lesson to one of them. By befriending Italy, which under the leadership of Sardinia was struggling to free itself from Austrian oppression, he found an opportunity to strike at Austria and to uphold in the most marked manner his favorite political hobby, the principle of nationalities. He encouraged Cavour (q.v.) in the advocacy of Italy's cause at the Congress of Paris, and, though the attempt of Orsini upon the Emperor's life almost destroyed the cordial relations that had been cultivated between the Courts of Paris and Turin, under Cavour's shrewd management the Emperor finally became more friendly than ever. The two held a private conference at Plombières, July 20, 1858, at which Napoleon agreed to support Sardinia in case of an attack by Austria. Cavour at once forced Austria into aggressive action, and Napoleon, now half repentant of his engagement, took the field. The Italian campaign of 1859, in which Napoleon showed himself utterly incapable of military leadership, was marked by two great battles, Magenta and Solferino, won by the Allies. Napoleon then selfishly closed the struggle by the preliminaries of Villafranca. (See CAVOUR and ITALY.) He exacted from Victor Emmanuel the cession of Nice and Savoy, although he had failed to deliver Venetia and the duchies. His later relations with Italy were disturbed by the fact that he felt called upon to uphold the Pope in his temporal possessions, and thus clashed with the national ambition of the Italians for complete unity with Rome as the capital. The protection of French troops was only withdrawn from the Papal States when war with Prussia had begun. During the Civil War in the United States (1861-65) Napoleon took an active part with the English Government in the diplomatic intrigues against the United States. He took advantage of the disturbed condition of Mexican affairs and of the preoccupation of the United States to revive his uncle's dream of a Latin-American empire under French protection, by establishing the Archduke Maximilian on the new imperial throne of Mexico by means of French bayonets. Secretary Seward warned the French Emperor that the Government of the United States could only consider this as an infringement of the Monroe Doctrine and an unfriendly act, but no attention was paid to this protest until the termination of the Civil War made it possible to send General Sheridan with an army of seasoned troops to the Mexican frontier, when the French troops were removed and the unstable Mexican Empire collapsed (1867). This struck a great blow at the prestige of the Emperor. In 1863-64, when the Schleswig-Holstein (q.v.) question engaged the attention of the Powers, Napoleon refused to aid Denmark in her fight for the duchies and advocated the recognition of the principle of nationalities through the union of the German portion of the duchies to Germany. On the eve of the war of 1866 Napoleon entered into negotiations with both Prussia and Austria, with respect to an alliance, but he was foiled by Bismarck's diplomacy, and the swift issue of the Seven Weeks' War (q.v.) revealed to Napoleon a new military power under masterful guidance, threatening his schemes for European control. Austria ceded Venetia to Napoleon with the understanding that it was to be made over to Italy. This was his last appearance in the rôle of an arbiter in the affairs of Europe.

The internal history of the Empire divides itself into two periods, that of the autocratic and that of the liberal Empire. Napoleon, the man of progressive and liberal ideas, believed that a permanent political edifice could be erected only by the exercise of absolute power. At the outset he brought under his own control the finances and public enterprises; public liberty was restricted, and a thorough system of police espionage was organized. Napoleon married, January 30, 1853, Eugénie de Montijo, a young Spanish countess, and gratified his own ambitions and her tastes with a brilliant, extravagant, and frivolous court. The Empress Eugénie's influence was always exerted in the interest of the Ultramontane Party. In these days of his absolute power Napoleon pushed public improvements with great energy. Philanthropic institutions were multiplied in France; industrial development was encouraged; and an era of great material prosperity followed, degenerating into one of speculation and luxurious living in which were the seeds of decadence. Railroads and highways were constructed and lines of steamships were established and subsidized. Canals were built and harbors improved. Manufactures, agriculture, and forestry were all fostered by the State. Stock companies were created, and the *crédit foncier* and the *crédit mobilier* stimulated these enterprises with financial support. Paris, under the Prefect Haussmann, was transformed. As early as the exposition of 1855 Paris was able to show a new city to its visitors, and at the brilliant exposition of 1867 this development was still more marked. Politically, there were three parties in opposition—Legitimists, Orleanists, and Republicans. Of these the Legitimists were almost lost sight of, with the exception of a few irreconcilable leaders. The Orleanists were stronger in numbers and in the quality of their adherents, and gave the Emperor more anxiety. The great literary leaders were found in their camp, and the French Academy was their stronghold. The really active opposition, however, lay with the Republicans. None of these parties had any legal means of expression or action. In 1858, after the Orsini attempt, the General Security Act was forced through the Corps Législatif, giving the Government power to exile or transport without trial any person convicted of a political offense. Wholesale arrests were made under this act for the purpose of intimidating the Republicans. Having alienated the Ultramontanes, upon whose support he had hitherto depended, by the Italian War, Napoleon relaxed some of his repressive measures to gain the support of the Liberals. In 1859 an amnesty decree allowed the return of the exiles of 1851. This was followed by a grant of more freedom of action to the Corps Législatif. The commercial treaty of 1860 with England abolished the prohibitions and lowered many of the high protective duties which had formed a part of the Emperor's commercial system. The restrictions upon the freedom of the press were partially removed. A Liberal opposition now began to organize through a coalition of the opposition parties, and after 1863 there was real parliamentary activity in France. A section known as Liberal Imperialists supported the Emperor, but opposed his reactionary ministers. The Ministry, headed by Rouher, and with Drouyn de Lhuys in charge of foreign affairs, favored a vigorous attitude of opposition to Prussia. The Emperor was broken in health, and after the Prussian triumph over Austria had demoralized his plans and left him discredited with his own ministers, he turned for support to the constitutionalists in the Corps Législatif. The liberties of that body and of the press were much extended, and the right to hold public political meetings was conceded. In 1869 a responsible Ministry was granted.

In 1870 the following proposition was submitted to a plebiscite: "The French nation approves the liberal reforms made in the Constitution since 1860, and ratifies the Senatorial decree of April 20, 1870." This was opposed by the Republicans, but was carried by a vote of 7,000,000 to 1,500,000. This popular support of the Imperial régime was apparent rather than real. Notwithstanding temporary coalitions, the different parties were still irreconcilable. The autocratic and war party, which had voted in the affirmative on the plebiscite, came again into power in the Corps Législatif, with the Duke of Grammont in charge of foreign affairs. Partly compelled by the diplomacy of Bismarck, and partly actuated by their own aims, the Ministry brought on the war with Prussia, much against the will of the Emperor. (See FRANCO-GERMAN WAR.) The Emperor went to the front, leaving the Empress as Regent, and she constituted a Ministry of the war party under General Palikao. Napoleon was captured at Sedan (September 2, 1870), and on the 4th of September was taken to the Castle of Wilhelmshöhe, near Cassel. In the wild confusion that attended the news of defeat in Paris and the declaration of the Republic, the Empress fled from the city and went to England, taking up her residence at Chiselhurst, Kent, where she was joined by Napoleon in 1871, after the conclusion of peace. He resided there until his death, January 9, 1873.

Napoleon and Eugénie had one child, a son, Eugène Louis Jean Joseph, Prince Imperial of France, born March 16, 1856. See NAPOLEON, EUGÈNE LOUIS JEAN JOSEPH.

A collection of Napoleon's own works was published in five volumes (Paris, 1869). Many of them, including the *History of Julius Cæsar* and *Napoleonic Ideas*, have been translated into English. The *Posthumous Works and Unpublished Autographs of Napoleon III. in Exile* were edited by De la Chapelle and published in 1873. English works on Napoleon III. are those of Forbes (London, 1898); Jerrold (London, 1874); and Frazer (London, 1895). In translation are the works of Imbert de Saint Amand, *Louis Napoleon and Mlle. de Montijo* (Eng. trans. New York, 1897), *Napoleon III. and His Court* (ib., 1898), and *The Court of the Second Empire* (ib., 1898). The leading comprehensive histories of the Second Empire are: De la Gorce, *Histoire du second empire* (4 vols., Paris, 1885-98), which partially supersedes the earlier work by Taxile Delord, *Histoire du second empire* (6 vols., Paris, 1869-76). Consult, also, Thirria, *Napoléon III. avant l'empire* (Paris, 1895); Villefranche, *Napoléon III.* (ib., 1897); Gottschalk, *Napoleon III., eine biographische Studie* (1871); Von Sybel, *Napoleon III.* (1873); Simson, *Die Beziehungen Napoleons III. zu Preussen und Deutschland* (1882); Murdock, *Reconstruction of Europe* (Boston, 1891); Victor Hugo, *Histoire d'un crime* (1877); and id., *Napoléon le petit* (1852).

NAPOLEON, Eugène Louis Jean Joseph (1856-79).. The only son of Napoleon III. of France; better known as the Prince Imperial. He was born in the Tuileries in Paris, March 16, 1856. At the outbreak of the Franco-German War of 1870-71 he accompanied his father to the front and was first under fire at Saarbrücken. When the war began to go against the Imperial arms, however, he was sent to England, where he joined his mother after her flight from Paris. Upon the death of his father he took the title of Count of Pierrefonds. In 1874 he reached his majority and was proclaimed as Napoleon IV. by his adherents. Five years later, in order to arouse enthusiasm on his behalf among his countrymen, he joined a British expedition against the Zulus, and while reconnoitring was ambushed and killed (June 1, 1879). Consult: Barlee, *Life of Napoleon, Prince Imperial of France* (London, 1880); Hérisson, *Le prince impérial* (Paris, 1890); and Martinet, *Le prince impérial* (ib., 1895).

NAPOLEON, Joseph Charles Paul, Prince (1822-91). A son of Jerome Bonaparte. See Bonaparte.

NAPOLEON GUN. See Artillery.

NAPOLÉON LE PETIT, le pe-tē′ (Fr., Napoleon the Little). A violent satirical attack on Louis Napoleon by Victor Hugo, written at Brussels in 1852.

NAPOLEON'S TOMB. The magnificent burial place of Napoleon Bonaparte is under the dome of the Invalides, Paris. It was constructed by Visconti and has the form of a circular crypt 20 feet deep and 36 in diameter, open at the top. On the granite walls are ten marble reliefs by Simart. The mosaic pavement, representing a laurel wreath, bears the names of various battles. In the middle rises the red granite sarcophagus, 13 feet long, 6½ wide, and 14½ high, cut from a single block weighing 67 tons, surrounded by 12 victories by Pradier. Above the entrance to the crypt is a sentence from Napoleon's will: "I desire that my ashes shall rest on the banks of the Seine, in the midst of the French people that I have loved so well." On one side is the sarcophagus of the Emperor's friend Duroc, who fell at Bautzen in 1813, on the other that of his faithful companion Bertrand, who shared his captivity. Napoleon's remains were brought from Saint Helena to their present burial place by the Prince de Joinville in 1840.

NAPOLÉON-VENDÉE, väɴ′dā′. A former name of Roche-sur-Yon (q.v.). A town of France.

NARA, nä′rȧ. The capital of a prefecture of the same name on the island of Hondo, Japan, situated 25 miles by rail southeast of Osaka (Map: Japan, D 6). It was the capital of Japan from 709 to 784. The most interesting temples are the Kasuga, situated in a magnificent park; the Todai-ji with its huge bell, over 13 feet high and more than 9 feet in diameter, and the gigantic statue of Buddha over 53 feet high; and the Kobuku-ji with the modern statues of Brahma and Indra. Of great archæological value is the storehouse in which specimens of articles used in the Imperial household for over a thousand years have been preserved. The local museum is also of considerable archæological interest. The principal manufactures of Nara are Indian ink, fans, and modern toys. Population, in 1898, 30,539.

NARAKA, nä′rȧ-kȧ (Skt., hell). The hell of the Hindus. The doctrine of a place for the bad, though not necessarily a place of torment, is as old as the Veda. This region was one of bottomless darkness beneath the earth. The faith of the Brahmanic period and of the Upanishads had the same belief, and the descriptions of hell-torments became fully developed later. Manu enumerates 21 hells, and gives a general description of the tortures which await the impious there. The Puranas, however, are more systematic. The Vishnu-Purana, for instance, not only names 28 such hells, but distinctly assigns each of them to a particular class of sinners. Besides these hells which the Purana knew by name, there were countless others. Buddhism shares with Brahmanism in the later doctrine of hell-torment and the grades of hell. Consult: Scherman, *Materialien zur Geschichte der indischen Visionslitteratur* (Leipzig, 1892); Hopkins, *Religions of India* (Boston, 1895).

NARBADA, nŭr-bŭd′ȧ. A river of India. See Nerbudda.

NARBONNE, när′bŭn′ (Lat. *Narbo*). A town in the Department of Aude, in Southern France, situated six miles from the Mediterranean, and 93 miles by rail southeast of Toulouse (Map: France, J 8). The streets of this formerly important city present a poor appearance, relieved only by those of the attractive new but small quarter. The Church of Saint Just was in olden times the cathedral. It is an imposing though uncompleted structure, begun in the Middle Ages, and exhibiting many of the most daring ideas of the Gothic. Its choir is 131 feet high; the towers rise 194 feet. The Gothic Hôtel-de-ville is a creation of Viollet-le-Duc. There is a good museum, containing chiefly paintings and ceramics. Narbonne has a hydrographical school and a seminary. Its industries include coopering and distilling establishments. It produces verdigris, candles, tiles, pottery, dyes, and leather. It deals in wine, grain, oil, salt, and sulphur. Its honey is famous, and its red wine is peculiar to the district. It has a Chamber of Agriculture and an œnological station, the latter established in 1894. The town is on a branch of the important Canal du Midi. About 11 miles to the south is the port La Nouvelle, at the end of the Narbonne Canal. It is the harbor for Narbonne, and has some manufactories. Population of Narbonne, in 1901, 28,852, a decrease of 700 since 1891. Narbo became Roman in B.C. 116. It was at the time one of the leading ports of the Mediterranean, and well known for its beauty and attractions as a city. It was the capital of the Provincia Romana, and later of Gallia Narbonensis. In the fifth century it passed under the sway of the Visigoths. About 720 it fell into the hands of the Saracens, from whom it passed into the possession of the Franks in 759. The Viscounts of Narbonne became hereditary feudatories of the French Crown in 1080. In 1447 Viscount William III. sold Narbonne to the House of Foix, and 60 years later the fief was united with the French Crown. Late in the Middle Ages the harbor of Narbonne became practically filled up and the town began to decline.

NARBROUGH, Sir JOHN (1640-88). An English admiral and explorer. In 1670 he made a notable voyage through the Strait of Magellan and up the Chilean coast. He was knighted and made rear-admiral in 1673, and the following year he sailed to the Mediterranean, where he distinguished himself by scattering the pirates of Tripoli and Algiers. In 1687 he sailed to the West Indies in command of a squadron, and he died there of fever while superintending the investigation of a sunken treasure ship, and was buried at sea off Santo Domingo.

NARCIS'SUS (Lat., from Gk. Νάρκισσος, *Narkissos*, from νάρκη, *narkē*, torpor). According to Ovid, the son of the river-god Cephissus and of the nymph Liriope of Thespiæ, in Bœotia. He was a youth of extraordinary beauty, but refused all suitors. They prayed to Nemesis for vengeance, and she caused Narcissus to see his own image in a forest spring. Enamored of this, he pined away in hopeless love beside the stream. From his body sprang the flower Narcissus. The story, which seems to be of Alexandrian origin, is told with variations by other late Greek and Roman writers. The bronze statuette in Naples, commonly called Narcissus, really represents the youthful Dionysus.

NARCISSUS. A genus of beautiful bulbous plants of the natural order Amaryllidaceæ, with narrow leaves and usually white or yellow flowers. The species are natives of Southern Europe, Northern Africa, and the temperate parts of Asia. Many are cultivated in gardens for the sake of their beautiful and often fragrant flowers, which in general appear early in the season. Some of them are known by the names of daffodil and jonquil. The different species are naturally separated into two divisions, those bearing but one flower on a scape and those bearing more than one. The poet's narcissus (*Narcissus poeticus*) is perhaps the best known and most popular species. It is a hardy plant and bears white fragrant flowers. The jonquil (*Narcissus Jonquilla*) bears from two to five very fragrant golden yellow blossoms on a scape. This species is employed in the manufacture of perfumes. *Narcissus Tazetta* is the narcissus of the ancient Greeks and Romans, and is now largely grown as a forcing-house plant. There are numerous varieties of this species with white, yellow, single, and double flowers. *Narcissus Pseudo-Narcissus* is commonly called daffodil or trumpet daffodil. The plants are ordinarily propagated by offset bulbs which are produced on the bulb. These usually flower the second year after planting. See Colored Plate of AMARYLLIDACEÆ.

POET'S NARCISSUS (*Narcissus poeticus*).

NARCOT'ICS (Gk. ναρκωτικός, *narkotikos*, benumbing, from ναρκοῦν, *narkoun*, to benumb, from νάρκη, *narke*, torpor; connected with OHG. *snerhan*, to draw together, AS. *snear*, Eng. *snare*). Remedies which, in moderate doses, lessen the action of the nervous system. Their full operation is sleep or coma. Opium is the type from which most descriptions of this class of medicines have been drawn; but although most narcotics more or less resemble opium in their action, almost every one presents some peculiarity in the way in which it affects the system. These medicines are primarily stimulating, especially when given in small or moderate doses; but this stage of their action is comparatively short, and when the dose is large the excitement is scarcely perceptible. Their power of inducing sleep has procured for them the names of hypnotics and soporifics; while many of them are termed anodynes, from their possessing the property of alleviating pain. Next to opium and the general anæsthetics, hyoscyamus, Indian hemp, and chloral may be regarded as the most important narcotics. Of late years a number of coal-tar derivatives have been introduced, such as sulphonal, trional, acetanilid, and phenacetine, which are taking the place, to some extent, of the older remedies.

It has been already mentioned that there are differences in the mode of operation of the different members of this class. Alcohol, for example, in sufficient doses produces intoxication; belladonna, delirium; opium contracts the pupil of the eye; hyoscyamus dilates it. Each drug affects the organism in its own peculiar way, and it is impossible to give a general description of their minor actions.

Narcotics are usually administered with the view either of inducing sleep or of alleviating pain or spasm. As, however, their action is much modified by a variety of circumstances—such as age, idiosyncrasy, and prolonged use—they should be administered with extreme caution, and, as a general rule, only under competent advice. The various quack medicines for children which are known as *carminatives*, *soothing syrups*, etc., contain some form of opium, and are a fertile cause of the great mortality that occurs in early life, especially among the poorer classes.

NAR'COTINE, $C_{22}H_{23}NO_7$. One of the organic bases or alkaloids occurring in opium, in which it usually exists in the proportion of 6 to 8 per cent. It is nearly insoluble in water, and but sparingly soluble in alcohol and ether, but dissolves readily in chloroform. Narcotine possesses very slight alkaline properties; its salts do not readily crystallize, and are even more bitter than those of morphine, although the substance itself is almost tasteless. See ALKALOIDS.

NARD. A fragrant plant. See SPIKENARD.

NARDÒ, när-dō' (Lat. *Neretum*). A town in the Province of Lecce, Italy, 34 miles south by east of Brindisi (Map: Italy, N 7). It is the see of a bishop, has a cathedral and an old castle, and manufactures woolen goods and tobacco. The surrounding country abounds in olive plantations and vineyards. Population (commune), in 1881, 10,683; in 1901, 14,387.

NAR'DUS (Lat., nard, from Gk. *νάρδος*, from Pers. *nard*, from Skt. *nalada*, Indian spikenard). A genus of one species of grass (*Nardus sticta*), often called mat-grass, a purplish perennial growing in tufts characteristic of dry elevated situations in Europe, Australia, etc. It has little or no feeding value.

NARES, nârz, Sir GEORGE STRONG (1831—). A British Arctic explorer, born at Danestown, Scotland. He entered the navy in 1846, and went with Mecham on the *Resolute* in the Arctic expedition of 1852. In 1872-74 he commanded the famous *Challenger* expedition, engaged in deep-sea exploration. In 1875, in command of the splendidly equipped *Alert* and *Discovery*, he set out on a Polar expedition, and proceeding up Smith Sound, he reached with the *Alert* the parallel of 82° 27', the farthest north any ship had then gone. Markham, his lieutenant, on sledges went in 1876 as far as 83° 20', another record at the time. In 1878 Nares surveyed Magellan Strait and many parts of the Pacific. He served in the Harbor Department of the Board of Trade (1879-96), and in 1892 became vice-admiral. He wrote: *Reports on Ocean Soundings and Temperature* (1874-75); *Official Report of the Arctic Expedition* (1876); and *Narrative of a Voyage to the Polar Sea* (1878).

NARES, ROBERT (1753-1829). An English philologist, born at York. After studying at Christ Church, Oxford, he took orders, and from 1798 until his death was Canon of Lichfield. As critic, essayist, and theologian he held a high rank among the writers of his time. With the Rev. William Beloe he founded the *British Critic* in 1793, and he published: *Elements of Orthoëpy* (1784); *Chronological View of the Prophecies Relating to the Christian Church* (1805); and *A Glossary of Words, Phrases, Names, and Allusions in the Works of English Authors* (1822), which is by far his most important work, contains many excellent criticisms of the text of Shakespeare, and is valuable for all of the Elizabethan literature.

NAREW, nä'rĕv. A river of West Russia, rising in the Government of Grodno. It flows westward, forming part of the boundary of Poland, and joins the Bug 19 miles north of Warsaw. Its length is 271 miles, 212 of which are navigable. The Augustowo Canal connects it with the Niemen.

NARIÑO, nȧ-rē'nyō, ANTONIO (1765-1823). A Colombian politician, born in Bogotá. In 1795, on account of his republican views, he was deported to Spain, whence he escaped to France and England. In 1797 he returned to New Granada. In the War of Independence, Nariño took a prominent part as leader of the Centralist Party and withstood the attacks of the Federalists on Bogotá. He had now become dictator and turned his attention to the Spanish forces in the south, by whom he was defeated and captured in 1814. After five years' imprisonment in Spain he returned to Colombia, was acquitted of a charge of embezzlement and malfeasance, and appointed Vice-President by Bolivar.

NARNI, när'nē. A town in the Province of Perugia, Italy, on the Nera, 45 miles north of Rome by rail (Map: Italy, G 5). Ruins of a massive marble bridge built by Augustus and of a very ancient aqueduct are still to be seen. Narni has been the seat of a bishopric since 360. The Cathedral of Saint Juvenalis dates from the thirteenth century. Other buildings of interest are the castle, now used as a prison, and the town hall with a finely sculptured façade. Narni, the ancient *Nequinum*, was colonized by the Romans about B.C. 300. The Emperor Nerva was born here. Population (commune), in 1881, 11,671; in 1901, 12,725.

NARO, nä'rō. A town in the Province of Girgenti, Sicily, situated at an altitude of 1945 feet, 12 miles east of Girgenti (Map: Italy, H 10). It has a sixteenth-century castle of the Chiaramonti, and remains of catacombs, grottoes, aqueducts, and other antiquities. The brimstone pits in the vicinity yield large quantities of sulphur. Population (commune), in 1881, 10,395; in 1901, 12,866.

NAR'RAGAN'SET. A former leading Algonquian tribe of New England, occupying most of the territory along the western shore of the bay of the same name, in Rhode Island, and claiming dominion over several smaller tribes of the interior and the islands, including Long Island. They seem to have been of more ancient occupancy than the neighboring Mohegan and Pequot. They escaped the pestilence which had desolated the southern New England coast in 1617, and being joined by many of the fugitive survivors, soon became a strong tribe, so that it is certain that they numbered several thousands when first known to the whites. They befriended Roger Williams, and through his influence refused to join in the Pequot War. In King Philip's War the Narraganset took a leading part under their chief Canonicus. In the celebrated 'Swamp Fight' they lost nearly 1000 in killed and prisoners. Canonicus himself was killed soon afterwards. Those who surrendered at the close of the war were settled among their former tributaries, the Niantic (q.v.), the whole body thenceforth being known as Narraganset. They were assigned a tract of land near Charlestown, on the southwestern coast of Rhode Island, where they have gradually decreased by emigration and decay, until they are now reduced to a mongrel remnant of mixed Indian, negro, and Portuguese blood.

NARRAGANSETT BAY. An inlet of the Atlantic Ocean, extending into Rhode Island (Map: Rhode Island, C 3). It is 28 miles long, from 3 to 12 miles broad, and receives the waters of several small rivers, the principal one being the Providence. It contains a number of islands of which Rhode Island, Prudence, and Conanicut are the largest. At the head of the bay lies the city of Providence, and Newport is situated at its entrance.

NARRAGANSETT PIER. A noted watering place in Washington County, R. I., nine miles from Kingston Station, where a branch line connects with the New York, New Haven and Hartford Railroad (Map: Rhode Island, C 4). It is delightfully situated near the mouth of Narragansett Bay, and has a fine beach and splendid drives. Among other attractions of the resort are its scenery, Narragansett Heights in particular commanding an extended view, and the beautifully colored rocks in the vicinity, which are picturesque also in form. There are a number of handsome summer residences and many hotels. Population (Narragansett District), in 1890, 1408; in 1900, 1523. The first settler came to this neighborhood about 1675, and in 1815 the pier from which the place takes its name was built. It was not until after 1876, when a railroad was completed to this point, that 'The Pier' became a favorite summer resort. Near by in December, 1675, General Winslow, at the head of 1000 colonists, defeated the Narraganset Indians, of whom 300 were killed and about 600 captured, while the whites lost 80 killed and 150 wounded.

NARRENSCHIFF, när'ren-shĭf, Das (Ger., The Ship of Fools). The most celebrated work of Sebastian Brant (q.v.).

NARSES, när'sēs (?-568). A celebrated eunuch statesman and general of the Byzantine Empire. He was an Armenian by birth, and was probably sold as a slave in childhood. He rose by successive steps to the post of grand chamberlain to the Emperor Justinian. In 532 he aided in suppressing the 'Nika' rebellion. In 538 he was sent to Italy to act in concert with Belisarius (q.v.) in the war against the Goths. After gaining some successes, Narses came into conflict with Belisarius and was recalled to Constantinople in 539. After Belisarius had been recalled, Narses was appointed to the chief command in Italy. Near Tagina in 552, after a desperate engagement, the Goths were totally defeated, and their King, Totila, slain. In the following year Teja (q.v.) was defeated near Sorrento. Narses took possession of Rome, and completely extinguished the Gothic power in Italy. He was appointed exarch of Italy in 553. He fixed his court at Ravenna, and continued till the death of Justinian in 565 to administer the affairs of Italy with vigor and ability. The only blot on the character of his administration is the avarice with which he is charged by his contemporaries. His exactions pressed heavily on the exhausted resources of the population, though their severity may be in some degree palliated by the splendor and utility of the public works on which he partly expended the public resources. The Romans, on the accession of Justin, complained of the exactions of Narses, and that Emperor is said to have deprived him of his office. He is accused of secretly intriguing with Alboin, King of the Lombards, to incite a new invasion of Italy, at the same time submissively offering his services to the Emperor for the purpose of repelling the invasion. This account, however, seems improbable; and as Narses died at Rome in 568, just on the eve of the Lombard invasion, no light is thrown upon this story by the actual events of the war. Consult: Bury, *Later Roman Empire*, vol. i. (London and New York, 1889); Hodgkin, *Italy and Her Invaders*, vols. iv. and v. (Oxford, 1885 and 1895); Gibbon, *Decline and Fall*, edited by Bury (London, 1896-1900). See Goths; Justinian.

NAR'THEX (Lat., from Gk. *νάρθηξ*, *narthēx*, casket, a sort of tall, hollow-stalked, pithy, umbelliferous plant). A part of Early Christian and mediæval churches, situated at the opposite end from the altar and choir, and either just inside or outside the entrance and façade. It had in most cases the same width as the entire church (nave and aisles), but was usually rather short. The term is used especially of Byzantine architecture, the corresponding part in the West being usually called portico or porch. There were two main divisions: (1) the *inner* narthex, which was an integral portion of the interior, within the main façade, and (2) the *outer* narthex, a closed porch attached to the outside of the façade, or with a separate façade.

NARUSZEWICZ, nä'rōō-shä'vĭch, Adam Stanislaw (1733-96.) A Polish historian and poet, born at Pinsk, Lithuania. He joined the Jesuits in 1748, and was sent by them to France to complete his education. On his return he became professor of Latin at the Vilna Academy. A second journey through France, Germany, and Italy secured for him the directorship of the Collegium Nobilium at Warsaw. Prince Czartoryski introduced him to King Stanislas Augustus, and the two became inseparable. After the suppression of the Jesuit Order, he became bishop, first, of Smolensk, and then of Lutsk. He died at Janow, Galicia. His chief work, the *History of the Polish Nation* (1780-86, new ed., 1859-60), was the first scientific treatise of its kind. It is the result of a critical collation of original documents in the Polish archives, and deals with the period previous to 1386. A democrat in his ideals, he aimed in his history to warn his countrymen against their narrow-minded egotism and the lawlessness and arbitrariness of the nobility. He also wrote a *Life of Chodkiewicz* (q.v.) (new ed., Warsaw, 1805), and a *History of the Crimca* (1787). The *Idylls* (highly sentimental) and *Satires* are the best known of his poetic productions, collected as *Lyrica* (Warsaw, 1778, and repeatedly).

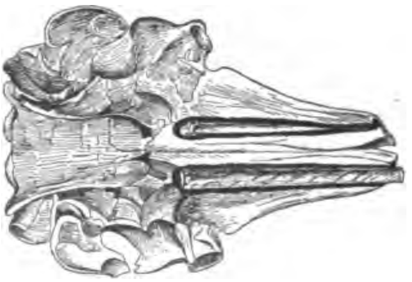
NARVA, när'vȧ. A town in the Government of Saint Petersburg, Russia, situated on the river Narova, about 100 miles west-southwest of Saint Petersburg (Map: Russia, C 3). The cathedral (formerly a Lutheran church) contains a fine collection of crosses and crucifixes. The town has a seventeenth-century town hall, an old castle, two gymnasia, a theatre, and a number of technical schools attached to the extensive cotton and woolen mills in the vicinity. There is a considerable trade in cotton and lumber. Population, in 1897, 16,577—Germans, Esths, and Russians. The town was founded by the Danes in the thirteenth century, and, after being held for a short time by the Russians, passed to Sweden in 1581. Here, on November 30, 1700, an army of about 40,000 Russians under Peter the Great was completely defeated by some 8000 Swedes under Charles XII. In 1704 Peter the Great made himself master of the town.

NARVACÁN, när′vȧ-kän′. A town of Northern Luzon, Philippines, in the Province of Ilocos Sur. It is situated on the main road, and on the proposed northern railroad, a short distance from the coast and about 13 miles southeast of Vigan. It has a population of 16,500, being next to the capital the largest town of the province.

NARVAEZ, när-vä′ȧth, Pánfilo de (1470?-1528). A Spanish soldier and 'conquistador.' He was born in Valladolid, and came to America about 1498, and became lieutenant to the Governor of Cuba, Velazquez. In 1520 Narvaez was sent with a body of soldiers to reduce Cortés, then in Mexico, to submission. Landing at San Juan de Ulua, he was surprised one dark night (May, 1520), and seized in his camp by a party under Cortés himself, who then persuaded the soldiers to join in the conquest of Mexico. After about two years of imprisonment at Vera Cruz, Narvaez was permitted to return to Spain. There he secured permission to conquer and govern the territory from Florida to the Rio de Palmas, which is now known as the Rio Grande. He sailed from San Lucas, June 17, 1527, with a fleet carrying six hundred colonists and soldiers, priests, and negro slaves, with a few women. Stopping at Santo Domingo for horses and supplies, about a quarter of his men deserted in order to join in the exodus toward Mexico and Peru. Thence he went to Santiago de Cuba, where he passed the winter, and toward the end of February or early in March, 1528, he finally started toward Florida. After many mischances, on April 14th he anchored near a bay which he named Bahia de la Cruz, and which has been identified with Apalachee Bay and Tampa Bay. Finding little hereabouts to justify settlement, on May 1st the company, now numbering three hundred, started to march through the country, while the vessels were to follow the shore as far as the harbor of Panuco. Hopelessly misled by Indian guides, lost in the tangled morasses, hungry and footsore, helpless against the harrying, pestering attacks of unseen natives, the Spaniards struggled along across the country until September 22d, when, at a point named by Narvaez Bahia de Cavallos, two hundred and forty survivors embarked in five boats which they had built with such rude tools as could be fashioned from their weapons. They followed the coast until (October 31st) they reached the mouth of a mighty river, whose stream carried them out to sea. This was the Mississippi. Here two of the boats, in one of which was Narvaez, disappeared. The others made their way toward the shore, but a storm separated them once more. Only one reached the land. For the fate of the survivors, see Nuñez Cabeça de Vaca, Alvar.

NARVAEZ, Ramón María, Duke of Valencia (1800-68). A Spanish general and statesman, born at Loja, in Andalusia. In early youth he fought in the war of liberation against the French. In 1822 Narvaez acted with the Liberals and contributed to the suppression of the revolt in the Royal Guards. He withdrew to Loja in 1823 upon the triumph of the Reactionary Party, and lived there in retirement until the death of Ferdinand VII. in 1833. He was engaged in the Basque provinces in 1834, then commanded a division under Espartero, and in November, 1836, routed the Carlist leader, Gomez, near Arcos. He won popularity in these campaigns, and was regarded as the rival of Espartero. In 1838, by acts of great severity, he cleared the District of La Mancha of brigands, and was appointed, in 1840, Captain-General of Old Castile, and general-in-chief of the army of reserve. He took part in the insurrection against Espartero that broke out at Seville in 1840, but was compelled to flee to France. He succeeded in 1843 in bringing about the overthrow of the Government of Espartero, and was made president of the Council and created Duke of Valencia in 1844. He entered upon a thoroughly reactionary policy and revised the Liberal Constitution of 1837. Petty insurrections broke out, which the rigorous soldier-statesman repressed with an iron hand. But his dictatorial manners alienated even his personal friends, and his Ministry was overthrown (February 10, 1846). After serving as special Ambassador at the French Court, he returned to power in 1847, but soon afterwards quarreled with Queen Christina, and retired from office in 1851. In 1856, on the overthrow of the O'Donnell Ministry, he again became president of the Council. Intrigues of the Court compelled his resignation in 1857. Once more in power in 1864, he was succeeded in the following year by O'Donnell, with whom he suppressed, in 1866, a military revolt in Madrid. He supplanted O'Donnell in the same year, and, despite the efforts of O'Donnell and Prim, retained power until his death, April 23, 1868. See Mazade, *Les révolutions d'Espagne* (Paris, 1869).

NARWHAL, när′wal (from Swed., Dan. *narhval*, Icel. *nahvalr*, probably from Icel. *nar*, corpse + *hvalr*, whale; so called from the pale color of the skin). A cetacean of the family Belugidæ, resembling the white whale in form and in the want of a dorsal fin, but remarkably characterized by having no teeth at all, except



SKULL OF NARWHAL.

The lower jaw has been removed, and the view is of the roof of the mouth, which has been partly cut away to show the deep insertion of the root of the tusk (on the left-hand side) and the abortive tooth on the right-hand side of the upper jaw.

two in the upper jaw, supposed to be canines, one and occasionally both of which (in the male) develop into spirally twisted straight tusks, passing through the upper lip, and projecting like horns in front. When, as usually, only one is so produced, it is always the left one. Only one species is known (*Monodon monoceros*), of Arctic seas, where narwhals are often seen in great numbers among the ice-fields, and in the creeks and bays, always active and playful. A mature narwhal is generally about 15 feet in length, besides the tusk, which is from 6 to 10 feet long. The tusk is hollow nearly to the point, and is spirally grooved. Its use is rather conjectured than known; it is probably a weapon of defense, but it may also be used for breaking thin ice in order to breathe, and for killing fish. The remains of skates and other flatfish have been found in the stomach of a narwhal, and it is not easy to imagine how a toothless animal, with rather small lips, could capture and swallow such prey unless the formidable tusk were first employed. Cephalopod mollusks, however, are believed to constitute a principal part of the food. The narwhal is pursued by the Eskimos for food, and for the sake of its blubber, with which the whole body is invested to the thickness of about three inches, weighing nearly half a ton and yielding a large amount of excellent oil. The tusks are also valuable, as they are denser, harder, and whiter than ivory. The kings of Denmark have long possessed a magnificent throne of this material, preserved in the Castle of Rosenberg. Great medicinal virtues were formerly ascribed to the tusks. The animal has been called the 'sea-unicorn.'

NASALS (from Lat. *nasus*, nose; connected with Skt. *nāsa*, OChurch Slav. *nosŭ*, Lith. *nosis*, OPrus. *nozy*, OHG. *nasa*, Ger. *Nase*, AS. *nosu*, Eng. *nose*). A name given to sounds; as *m*, *n*, whose quality is affected by the deflection of the breath from the oral to the nasal passages. The voice is made to pass through the nose by lowering the soft palate and sometimes by closing the oral passage.

NAS'BY, Petroleum V(esuvius). The pseudonym of the American humorist David Ross Locke (q.v.).

NASCENT STATE (from Lat. *nascens*, pres. part. of *nasci*, to be born), *status nascendi*. The state in which a chemical element exists at the instant of its liberation from a compound. The reacting capacity of an element in the nascent state is far greater than in the ordinary state, i.e. some time after it has been liberated. For example, in the gaseous state hydrogen has no action upon ordinary aldehyde; but when sodium amalgam is brought in contact with an aqueous solution of aldehyde, the latter combines directly with the nascent hydrogen, yielding ordinary alcohol. According to most authors, nascent hydrogen is made up of single atoms, while gaseous hydrogen is made up of molecules, each of which consists of two atoms. Others believe that nascent hydrogen is nothing but highly compressed gaseous hydrogen; for, as a matter of fact, it has been shown that highly compressed hydrogen is capable of acting in many respects like nascent hydrogen, and it can also be shown that hydrogen is chemically liberated with considerable pressure. Similar remarks apply also to other elements in the nascent state.

NASCIMENTO, näs'sē-män'tō, Manoel do (1734-1819). A Portuguese poet and a secular priest. He was summoned to appear before the Inquisition because of certain heterodox practices. He fled to Holland and then to France, where he spent the rest of his life. While still in Portugal Nascimento formed with some seceders from the Arcadia a counter poetical academy (the *Grupo da Ribeira das Naos*), whose members observed the Arcadian system of taking pseudonyms, so that he is known as *Niceno* and *Filinto Elysio*. At Paris (1817-19) and at Lisbon (1836-40) there appeared two separate editions of his *Obras completas*, neither of which is really complete. Consult Pereira da Silva, *Filinto Elysio e sua epoca* (Rio, 1891).

NASCOPI, nȧ-skō'pē. The most northeasterly tribe of the Algonquian stock (q.v.), occupying the interior highland region of Quebec and Labrador, northward almost to Ungava Bay. They are closely allied by intermarriage with the Montagnais (q.v.), and trade at the same stations along the Saint Lawrence. They depend entirely upon hunting and fishing for subsistence, and are still but little changed from their primitive condition. They are supposed to number altogether about 3200 souls.

NASEBY, nāz'bĭ. A parish of Northamptonshire, England, 12 miles east by north of Rugby. Population, under 750. It gives its name to the decisive action of the Civil War between Charles I. and the Parliamentary army under Fairfax and Cromwell, which took place here, June 14, 1645. It resulted in the total defeat of the Royalists, the King being compelled to flee, after losing his cannon and baggage, and nearly 5000 of his army as prisoners.

NASH, Abner (1716-86). An American official, brother of Gen. Francis Nash (q.v.). He was born in Prince Edward County, Va., but removed to North Carolina, was admitted to the bar, and gained a large practice. He represented Newbern in the First Provincial Congress in 1774, and the next year was a member of the Provincial Council. He was a member of the body which framed the State Constitution in 1776, and was the Speaker of the first House of Commons the next year. In 1780 he was elected the second Governor of the State. His administration was stormy, as the Legislature gave most of his powers to a board of war, and he served but one year. In 1782 and 1785 he represented Jones County in the Legislature, and was elected by that body a delegate to the Continental Congress in 1782-84 and 1785-86.

NASH, Francis (1720-77). An American soldier, born in Prince Edward County, Va. At an early age he removed to Orange County, N. C. In 1771 he served as a captain under Governor Tryon in the campaign against the Regulators. He was a member of the Assembly in 1771, and from 1773 to 1775. He was also a member of the Provincial Congress of 1775, and by it was commissioned lieutenant-colonel of the First North Carolina Regiment in September, and promoted to be colonel, April 22, 1776. This regiment became a part of the Continental line, and in February, 1777, he was made brigadier-general. At Germantown his brigade, which was intended to form part of the reserve, participated in some of the hottest fighting of the day. General Nash was mortally wounded by a cannon ball, and was buried at Kulpsville.

NASH, Sir John (1752-1835). An English architect. He was born in London, and was a pupil of Sir Robert Taylor. After qualifying as an architect, he spent many years in building speculations, and did not, until 1792, return to London and architecture, in which he speedily rose to eminence. He designed numerous mansion-houses for the nobility and gentry in England and Ireland, but he is chiefly celebrated in connection with the great street improvements in London, especially in the Marylebone region, which he helped to transform into Regent's Park. Regent Street, Haymarket Theatre, Langham Place Church, Park Square, and the terraces in Regent's Park are specimens of his designs. The pavilion at Brighton is another of his works. He died at East Cowes, Isle of Wight, May 13, 1835. Nash, notwithstanding his many defects, possessed great power of effective grouping, as may be seen in Buckingham Palace.

NASH, Joseph (1809-78). An English water-color painter and lithographer, born at Great Marlow, Buckinghamshire. He is principally known by his water-colors and lithographs, illustrating late Gothic architecture and domestic interiors. His publications include *Architecture of the Middle Ages* (1838) and *Mansions of England in the Olden Time* (1839-49). He also did some views of Windsor Castle. There are sketches by him in the Victoria and Albert Museum, South Kensington.

NASH, Richard (1674-1762). An English society leader, better known as 'Beau Nash;' born at Swansea. In 1692 he entered Jesus College, Oxford, but he left before finishing his course, and after a very brief career in the army, entered as a student of law at the Inner Temple in 1693. There he quickly became conspicuous for his good manners, his taste in dress, and his high living. His income being insufficient to meet his demands, he eked it out by gambling and by performing for large wagers such *risqué* exploits as riding naked through a village on a cow. It was the former occupation that in 1705 took him to Bath, then newly become a fashionable watering place. Here was his opportunity. Bath was then a rude little village filled to overflowing with fashionable people who were compelled to pay extravagant rates for miserable lodgings, whose only dancing place was the bowling green, and whose card and tea rooms were canvas tents. Nash set himself to change all this, and in a short time he had succeeded not only in building an assembly house, in procuring decent lodgings, and in reducing the insolent sedan-chair men to humility, but also in making himself the social autocrat of the place. He drew up a set of rules which were enforced on high and low: he practically abolished dueling, and he even assumed the duty of improving the country roads in the neighborhood. During these years his income, principally derived from his partnership in gambling houses and his own skill as a gamester, was large, and he lived in a style befitting 'the King of Bath.' But in 1740 gambling came under the ban of the law, and though Nash managed for a time to evade yielding obedience, new regulations in 1745 left him practically without resources. In this plight, the town, which owed so much to him, came to his rescue with a pension of £10 a month, and on this he lived until his death. Nash owed but little of his popularity to physical attraction, for, according to Goldsmith, he was large and clumsy, and his features were "harsh, strong, and peculiarly irregular." But he did have "assiduity, flattery, fine clothes, and as much wit as the ladies he addressed." Consult Goldsmith, *Life of Richard Nash* (London, 1762).

NASH, Thomas (1567-1601). An English pamphleteer, born at Lowestoft, Suffolk, in 1567. He graduated B.A. from Saint John's College, Cambridge, in 1586; traveled in France and Italy; settled in London as an author in 1588; and died obscurely in 1601. His first publication was a sharp review of the state of letters, prefixed to Greene's *Menaphon* (1589). It was followed by a pamphlet in similar vein entitled *Anatomy of Absurdities* (1589). Nash now entered the Martin Marprelate controversy (q.v.), writing abusive satires on the Puritans. He also violently attacked Gabriel Harvey in *Have With You to Saffron Walden* (1596). Of more general interest are his satirical sketches of contemporary manners: *Pierce Penniless, His Supplications to the Devil* (1592); *The Terrors of the Night* (1594); *Lenten Stuff* (1599); and the picaresque novel called *The Unfortunate Traveler, or Jack Wilton* (1594). This last work was the sternest piece of realism that had yet appeared in English fiction. Nash also wrote a comedy entitled *Summer's Last Will and Testament* (printed 1600), and had a hand with Marlowe in *The Tragedy of Queen Dido* (printed 1594). Nash was given to outright speech and sarcastic mirth. He was well read and avowed himself the disciple of Pietro Aretino. He also knew Brant's *Narrenschiff* and the works of Rabelais, as well as English poets, such as Surrey and Spenser. Izaak Walton aptly described Nash as "the master of a scoffing, satirical, and merry pen." Consult his *Complete Works*, ed. by Grosart (6 vols., London, 1883-85).

NASHUA, năsh'û-ȧ. An important manufacturing city and one of the county-seats of Hillsboro County, N. H., 40 miles northwest of Boston, Mass.; on the Nashua River, near its junction with the Merrimac, and on several divisions of the Boston and Maine Railroad (Map: New Hampshire, J 10). It has a public library, a United States Fish Hatchery, and Saint Francis Xavier Church (Roman Catholic), one of the finest church edifices in the State. A canal, 3 miles long, 60 feet wide, and 8 feet deep, leading from the Nashua River, furnishes excellent water power for large cotton mills. The manufactures include iron and steel, stationary engines, edge tools, furniture, cotton goods, cards and glazed paper, shoes, refrigerators, ice-cream freezers, registers, sash, doors, and blinds, kits and caskets, boxes, saddlery and hardware, shears and clippers, etc. The government is administered, under the original charter of incorporation (1853), by a mayor, chosen every two years, and a bicameral council, which elects the majority of municipal officers. The school board is independently elected on a general ticket by the people. Population, in 1890, 19,311; in 1900, 23,898. Settled in 1655, Nashua was incorporated as the township of Dunstable by Massachusetts in 1673, was reincorporated by

New Hampshire in 1746, received its present name in 1836, and was chartered as a city in 1853. Consult Parker, *History of the City of Nashua, N. H.* (Nashua, 1897).

NASH'VILLE. A city and the county-seat of Washington County, Ill., 49 miles southeast of Saint Louis, Mo.; on the Louisville and Nashville and the Illinois Southern railroads (Map: Illinois, C 5). It is surrounded by a district interested chiefly in farming, cattle-raising, and coal-mining, and has large flour mills and a coal mine. Population, in 1890, 2084; in 1900, 2184.

NASHVILLE. The capital of Tennessee, and next to Memphis its largest city, and the county-seat of Davidson County, 233 miles east-northeast of Memphis and 186 miles south by west of Louisville, Ky.; on the Cumberland River (mainly on the left bank), and on the Louisville and Nashville and the Nashville, Chattanooga and Saint Louis railroads (Map: Tennessee, E 4). It has an area of about 9½ square miles, and is regularly laid out on gradually rising ground, which reaches an elevation of 550 feet above sea level. Macadam is very largely used in the pavement of streets, about 190 miles being laid with this material. There are a number of handsome structures. The State Capitol, situated on a hill, cost $1,500,000 and is the most imposing building in the city. The grounds contain the tomb of James K. Polk and a statue of Andrew Jackson. Among other notable public edifices are the United States Government building, the court-house, the city hall, the Tennessee School for the Blind, the State penitentiary, and the 'Parthenon.' The Tennessee Industrial School is in Nashville, and about six miles away is the State lunatic asylum. The Hermitage, of historic interest as the home of Andrew Jackson, is some ten miles distant to the east. The national cemetery, a short distance north of the city, has 16,643 graves, 4711 of unknown dead.

Nashville is one of the most prominent educational centres in the South. It is the seat of Vanderbilt University (q.v.); University of Nashville (q.v.), with the Peabody Normal College; Central Tennessee College (Methodist Episcopal), opened in 1866 (colored); Fisk University (q.v.) (colored); Roger Williams University (Baptist), opened in 1865 (colored); Boscobel College for women, opened in 1889; and Ward Seminary for women (Presbyterian), opened in 1865. There are also the medical and dental departments of the University of Tennessee, and numerous secondary institutions, among which are Belmont College and Saint Cecilia's Academy. The State library comprises 40,000 volumes; and Watkins Institute, the repository of the collections of the State Historical Society, has the Howard Library of 10,000 volumes. Nashville is the leading industrial city in the State, its manufactures, according to the census of 1900, having an aggregate capital of $13,173,000, and a production valued at $18,470,000. First in importance is the manufacture of flour and grist-mill products, the city being the chief centre of this industry in Tennessee. Next in rank are lumber and timber products. There are also extensive manufactories of fertilizers, cotton goods, clothing, saddlery and harness, confectionery, tobacco, soap and candles, foundry and machine-shop products, carriages and wagons, etc. Nashville controls a large trade in lumber, cotton, grain, and manufactured goods, and, as the distributing centre for a considerable area, has important wholesale interests in groceries, dry goods, drugs, boots and shoes, etc.

The government, under the charter of 1883, last revised in 1901, is vested in a mayor, elected every two years, and a unicameral council, which confirms the mayor's nominations of boiler inspector and of the boards of education and health. It elects the other administrative officers excepting the city attorney, comptroller, treasurer, tax assessor, city judge, and board of public works, these being chosen by popular vote. Nashville spends annually in maintenance and operation about $1,000,000, the principal items of expenditure being: for schools, $200,000; for interest on debt, $167,000; for the police department (including police courts, jails, etc.), $95,000; for the fire department, $92,000; and for the water-works, $60,000. The water-works are owned by the municipality and were built in 1832. The system now comprises about 80 miles of mains and cost more than $2,000,000. Population, in 1830, 5566; in 1850, 10,165; in 1860, 16,988; in 1870, 25,865; in 1880, 43,350; in 1890, 76,168; in 1900, 80,865, including 3037 persons of foreign birth, and 30,044 of negro descent.

Nashville was first settled in 1780 by a company of pioneers led by James Robertson, and in honor of Governor Abner Nash of North Carolina, was called Nashborough until 1784, when it was incorporated as a town under its present name. Throughout its early years the settlement was almost continually harassed by the Indians, and on April 2, 1783, a large body of Cherokees made a determined but unsuccessful attack. Nashville was chartered as a city in 1806, was the seat of the State Legislature in 1812-15 and again from 1826 to 1843, and became the permanent State capital in 1843. It was occupied by a Federal army in 1862, and in 1864 was the scene of a hotly contested battle. (See NASHVILLE, BATTLE OF.) The centennial of the admission of Tennessee into the Union was celebrated at Nashville in 1896, and the event was further commemorated by a grand exposition opened on May 1, 1897. Many well-known men, including Andrew Jackson, James K. Polk, Gen. Sam Houston, and Thomas H. Benton, made Nashville their home for the whole or a part of their lives. Consult Powell (editor), *Historic Towns of the Southern States* (New York, 1900).

NASHVILLE, BATTLE OF. A battle of the Civil War in America, fought south of Nashville, Tenn., December 15 and 16, 1864, between a Federal army under Gen. George H. Thomas and the Army of Tennessee under Gen. John B. Hood.

When General Hood evacuated Atlanta early in September he moved west into Alabama, hoping to draw General Sherman after him and carry the war back into Tennessee. General Sherman, however, sent General Thomas and a part of his army to oppose General Hood, while he undertook the 'March to the Sea.' General Thomas proceeded to Nashville and assembled the Fourth Corps of the Army of the Cumberland under General Wood, the Twenty-third Corps, Army of the Ohio, under General Schofield, the First and Third Divisions, Army of the Tennessee, under Gen. A. J. Smith, a provisional division including two brigades of colored troops under Gen.

J. B. Steedman, and the cavalry corps under Gen. James H. Wilson, about 55,000 in all. General Hood advancing northward into Tennessee was repulsed at Franklin, November 30th, by General Schofield, who at once retired within the intrenchments at Nashville. On December 2d General Hood appeared before Nashville and offered battle. General Thomas, feeling that his army was not sufficiently unified, delayed, though ordered to fight at once by the authorities at Washington. On December 15th he advanced from his intrenchments. The cavalry was placed upon the right of a great curve, the Sixteenth Corps next, the Fourth Corps was the centre and the pivot, the Twenty-third Corps, as a reserve, was to the left, and the Provisional Division was at the extreme left. General Steedman attacked Cheatham's corps on the Confederate right, but was repulsed; but Gen. S. D. Lee in the centre and General Stewart on the left were driven back and some unfinished works captured. Late in the day General Schofield with the Twenty-third Corps was moved to the Federal right. During the night General Hood formed Cheatham's corps on the left. No change was made in the Federal arrangement. On the morning of December 16th the Fourth Corps made an unsuccessful attack on Overton's Hill on the Confederate right, but Cleburne's old division was transferred from the left to strengthen the right. General McArthur, of the Sixteenth Corps, assaulted General Bate's division on the Confederate left, and pierced the line. At this moment some of Hatch's cavalry, which had made a long detour, attacked the Confederate rear and soon the retreat became a rout along the whole line. General Forrest with the Confederate cavalry came up and covered the rear. General Hood with the fragments of his army retreated across the Tennessee River, and on January 14, 1865, asked to be relieved from the command. The Federal troops actually engaged numbered about 45,000; the Confederate about 25,000. The Federal forces lost in killed, wounded, and missing 3057. The Confederate losses in killed and wounded were not given, but 4462 were taken prisoners. Consult: Hood, *Advance and Retreat* (New Orleans, 1880); Johnson and Buel (ed.), *Battles and Leaders of the Civil War* (New York, 1887); and Cox, *March to Sea* (New York, 1882).

NASHVILLE, UNIVERSITY OF. An educational institution at Nashville, Tenn., chartered as Davidson Academy in 1785 by the State of North Carolina, and as Cumberland College in 1806 by the State of Tennessee. In 1826 the name was changed to the University of Nashville, and it became in time one of the leading colleges of the Southwest. During the Civil War the institution was closed. In 1875 the trustees of the Peabody Fund and of the university united in establishing a school for the training of teachers. (See PEABODY NORMAL COLLEGE.) The university has a collegiate department with an attendance in 1902 of 577, a medical school with 310 students, and a preparatory department (Montgomery Bell Academy and Winthrop Model School) with 303 students. The faculty numbered 65. The library contained 16,000 volumes. The college buildings and campus of 16 acres were valued at $200,000; the endowment was $106,000, and the gross income was $80,000. At the same time the total value of the university property was $325,000.

NASIK, nä'sĭk, or **NASSICK.** The capital of a district of Bombay, British India, on the Godavari River, 95 miles northeast of Bombay (Map: India, B 5). Owing to its proximity to Trimbak, 19 miles distant, the source of the sacred Godavari, Nasik is one of the holy towns of India, and rivals Benares as a place of pilgrimage. It is the chief seat of Brahmanism in the Deccan. The town is built on both sides of the river, the portion on the right bank divided into the old and new town, being spread over three hills; Panchwati, the quarter on the left bank, contains the principal features of interest. The river is lined with temples, shrines, and ghats for devotional ablutions. Nasik is the chief seat of the copper and brass industry in the province, and is noted for its artistic productions; it has also manufactures of cotton and paper. Four and a half miles to the south are the celebrated Lena Caves, situated in a conical hill, about 450 feet from its base. They were excavated probably in the second or third century A.D., and contain several rudely sculptured figures, the leading ones representing Buddha. The town is the Nasica of Ptolemy. It was long the capital of a Mahratta principality. Population, in 1891, 24,429; in 1901, 21,490.

NASMYTH, nä'smĭth, JAMES (1808-90). A Scotch engineer and inventor. He was born at Edinburgh, where he received his education at the high school, the school of arts, and the university. As a youth he was an expert mechanic and constructed models of steam-engines and other machinery. In 1829 he became assistant to Henry Maudsley, a London engineer, from whom he derived much useful knowledge and experience. In 1834 he began the manufacture of machine tools at Manchester, where his business rapidly increased and developed into the well-known Bridgewater Foundry. In 1839 he invented the steam hammer, which he improved from time to time. He was also the inventor of many important machine tools, including a hydraulic punch and a steam pile-driver, and he was the first to propose the use of a submerged chain for towing boats on rivers and canals, and of chilled cast-iron shot. In addition to his work as a mechanical engineer he was much interested in astronomy and made many observations with reflecting telescopes which were constructed and mounted according to his ideas. His astronomical work includes investigations of the surface of the sun and moon, which form the subjects of several papers, which were published in elaborate form. Consult *James Nasmyth: An Autobiography*, edited by Smiles (London, 1861-62).

NASR ED-DIN, näsr ĕd-dēn' (1829-96). A Shah of Persia. On the death of his father, Mohammed Mirza, September 10, 1848, he ascended the throne. At his accession he found the country in confusion, but by the aid of his Vizier, Mirza Taki Khan, he established himself firmly, and proceeded to carry out numerous reforms. These plans were unfortunately interrupted by the new Vizier, who was an enemy of all progress. Against the Turkomans and other neighboring peoples Nasr ed-Din was successful, but in 1871 the English put a stop to whatever thoughts of further conquest he may have entertained by defining the boundaries between Persia and Afghanistan. The Shah made three tours of Europe, in 1873, 1878, and 1889. Nasr ed-Din introduced many reforms into his kingdom, and his long reign of forty-eight years has but one serious blot on it, the persecution of the Babis. He was assassinated in 1896, and was succeeded by his son, Muzaffar-ed-Din.

NASS, näs (properly Nasqa, corruptly Nishgar). A group of tribes related to the Chimesyan, but speaking a distinct language, residing on the Nass River and the adjacent territory in Northwestern British Columbia. They are a maritime people, and their culture is that of the other peoples of the Northwest coast. Their population is 800, in seven villages. Morally and intellectually the Nass are steadily improving, but in numbers they are barely holding their own. About one-half are reported as Christianized.

NASSAU, *Ger. pron.* näs′sou. Formerly a German duchy, now a part of the Prussian Province of Hesse-Nassau (q.v.). The districts now known by the name of Nassau were anciently occupied by the Alemanni (q.v.). They subsequently became a part of the Frankish realm. After the partition of the Carolingian Empire in the Treaty of Verdun (843) the present Nassau was a part of the Kingdom of Germany and was included in the Duchy of Franconia. About 1100 the Count of Laurenburg built the Castle of Nassau, from which his descendant Walram I. took the title of Count of Nassau about 1160. In the middle of the thirteenth century Walram's two grandsons, Walram II. and Otho, became the founders of two separate lines, ruling respectively in the southern and the northern parts of the country. The descendants of Walram II. continued to rule in Nassau until 1866. His son Adolphus was King of Germany from 1292 to 1298. His later descendants established several separate lines, but by the successive extinction of other branches the Nassau-Weilburg family was left as the sole representative in 1816. In 1806 the territories of the line of Nassau-Usingen had been erected into a duchy. In 1835 Nassau joined the Zollverein. Duke Adolphus of Nassau (1839-66) had many difficulties with his subjects, who chafed under his conservative tendencies. He sided with Austria against Prussia in 1866, with the result that Prussia took possession of Nassau. (See Germany.) In 1890 the Grand Duchy of Luxemburg passed to the Duke of Nassau.

The younger line of Nassau was founded by Otho I. (died about 1292), who in the division with his brother received the northern part of the country. From this line have sprung the Stadtholders and royal sovereigns of Holland. This junior branch of the House of Nassau acquired possession in 1544 of the Principality of Orange in the person of William the Silent, the great leader of the Dutch in their struggle for independence, who assumed the title of Prince of Orange. With the death of William III. of England and Holland in 1702 Orange passed out of the House of Nassau, but the princely title derived from the little State was retained by his successors, and the reigning dynasty in the Netherlands is still styled the House of Orange. Consult Schliephake, *Geschichte von Nassau* (7 vols., Wiesbaden, 1864).

NASSAU, năs′sa̧. The capital of the Bahama Islands, situated near the eastern end of the island of New Providence (Map: West Indies, J 2). Owing to its salubrious climate, Nassau is a winter resort for invalids, chiefly from the United States. The town is well laid out, has handsome public buildings, a cathedral, and the only good harbor in the Bahamas. The people are engaged in agriculture, and carry on considerable trade in cotton, fruit, sponges, and salt. Population, 11,000, chiefly negroes. Founded by the English in the seventeenth century, Nassau was destroyed by the French and Spaniards in 1703, but was rebuilt fifteen years later. In 1740 it was made a fortified port, open to free trade.

NASSAU, näs′sou, Joan Mauritz van, Count of Nassau-Siegen (1604-79). A Dutch soldier and governor. He early distinguished himself in the service of Holland at the sieges of Breda (1625) and Maastricht (1632). From 1636 to 1642 he was Governor of the Dutch possessions in Brazil. Under his rule the colony was notably prosperous. He defeated the Spanish and Portuguese fleets in 1640, and continued to attack these powers with varying success, until his return to Holland. In 1647 he was made Governor of Cleves, and as Ambassador from Brandenburg arranged the treaty of 1661 with England. Placed at the head of the army of the Netherlands, he repulsed the Bishop of Münster (1665). In 1671 he became field-marshal, took an active part in the war against Louis XIV. in the Spanish Netherlands, and was made Governor of Utrecht (1674).

NASSE, näs′se, Erwin (1829-90). A German economist, one of the most prominent representatives of the 'Socialism of the Chair.' He was born and educated at Bonn, and became professor there in 1860. From 1869 to 1879 he was a member of the Prussian Lower House, and in 1889 was appointed to the House of Peers. One of the founders of the Verein für Socialpolitik, he was its president from its institution until his death. His writings, which were marked by unusual clarity of style, include: *Ueber das preussische Steuersystem* (1861); *Die preussische Bank* (1866); *Ueber die mittelalterliche Feldgemeinschaft in England* (1869; trans. by Ouvry, 1871); and *Agrarische Zustände in England* (1884).

NAS′SICK. A town of India. See Nasik.

NAST, Thomas (1840-1902). An American illustrator. He was born at Landau, Bavaria. His parents emigrated to America in 1846, and when only fourteen years of age he was employed as a draughtsman on *Frank Leslie's Illustrated Newspaper*. He went to England in 1860 and then traveled to Italy to follow Garibaldi, making sketches of the war, which appeared in the *New York Illustrated News*, the *Illustrated London News*, and *Le Monde Illustré*. Returning to America, he formed a connection with *Harper's Weekly*, which was continued for many years. In 1862 his drawings of scenes from the American Civil War, published in Harper's periodicals, attracted wide attention. His caricatures of public men were pointed and severe, and he in his drawings did as much probably as any verbal vituperation of the newspapers to break up the corrupt Tweed 'ring.' He started the publication of *Nast's Illustrated Almanac* in

1872, and illustrated *The Tribute Book*, Nasby's *Swinging 'round the Cerkle*, and other works, including Dickens's *Pickwick Papers* and *Pictures from Italy*. He was also a clever painter in oil and water colors, remarkable for quickness of conception and facility of execution. Though he was not as good a draughtsman as the great French caricaturists, his pictures are fine examples of strong realism. Among his chief oil paintings are: "The Departure of the Seventh Regiment" (1861); "The Civil War;" "The Last Drip." In 1894 he was called to the *Pall Mall Magazine*, London. On May 1, 1902, he was appointed consul-general to Guayaquil, Ecuador, where he died on December 7th of the same year.

NASTURTIUM. See Cress; Tropæolum.

NA'SUA. See Coati.

NATAL, na-täl'. A colony of Great Britain on the southeast coast of Africa, bounded by the Transvaal Colony, Portuguese East Africa, the Indian Ocean, Cape Colony, Basutoland, and the Orange River Colony (Map: Transvaal Colony, G 8). Its area, including Zululand and the portion of Transvaal annexed in 1902, is 31,307 square miles.

Topography. Natal occupies a part of the seaward slope of the great South African plateau, which falls in a series of terraced escarpments running parallel with the coast around the southern end of the continent from the mouth of the Orange on the west to that of the Limpopo on the east. The ranges culminate in the Drakensberg (q.v.), which forms the natural boundary of the great inland plateau. The average height of the Drakensberg is 9000 feet, and its highest point in Natal, the Montagne aux Sources, has an altitude of 11,155 feet. Below the last ridge of the escarpment is a low coastal plain which widens northward, where it contains a series of large, shallow lagoons, of which the largest is Lake Saint Lucia, 55 miles long and 10 miles wide. Natal is watered by numerous permanent rivers of great volume, but, owing to the enormous fall of 8000 to 9000 feet in less than 300 miles, they are all violent mountain torrents falling in a series of cataracts to the sea. The largest is the Tugela.

Climate. The warm Mozambique current flowing along the southeast coast of Africa gives off considerable amounts of moisture, which is blown up the mountain slopes, giving the whole of Natal a sufficient rainfall. The annual precipitation along the coast is about 44 inches, while in the elevated interior it is much heavier. In regard to temperature, Natal presents a series of climatic zones, from the subtropical coastal region with a mean temperature of 68° to the frigid highland region. The former, however, is tempered by cool southeast storms, and the latter by the hot winds from the interior.

Flora. The flora is characterized in general by richness and variety. In the coastal region we find the tropical euphorbias, bamboo, cotton, indigo, sugar-cane, coffee, fig, and cocoanut; in the middle zone the common European cereals, fruits, and vegetables flourish, while higher up are good pasture-lands.

Fauna. Nearly all the large wild animals which formerly overran the country have disappeared. Snakes are still found near the coast, including the python, the puff-adder, and the venomous cobra.

Minerals. There are extensive coal measures, especially around the headstreams of the Tugela, the output being considerable. Iron ore abounds in many localities, and valuable deposits of argentiferous lead and copper ores, as well as gold, have been found.

Agriculture. The interior of the colony is well adapted for agricultural and pastoral purposes. The total area under cultivation in 1900 was over 600,000 acres. The principal cereal is corn, which constitutes the staple food of the natives. Tea is extensively cultivated, the annual crop exceeding 1,000,000 pounds. Sugar is also increasing in importance, and tropical fruits are cultivated with success. The live stock of the colony consisted in 1900 of 54,485 horses, 349,607 horned cattle, and 586,489 sheep.

Commerce. Natal is as yet without manufacturing industries. Its maritime position in close proximity to the two interior colonies of Orange River and Transvaal, with which it is connected by rail, naturally gives Natal a considerable transit trade. The chief exports are wool, sugar, coal, hides and skins, and gold; principal imports are haberdashery and articles of apparel, metals and metal products, machinery, beverages, and textiles. The total value of the imports and exports amounted in 1901 to $45,855,920 and $23,337,512, respectively. This was somewhat above the normal.

The sea-borne trade passes entirely through Durban (q.v.). The transportation facilities are adequate. The railway lines, all owned, with one exception, by the Government and operated by it, had a total length of over 600 miles in 1901. The cost of the lines up to the end of 1900 was $38,026,012. The net earnings of the Government roads exceed 4 per cent. on the capital invested.

In accordance with the provisions of the present Constitution, dating from 1893, Natal is administered by a Governor, who is appointed by the Crown, and is assisted by a Cabinet of six ministers and a legislative council of twelve members, appointed by the Governor for two years with the advice of the Cabinet. The Legislative Assembly consists of thirty-nine members (including two for Zululand), elected for four years by a restricted suffrage. In 1899-1900 the revenue and the expenditures of the colony amounted to $9,188,278 and $9,693,843, respectively. The chief item of revenue is customs duties. The public debt amounted in 1900 to $43,923,226.

Education is neither compulsory nor free, and a considerable proportion of the European children are educated in private schools. The school attendance of the European children amounts to about 96 per cent. of the total school population. In 1900 there were 186 schools for native children, with a total attendance of over 10,600, and 30 schools for Indian children, with an attendance of about 2900.

The population of the colony increased from 361,587 in 1879 to 543,913 in 1891, and to 929,970 in 1900, the latter gain being due partly to the annexation of Zululand in 1897. The European population increased from 22,654 in 1879 to 64,951 in 1900. Capital, Pietermaritzburg (q.v.).

History. The coast of Natal was first sighted on Christmas Day, 1497, by Vasco da Gama, who named the country in honor of the day

(Nativity). The first attempt at settlement made by the Dutch about 1720 proved unsuccessful. In 1824 Captain Farewell and his twenty companions concluded a treaty with Chaka, King of the Amazulus, who had overrun the region during the first decade of the century, but in 1828 the English colony was broken up by Dingaan, the successor of Chaka. In 1835 Captain Gardiner obtained a concession of land from Dingaan and established himself with a number of missionaries at Durban. Two years later the Dutch of Cape Colony, who, in disgust with British rule, had set out in 1835 on their great trek northward, entered the confines of Natal. The first band of pioneers, numbering seventy-nine men under Pieter Maurits Retief, were treacherously murdered by Dingaan, but the tide of Boer immigration continued unchecked, the Zulu power was broken in a great battle on the Bloed River, December 16, 1838, and in 1839 the Republic of Natal was organized, comprising the districts of Pietermaritzburg, Weenen, and Durban. Great Britain, however, continued to regard the Afrikanders as her subjects, and annexed the Republic to Cape Colony in 1843. The greater part of the Boer population trekked westward and northward to found the Orange Free State and the Transvaal. In 1856 Natal was made an independent colony. In 1879 war was carried on against Cetewayo, King of the Zulus; his territory was overrun and occupied; and in 1897 Zululand was annexed to Natal. In 1881 the Transvaal Boers entered the extreme northwestern corner of the colony and defeated the British at Majuba Hill (q.v.). In 1899 and 1900 northern Natal was the scene of fierce fighting between the British and the Boers. At Elandslaagte, Glencoe, and Ladysmith, and all along the line of the Tugela, the most obstinate and sanguinary battles of the war occurred.

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NATAL. The capital and chief port of the State of Rio Grande do Norte, Brazil, situated on the Atlantic coast, 140 miles north of Pernambuco (Map: Brazil, K 5). The estuary which forms the harbor is obstructed by sand bars. Still the port is the chief outlet for the products of the State, and it exports cotton, leather, rubber, woods, and sugar. It is the seat of a United States consular agent. Population, about 6000.

NATALIE, nȧ'tȧ'lē' (1859—). A Queen of Servia, the daughter of a Russian officer named Keshko. In 1875 she married Prince Milan, afterwards King of Servia, but their married life was unhappy, and in 1888 Milan procured a divorce. After King Milan's abdication in 1889 she returned to Belgrade and remained for some time with her son, King Alexander, but the National Assembly having requested her to leave the country in the interest of internal harmony, she withdrew in 1891, though with the masses of the people she enjoyed immense popularity, owing partly to her beauty. In 1893 she became reconciled to King Milan. In the following year she was restored by royal decree to all her rights as a member of the royal family, and in 1895 she returned to Belgrade and was received with great enthusiasm. Since then she has mainly lived in Biarritz, France. In 1902 she joined the Roman Catholic Church. After the assassination of her son Alexander, in 1903, she was forbidden to enter the Kingdom of Servia.

NA'TANT. A term in heraldry. See NAIANT.

NATCHEZ, năch'ĕz (from their native name, *Na'chi*). An interesting tribe, constituting a distinct linguistic stock, originally residing in nine villages in the vicinity of the present city of Natchez, Miss., with a total population of perhaps 2500. Although comparatively a small tribe, they exercised a commanding influence from the Gulf to the Ohio. Their greatest religious rites were connected with the worship of the sun. They were sedentary and agricultural, expert basket-weavers and skillful potters, while their men bore a deserved reputation as proud and determined warriors. In 1716 they quarreled with the French, who had without their consent erected Fort Rosalie in their country. In 1722 a fight occurred at the post, in which several were killed on both sides. Other collisions followed, until the Natchez secretly organized a combination of several neighboring tribes to drive out the white intruders. On November 28, 1729, the Natchez fell upon the garrison and massacred two hundred men, only twenty escaping, besides making prisoners of all the women, children, and negro slaves. The war rapidly spread to the outlying settlements, but after a few weeks the Natchez, unable to oppose the French and their Indian allies, fled across the Mississippi and fortified themselves in stockade forts on Black River, La. Here they were attacked in January, 1731, by a strong French force, which succeeded in taking nearly 450 prisoners, the rest escaping during a storm at night. All the prisoners were sold as slaves in the West Indies. The remnant, made desperate by defeat, continued the war, but were obliged to give way before fresh Spanish reinforcements from the west. This ended the war, in which they had probably lost half their tribal population. The survivors took refuge with other tribes, some with the Chickasaw, others with the Creek and Cherokee. A part of them under the name of 'Notchee' even found their way to South Carolina and were incorporated with the Catawba.

NATCHEZ. A city and the county-seat of Adams County, Miss., 100 miles southwest of Jackson; on the Mississippi River, and on the New Orleans and Northwestern and the Yazoo and Mississippi Valley railroads (Map: Mississippi, C 7). It is built largely on a bluff, 200 feet above the river, the summit of which contains the most costly residences, and the base, or water front, the principal shipping and business houses. Among noteworthy features of the city are the fine Memorial Park, Fisk Library, Stanton College, Natchez Institute, Institute

Hall, Temple Opera House, Pearl and Natchez hotels, and the handsome court house and city hall buildings. A national cemetery, on a bluff adjoining the city, contains 3159 graves, 2780 of unknown dead. In the cemetery is an observatory which commands good views of the vicinity. Natchez has steamboat connection with the whole Mississippi Valley, and is the shipping port of a large cotton region, exporting annually many thousand bales. There are cotton mills, cotton compress, cottonseed oil mills, a foundry, saw and planing mills, an artificial ice plant, etc. The government is administered under a charter of 1877, which provides for a mayor, chosen biennially, and a unicameral council that elects the school trustees. Population, in 1890, 10,101; in 1900, 12,210.

In 1716 Bienville built Fort Rosalie on Natchez Bluff. In November, 1729, the place was destroyed, and most of its inhabitants were massacred by the Natchez Indians. In 1763, according to the terms of the Treaty of Paris, the English took possession and renamed the fort Fort Parmure. From this year dates the real foundation of the village. A Spanish force from New Orleans dispossessed the English in 1779, and in 1798 Spain gave way to the United States. Natchez was incorporated as a city in 1803, and was the capital of Mississippi from 1798 to 1820. It suffered considerable damage from a tornado in 1840. The city was shelled by Commodore Porter in 1862, and in 1863, soon after the fall of Vicksburg, it was occupied by Federal troops, and remained under their control until the close of the war.

NATCHEZ, nȧ'châ', Les. A romance written by Chateaubriand during his exile in England, and printed in 1825-26. It contains the author's impressions of America and views of life, and is pervaded by a morbid psychology.

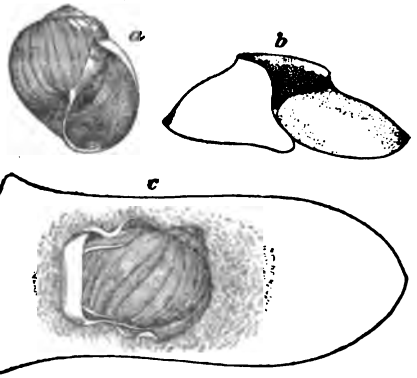
NATCHITOCHES, năch'ĭ-tŏch'ĕz. A tribe of the Caddoan linguistic family of Indians, living formerly on the Red River in Louisiana. Each clan lived apart and they were scattered among the Sioux from Dakota to the Gulf. Their habit of life was partly hunting, partly agricultural. They dwelt in permanent houses covered with sod. In some of their kindred tribes rude pottery was also made. Their religion demanded under certain conditions the sacrifice of human beings.

NATCHITOCHES, năk'ĭ-tŏsh'. A town and the parish seat of Natchitoches Parish, La., 63 miles southeast of Shreveport; on a branch of the Red River, and on the Texas and Pacific Railroad (Map: Louisiana, B 2). It is the seat of a Roman Catholic bishop, and has a State normal school, a State high school, and a Roman Catholic convent. The town is surrounded by a productive district, devoted to stock-breeding and agriculture, its chief products being cotton and sugar-cane. Natchitoches owes its origin to a trading post established in 1714 by the French. Population, in 1890, 1820; in 1900, 2388.

NATHAN'AEL (Heb. *Nĕthan'ēl*, God gives). A man of Cana in Galilee, brought to Jesus by Philip, and declared by Jesus to be a true Israelite and a sincere, open-minded man. He proved this sincerity by coming to meet Jesus, although the fact that Jesus was described as 'of Nazareth' was naturally repugnant to him. He accepted the claims of Jesus as Messiah when those claims were brought clearly before him (John i. 45-51). From this time on nothing more is said of Nathanael in the Gospels, except the mention of him as one of seven to whom Jesus manifested himself after the Resurrection (John xxi. 2). He is not named among the Twelve Apostles. This fact has led many to attempt to identify Nathanael with Bartholomew (q.v.).

NATHAN DER WEISE, nä'tan dĕr vī'ze. A dramatic poem by Lessing, published in 1779, in which the author clothed in poetic form the principles underlying his controversial writings. The interest of the drama concentrates itself in the seventh scene of the third act, in which Nathan, the Jew, summoned by Sultan Saladin, to express his opinion as to which of the three religious creeds professed in Palestine he holds to be the true one, recites the parable of "The Three Rings," purporting to show that the true religion is to be known only by its fruits. The drama is based upon the story of *Melchisedec the Jew*, in Boccaccio's *Decamerone*. The character of Nathan is a monument to Lessing's friend Moses Mendelssohn, the Jewish philosopher.

NAT'ICA (Neo-Lat., from ML. *naticæ*, from Lat. *natis*, buttock). A genus of gastropod mollusks, represented by *Natica heros* (now *Polynices heros*), one of the most common and largest of the univalves, and to be found in abundance along our coast from New Jersey to Maine. The shell is large, composed of several whorls, with a small flattened spire or apex. The aperture is large, lunate in shape, and can be closed by a large horny door or operculum. The animal lives partly buried in the sand, near low-water mark. On taking it up the large, round swollen 'foot' or creeping disk ejects a spray of water as if poured from the 'rose' of a watering-pot. The animal has two short, broad, flattened tentacles, but, owing to its burrowing habits, its eyes are wanting. Its eggs are laid in a large, thin circular mass, like a miniature lamp-shade, which is a curious object and a good deal of a puzzle to young collectors. Another common but much smaller snail (*Polynices triseriata*) is thought to be the young of this species. It is marked with three rows of bluish or chestnut-brown spots. A rather more southern species is *Polynices duplicata*, in which the umbilicus (open in the other species) is closed or nearly so.



WHITH SNAIL (*Natica heros*).

a, The shell; *b*, an egg case; *c*, animal, with distended foot, in the attitude of walking.

Consult Arnold, *The Sea Beach at Ebb-Tide* (New York, 1901).

NATICK, nā′tĭk. A town, including several villages in Middlesex County, Mass., 17 miles west-southwest of Boston; on the Boston and Albany Railroad (Map: Massachusetts, E 3). It has public parks, in one of which is a soldiers' monument, and in another a monument to the memory of John Eliot; the head of Cochituate Lake, one of the sources of Boston's water supply; the Walnut Hill School for young ladies; the Morse Institute (public library and reading room); and the Bacon Public Library. The principal industries are the manufacture of boots, shoes, shirts, clothing, baseballs, boxes, saws, etc. The government is administered by town meetings. There are municipal water-works. Population, in 1890, 9118; in 1900, 9488. Natick was founded by John Eliot, who about 1651 brought hither from Nonantum a company of 'praying Indians,' and for many years it was almost exclusively a settlement of Indian converts. It was incorporated as a town in 1781. Consult: Bacon, *History of Natick* (Boston, 1856); Hurd, *History of Middlesex County, Mass.* (Philadelphia, 1890).

NATIONAL ACADEMY OF DESIGN, The. A society of American painters and sculptors, whose headquarters is in New York City. The first Academy of Arts in New York City was founded in 1802 by prominent citizens, among whom was only one professional artist, Trumbull, but it excited little interest until 1825, when a secession of the younger artists occurred. Dissatisfied with the character of the old society, they formed a new association, called the New York Drawing Association, directed by practical artists. The present name was adopted in 1828, and the society, composed of thirty members, was incorporated. Prof. S. F. B. Morse (q.v.) was the chief organizer of the movement, and was twice president of the National Academy, in 1827-45 and again in 1861-62. In this capacity he delivered the first lecture on the fine arts ever given in America. The Sketch Club, formed by C. C. Ingham, one of the original members of the National Academy of Design, afterwards became the Century Club (1846).

The National Academy is founded on the plan of the Royal Academy of London, and its active members are divided into academicians and associates, the number being limited to one hundred, the only qualification that they be professional artists. There are also honorary members and fellows of the Academy who have certain privileges. The society is governed by a council consisting of its officers and six members, and the instructors in the school of design are chosen from among its ranks. The Academy stands for the conservative, traditional element in art, as opposed to the more modern sentiments which were represented in the earlier work of the Society of American Artists (q.v.). It held its seventy-eighth annual exhibition in 1903. At these exhibitions the Clarke prize of $300, and the Hallgarten prizes of $300, $200, and $100, respectively, are distributed, and the Inness gold medal for the best landscape. The school of design connected with the Academy has been in existence since 1825, and the instruction includes classes in the antique, life, still life, anatomy, painting, perspective, composition, etching, and medal and coin engraving. These classes are open from October until May, and are free to students admitted on the evidence of the school committee. The average attendance of pupils is about 300. Consult Cummings, *Historic Annals of the National Academy of Design* (Philadelphia, 1865).

NATIONAL ACADEMY OF SCIENCES. An organization incorporated by act of Congress on March 3, 1863, to investigate, experiment, and report on any subject of science or art, when called upon to do so by any department of the United States Government. The membership was limited to fifty till 1870, since when it has never had more than one hundred members at a time; and at the annual elections no more than five names are considered. The members are grouped into committees on: (1) mathematics and astronomy; (2) physics and engineering; (3) chemistry; (4) geology and paleontology; (5) biology; and (6) anthropology. Admission to the Academy is through the recommendation of the committee on the subject in which the nominee is a specialist. There are also fifty foreign associates. Two annual meetings are held. The Academy has prepared a number of official reports on subjects that call for special scientific advice, among which may be mentioned: On the Protection of the Bottoms of Iron Vessels (1864); On the Preservation of the Writing of the Original Declaration of Independence (1879); On the Forest Policy for the Forested Lands of the United States (1897); and Concerning the Value of the Metric System (1902). Several of the members have left funds to the Academy for use in research in various branches of science, and also for medals, of which there are now four that are awarded at intervals. Of these the Draper medal is awarded every two years for the most important discovery in astronomical physics. The Watson medal is given for any astronomical discovery or any astronomical work worthy of special reward; the J. Lawrence Smith medal is awarded to students of meteoric bodies; the Barnard medal is given for discoveries in physical science. The publications of the Academy include seven quarto volumes of memoirs and four octavo volumes of biological memoirs and annual reports made to the Government. The presidents, who are chosen for the term of six years, have been Alexander Dallas Bache (1863-67), Joseph Henry (1867-78), William B. Rogers (1879-82), O. C. Marsh (1883-95), Wolcott Gibbs (1895-1900), and Alexander Agassiz (1901—).

NATIONAL ARTS CLUB. An organization formed in New York City in 1898 "to promote acquaintance among art lovers and art workers in the United States, and to stimulate the practical expression of the artistic sense of the American people; to provide proper exhibition facilities for such lines of applied and industrial art as shall be unprovided for; and to encourage the publication and circulation of new suggestions and discussions relating to the fine arts." A regular feature of the club programme is the holding of monthly exhibitions of works of art. The membership of the club is large and includes men who have won fame in various walks of art, and who are in constant requisition for advice by various associations to whom are committed public and private enterprises in which art largely enters. The principal executive office, that of managing director, has been filled since the organization of the club by Mr. Charles de Kay.

NATIONAL CHRISTIAN LEAGUE FOR THE PROMOTION OF SOCIAL PURITY. An organization with headquarters in New York City. Its distinctive aim is the prevention of the extension of vice, (1) by the dissemination of wholesome literature, (2) by the supplying of the physical needs of those who are being rescued from or dangerously exposed to vice, (3) by the establishment of homes for working-girls, and such other means as opportunities present. The work is carried on by special committees. The League has established a home for self-supporting women, where nominal rates only are charged. The League has, also, a hospital committee, whose duty it is to visit the hospitals and assist special cases of charity, and an auxiliary, the Social Culture Club, to improve family life by reaching young mothers and girls. Annual conventions are held.

NATIONAL CIVIC FEDERATION. An organization formed of a number of prominent representatives of capital and labor, the direct outgrowth of conventions held in Chicago and New York in 1900-01. The object of these preliminary meetings was to secure the fullest possible information as to the methods and measures of arbitration in labor disputes throughout the world, and to consider the best means of promoting industrial peace. At the New York convention, held December 16, 1901, a commission of thirty-six was created to be known as the "Industrial Department of the National Civic Federation," charged with full authority to endeavor by timely mediation to check labor disputes, and as a last resort to end them by formal arbitration. The commission represented equally the employers, the wage-earners, and the public, and among those selected were ex-President Grover Cleveland, President Eliot of Harvard University, and Archbishop Ireland, representing the public; Mark Hanna and John D. Rockefeller, Jr., representing employers; and Samuel Gompers, John Mitchell, and Frank P. Sargent, representing the laborers. The objects to be kept in view by the commission were the adoption of the best means for the promotion of industrial peace; the establishment and maintenance of proper relations between employers and workers; the prevention of strikes and lockouts; the settlement of labor disputes before an acute stage shall have been reached; and, where a rupture has occurred, the application of the best means for the restoration of friendly relations between both parties. The department assumes no power of arbitration unless when such power is conferred upon it by both parties concerned in the dispute. The commission was instrumental in settling eleven strikes from the date of its organization to the breaking out of the anthracite coal strike in 1902.

NATIONAL CONFERENCE OF CHARITIES AND CORRECTION. A body composed of the State boards of public charities, where they exist; of delegates appointed by the Governors of other States; of charity organization societies and associated charities throughout the country; and of persons connected officially or unofficially with charity work. It holds annual meetings in some city determined upon at a preceding meeting of the Conference. It has no formal constitution.

NATIONAL CONVENTION (in French history). See Convention, National.

NATIONAL COVENANT. The league formed by the Scotch Presbyterians in 1638, being one of the famous Covenants (q.v.).

NATIONAL DEBT. See Debt, Public.

NATIONAL EDUCATION, Systems of. A system of national education may be said to exist wherever the sovereign authority in a nation takes part in the establishment, maintenance, or to any considerable extent the regulation of the agencies for the education of the people. In ancient times and among the antique civilizations that survive to-day State systems of education are found. Such systems are (1) theocratic, where the priesthood, who form a ruling caste or are intimately connected therewith, carry on education; (2) examining, where the State conducts tests for citizenship or official position, thus indirectly determining the character of the instruction; or (3) martial, where the State aims to prepare its youth for citizenship which is practically equivalent to membership in its army. The Roman Government regulated education to some extent, and the emperors endowed many institutions of learning. With the fall of the Roman Empire and the appearance of the mediæval ecclesiastical system, the Church assumed control of education in Europe and resented any encroachment of the State upon its domain. The Reformation, however, by placing wherever it prevailed the control of religion in the hands of the State, transferred to the secular authority the control of education as well. The modern emphasis of the necessity of education for all, not only in religion, but also in letters, led to a broader popular education than had hitherto existed. The multiplication of sects that was an outcome of the Protestant movement brought about so much warfare regarding religious instruction that in most of the advanced nations it has largely or entirely disappeared from the curriculum of the State schools. Thus the modern systems, concerned principally with secular instruction, and controlled by the State, have come to exist.

The development of modern national support and control of education has in general followed this order: first the regulation, then the partial support, and finally the assumption by the State of almost the entire responsibility for the education within its borders. To-day in Prussia 99.5 per cent. of the elementary education is carried on in public schools, and all the secondary and higher institutions are State institutions. Switzerland and Sweden show practically the same conditions. In Italy private elementary schools do 10 per cent. of the work, and in Spain they are a much more significant factor. In England the law of 1902 brings most of the elementary schools of the religious societies under Government control and provides for them a contribution from public funds as liberal as that given to the schools established by the State. Secondary education is also gradually coming under State supervision and provision is being made for national secondary schools. In France the private secondary and elementary schools, the larger part of which were under clerical auspices, have been to a great extent suppressed by the enforcement of the Associations Law of 1901. In the United States 8.1 per cent. of all elementary and secondary school attendance is in private schools.

The result of the vigorous efforts of the most progressive States within the nineteenth century is the almost entire disappearance of illiteracy within their borders. Germany, Switzerland, and Sweden find less than 1 per cent. of their conscripts unable to read and write. In Holland, England, and France the proportion of illiteracy grows greater, 4.9 per cent. of the French recruits in 1897 being ignorant of letters. In Italy the percentage of illiterate conscripts in 1899 was 33.8, and the marriage register shows that 50 per cent. of the women called upon to sign it were unable to do so. In Spain the percentage of illiteracy was estimated as 68 per cent. in 1889, and this proportion has probably not been greatly reduced since that date. In the United States in 1890, 13 per cent. of the population over ten years of age could neither read nor write. This large proportion, however, is due to the enormous negro population and to extensive emigration from Eastern and Southern Europe. At the same date only seven per cent. of the native population over ten years of age was illiterate. Doubtless the proportion of illiterate adults whose parents were native would in America (if we exclude negroes) be about as small as that of illiterate conscripts in the European States having the most effective systems of popular education. To-day the great problem of popular education is not the abolition of illiteracy, but the training in vocations.

In 1899-1900 20.38 per cent. of the population of the United States were enrolled in elementary schools. Prussia and Switzerland show about the same percentages. Then follow England, Sweden, and France. Italy had only 7.36 per cent. of her population in elementary schools in 1898, while in Russia this percentage was in 1896 only about 3. The United States also leads in the amount expended for elementary education, whether we calculate the rate of expenditure per capita on the total population or per pupil on the enrollment in the schools. The average expenditure per pupil in 1899-1900 was $20, about double that of England and France, and nearly three times that of Prussia. Italy and Russia spent in 1900 $5.15 and $5.12 per pupil respectively. The United States spent on elementary education in 1899-1900 $2.83 per capita on the total population. Prussia followed with $1.29 per capita. These comparisons are based on statistics that vary from year to year and are constantly becoming more reliable. In the series "Our European Neighbors" (New York, 1901-03) each volume contains a good brief popular account of the schools of the respective European countries.

FRANCE.

The French system of education affords the best example of centralization and uniformity in educational affairs that the world has seen. It has been built up since the Revolution, and instead of taking charge of existing schools (most of which were clerical) the French Government has established its own system, which has been gradually replacing other educational agencies. The latest act in this drama of rivalry is the active suppression by the State of a large part of the instruction carried on by religious associations. To this reference will be made later. The present system of elementary instruction may be said to have begun with Guizot's law of 1833, by which each commune was required to establish a primary school and each department a normal school. Not until 1878, however, when the central Government began to grant and loan money to communes for the construction of school buildings, did this law become really effective. The present organic law was passed in 1886.

The system of public instruction in France comprises three departments, primary, secondary, and higher. They are all under centralized control. At the head of the system stands the Minister of Public Instruction, who is a Cabinet officer. Each of the great departments has a special director. The central administration includes, in addition, the Superior Council of Public Instruction, and the general inspectors. The Superior Council consists of about 60 members, and has advisory and judicial functions. One-fourth of its members are appointed by the President. Other vacancies are filled by the Council itself. It has a committee to consult with the school authorities regarding school matters. Officials exist for the inspection of every phase of school work.

For convenience in educational administration, France (including Algeria) is organized into 17 academies. Each one comprises a university, associated lycées, and colleges, and the public primary schools within its limits. At the head are a rector, an academic council, composed of professors and officers of education, and an academic inspector. Under the academic inspectors serve the primary inspectors, who come in direct touch with the schools, each one having supervision of about 150. The departments of France, of which there are 90, constitute the next division for school administration. The prefect has the power of appointing elementary teachers, and there is an advisory council for primary schools composed of teachers, school inspectors, and members of the civic council. In the communes the councils and mayors select sites for school buildings, and vote the funds for the communal school expenditures. There are also committees formed to encourage school attendance.

It has been said that the control of schools in France is highly centralized. The President of the Republic appoints the Minister of Instruction, the general inspectors, the professors in the universities, the rectors of the academies, the prefects of the departments. Of these, the general inspectors have passed a special examination, and professors in the universities are chosen from lists submitted by the Superior Council and the university council. The general inspectors and the rectors are appointed on nomination by the Minister of Public Instruction, and his advice is asked regarding the professors. He appoints the rest of the officials of the central department, the central examination boards, the academy inspectors, the primary inspectors, the secondary teachers, the officials in the normal schools, and in the superior elementary schools. Inspectors are drawn only from the ranks of experienced teachers, who have held important positions. They are required to pass a special examination. So, too, are the professors in normal schools. The primary teachers are required to pass an examination or to be graduates of normal schools.

There are three grades of certificates, elementary, superior, and professional. For the last, stress is laid on knowledge of professional matters, and two years' teaching experience is required. The examination includes a test in actual teaching before inspectors. Only such as pass it can become principals. The elementary teachers are appointed at first on probation by the academy inspectors, and if successful are, on his recommendation, appointed by the departmental prefects. The entire body of educational officials is therefore practically in the hands of the President, the Minister of Public Instruction, and the academic inspector.

The Superior Council deals with programmes for instruction, regulations for discipline, teaching, and school management generally, and hears appeals from the lower councils regarding schools that have been suppressed or have not been sanctioned by the lower authorities. It is the high court of appeal in all contentions. The academic council oversees courses of instruction in either higher or secondary schools, judges cases involving discipline of teachers or pupils therein, or the establishment or suppression of secondary schools. The departmental council has similar functions regarding the primary schools and determines their establishment, location, and the number of teachers. It also inspects them.

By the laws of 1890 and 1896 universities have been organized in each academy. Preparatory to them are State lycées, or classical schools, of which there were in 1900 for boys 109, and for girls 40; communal colleges for boys, of which there were 229; and colleges for girls, numbering at that date 28. All these institutions take both boarders and day pupils. Besides these, there are a number of secondary courses for girls. The primary schools may be grouped under five heads: (1) The *maternal schools*, which receive children between two and six years of age. From being schools for taking care of children whose mothers were out at service, they have become part of the educational scheme. They are supplemented by infant classes, which prepare the children for the elementary schools, and take the place of the maternal schools in small communities. To them are admitted children from four to seven years of age. (2) The *elementary primary schools* (*écoles primaires élémentaires*). These take children from six to thirteen, the work being divided into three grades of two years each. (3) The *superior primary schools* (*écoles primaires supérieures*). The place of these may be taken by the 'complementary courses.' The latter are partly review courses, partly advanced with special attention to training for practical life. In them instruction lasts two years. There are two classes of superior primary schools, the professional and the nonprofessional. The first class includes commercial, technical, and industrial schools. The second has an advanced, liberal course for three years, supplementing it by considerable technical and industrial work during the rest of the time. It takes pupils from twelve to eighteen. It was originally designed to prepare for the secondary schools, but having a somewhat similar course, and being less aristocratic, it failed. It was revived with the addition of the vocational training in 1886. (4) The *apprentice schools*, which are sometimes classified as superior primary schools. Their name indicates their function, actual shop work being the centre of the curriculum. (5) The *primary normal schools*. Besides these, there are two higher normal schools, which prepare teachers for the primary normal schools and the superior primary schools. There are eighty-seven primary normal schools for men and eighty-five for women. They give a three years' course. The primary school system is further supplemented by courses for adults offering either elementary, technical, or commercial instruction, or lectures on subjects of general culture.

In the primary schools tuition is free. Moreover, by the law of 1867, a fund to help pupils whose parents cannot supply them with clothes, books, etc., was created. Its establishment in each commune was decreed in 1882, the State agreeing to contribute. It is distributed by local committees, and in many cases children at school are even provided with dinners. In the superior primary schools, bursaries exist to support deserving pupils taking the courses. At the age of sixteen the holders of bursaries may be transferred to secondary schools with a continuation of their stipends. Bursaries also exist in the secondary schools, awarded on examination to students of limited means. Students are admitted to the normal schools on competitive examination. They are supported while there, and, when they graduate, are pledged to teach ten years. They receive positions in the order of merit. Secondary and higher schools charge tuition, but, as they are largely provided for by the State, the amount of this is small.

The salaries of all administrators of schools, inspectors, and, except in the case of the communal colleges and in cities having over 150,000 inhabitants, teachers as well, are paid by the State. This brings about general uniformity. The salaries of primary teachers range from $200 to $560 a year; of normal school teachers from $500 to $1100; of professors in the lycées from $640 to $1800; of professors in the universities from $2400 to $3000. In primary schools of all kinds, the teachers are divided, according to length of service and efficiency, into five grades, and in lycées into four. Salaries are based on this ranking. The teachers may, when they have served thirty years, and have reached the age of sixty, receive a pension which amounts to one-sixtieth of the average salary during the last six years multiplied by the number of years served. To make up for this, they contribute to a pension fund 5 per cent. of their yearly salaries plus one-twelfth of their first year's salary and one-twelfth of each increase in salary for the first year of such increase. In addition to paying salaries and pensions, the State supports the normal schools, the buildings for which are erected and equipped by the departments. The departments also furnish the supplies for them, and pay the office expenses incurred in running the departmental bureaus and the academic bureau of inspection. The communes pay for the supplies of the primary schools and local school officials, for janitors, and for the building and equipping of schools and residences for masters. In the building of primary schools, however, a State loan is available, the amount of which depends on the necessities of the commune, and varies from 15 to 80 per cent. of the total cost of the work. The State also loans money to build normal schools. The universities, since their organization in the academies in 1896, have been thrown somewhat on their own resources and those of their localities. The State no longer equips laboratories or libraries, nor maintains new courses, nor builds new buildings.

The courses of study in the primary schools are in general determined by State laws. In addition, the Minister of Public Instruction, in consultation with the Superior Council, determines the programmes of instruction even in details of considerable minuteness, and also rules for the conduct of the schools. In general, the primary schools give instruction in moral and civic matters, reading, writing, arithmetic (with simple geometry), history and geography (particularly of France), elementary science, drawing, singing, manual work (including needle-work for girls), gymnastic exercises, and for boys, military drill. The superior primary schools have, in addition, algebra and geometry, biological and physical sciences, with applications to agriculture, industries, and hygiene, political economy, the French language and literature, general history, industrial and commercial geography, iron and wood work for boys, and cutting and fitting for girls. One foreign language also is taught. The apprentice, commercial, and technical schools emphasize, of course, work preparing for special vocations. The courses of study for the secondary schools are laid down by law, and were modified in 1890 and 1891 in order to make them conform more completely with modern demands. They were again modified in 1901 and 1902. The entire course occupies eleven years. Four years are spent in the primary department and pupils can take this work in the free primary schools. They will, however, be under the disadvantage of not taking a course of three years in a modern language. The secondary school proper has a course of seven years, divided into two parts. During the first four years the work may be in either of two courses, in one of which Latin is obligatory and Greek optional, and in the other neither is taken. For the last three years there are four courses presented for choice. These courses emphasize respectively Latin-Greek, Latin-modern languages, Latin-science, and science-modern languages. During the last year of the course options in either philosophy or mathematics are offered.

The programmes in all the secondary schools of France are rigidly laid down by statutes and regulations of the central Department of Education, and general uniformity exists.

The system of inspection in France comes in to insure this uniformity in curriculum and methods. It extends to sanitary conditions as well as to instruction, although such inspection is in the hands of the regular medical inspectors of the localities. Uniformity of results is brought about by a regular system of examinations carried on by outside authorities. An examination for a certificate of primary studies may be given to pupils at the age of eleven, and those passing are exempt from further compulsory attendance. It is carried on in the cantons by examiners appointed by the rectors of the academies. A special departmental commission holds yearly an examination for certificates in higher primary studies. The secondary schools also have their final examinations for degrees conducted by outside examiners. Indeed, as the primary schools are the product of the central republican governments of France, so the lycées are part of the imperial scheme of education devised by Napoleon, and both therefore are characterized by the system, uniformity, and dependence on central authority that their origin would insure.

Private schools in France require the sanction of the State, but can receive no support from public funds. The mayor or academic inspector can oppose them in the interests of hygiene, morals, or public order. They are free in regard to their programmes and methods, but their teachers must have received the certificate of capacity. For the most part, they have been under the control of religious Orders or congregations, and their large attendance was due to the demand for more religious instruction on the part of some classes. These congregations, however, were alleged to be in many cases hostile to the Republic. The Catholic Orders were particularly aimed at in this charge. The Ministry of Waldeck-Rousseau attacked their independence in the 'law of associations' that became a law July 1, 1901. By it all congregations are required to obtain official authorization in order to get legal recognition as such. All unauthorized congregations are absolutely forbidden to give instruction. By this means a careful scrutiny of the conduct of the affairs of such bodies is made possible, and the character of their instruction inspected. The law contemplates the suppression of all congregations that shall resist such scrutiny. During the year 1901-02 the Ministry presided over by Premier Combes compelled many thousands of unauthorized clerical schools to close their doors. In 1903 supplementary legislation to the Association Bill resulted in practically closing all the clerical schools both authorized and unauthorized.

The universities of France are discussed more at length under UNIVERSITY.

GREAT BRITAIN.

The foundation of the present system is the Elementary Education Act of 1870. It declared that each district where sufficient facilities for elementary instruction were not in existence should provide them. Schools requiring denominational instruction or charging more than ninepence a week for tuition were not regarded as providing sufficient means for this purpose. The Education Department was required to make a statement of what was in each case demanded. In case voluntary provision to meet these demands was not forthcoming, a school board was to be elected in the district, which was to provide, to maintain, and to keep efficient the requisite elementary schools. Children attending board schools were to pay a weekly fee determined by the board, with the consent of the department, but this was to be omitted where parents were regarded as unable to pay. School boards were permitted to make provision for the compulsory attendance of children between five and thirteen years of age, who were not elsewhere receiving efficient instruction, unless these children had attained the requisite standard of scholarship, or were exempt under the Factory Acts. The board schools were to give no denominational instruction. The funds for the support of elementary schools were to be at the disposal of the boards, and were to be derived from Parliamentary grants, loans, fees, and local rates.

Power was given to the school boards to fix the amount of the local contribution for school purposes. Voluntary schools, wherever they existed, were recognized as before, and, in case they remained properly public and elementary, were to receive grants not greater than the amount contributed from other sources. Local rates were not to be levied for voluntary schools. In 1876 the age of compulsory education was extended to 14 years, and provision was made for the more effective enforcement of the last by punishing delinquents. This law was also made to apply to districts where there were no school boards, and it was enacted that children under ten years of age should not be regularly employed at labor. In 1880 boards were required to make attendance compulsory. Subsequent legislation has improved the evening schools (q.v.), turning their attention to technical and industrial education, has started undenominational day training colleges, and has greatly developed technical instruction. The poorer rural elementary schools have also received especial help. In 1890 the payment of tuition fees in elementary schools was abolished. In 1899 the Education Department was replaced by a Board of Education for England and Wales consisting of a president, the Lord President of the Council, the principal Secretaries of State, and the Chancellor of the Exchequer. In December, 1902, a far more important measure for the unification of school administration was passed. The occasion for this act was the complaint on the part of the voluntary schools that, while they gave instruction to more children than the board schools (in 1898 about 20 per cent. more), they received no aid from the local rate. The amount that they received from voluntary subscriptions was not sufficiently great to enable them to keep pace with the board schools, a large portion of the support of which was derived from local taxes. The act of 1902, which applies everywhere except to London, changes this condition by sweeping away the old school boards and attendance committees, and replacing them by education authorities, which are empowered to provide for all the schools in their respective districts out of the local rates. Whatever schools receive such support are under the general supervision of the local education authority. This authority is the council of the county or the county borough. It retains the right of levying the local rate and of borrowing money for school purposes, but hands over to a committee all other educational functions. The Education Committee is appointed according to a scheme determined by the local authority and approved by the Board of Education. A majority of its members are in most cases appointed by the council from its own number. Some of the others must be persons of experience in education, and the committee must include women. The Education Committee has power to determine the secular education to be given in the public elementary schools, and to fix the number and educational qualifications of the teachers. Its consent is necessary to the appointment or dismissal of teachers except where religious considerations are involved.

Each school is under a board of managers, who elect teachers, control the school property, etc. The schools provided for wholly by the education authority are governed by managers appointed by it and by local authorities. Moreover, the denominational schools have on their managerial boards appointees from both these sources. No school that does not comply with the requirements of the Education Committee can receive even a Government grant.

Parliament grants to all schools a sum equal to four shillings per scholar, and an additional halfpenny per scholar for every complete twopence per scholar by which the amount which would be produced by a penny rate in the area of the authority falls short of ten shillings a scholar. Whatever tuition fees are paid to schools maintained by an education authority are turned over to it, but a certain portion of these, such as may be agreed upon, is returned to the managers of the school. The proceeds of school endowments for the aid of elementary education are primarily devoted to the care of the school property. Whatever surplus there may be is turned over to the education authority.

The managers of denominational schools are allowed to determine the religious instruction given therein and the religious qualifications of the teachers. But a pupil need not attend such instruction, and cannot be excluded from the school for religious reasons.

The act of 1902 is bitterly opposed by the Non-Conformists. The voluntary schools are largely under the control of the Church of England, and the use of a local rate for their support was regarded as taxing Non-Conformists for the benefit of the institutions of the Established Church. Moreover, it was feared that the new education committees would be more favorable to the Church of England than the old school boards. The schemes of the councils for the appointment of the committees, however, give, in general, far less representation to the Established Church than was commonly expected.

For the training of elementary teachers in 1898 there were forty-four residential and fourteen day training colleges. The latter are attached to some university or college of university rank. Teachers are appointed by the school boards. The average annual salary of certificated masters is about £121 and of mistresses about £80. In 1898 provision was made for pensioning teachers who have reached the age of sixty-five or have become disabled. The amount is estimated on the basis of length of service, and is partly made up by an annual contribution on the part of men of £3 and of women £2. Inspectors are appointed by the Crown on recommendation of the Education Council. There are for elementary education twelve chief inspectors, two being for training colleges, one senior chief inspector, ninety subordinate inspectors, and a number of sub-inspectors. The pupil teachers constitute a large proportion of the teaching staff, the law allowing three for the principal teacher in each school, and one for every certificated assistant teacher. The system of grants in aid of their training still prevails.

For secondary education England has schools under a variety of authorities. They may be classed, according to method of control, as private enterprise schools, subscribers' schools, companies' schools, endowed schools, and schools under local authorities. There were 6209 such schools in England in 1897. They are not organized under any system, except that the Charity and other commissions have been revising the courses of study in the endowed schools. (See ENDOWED SCHOOLS ACTS.) The Public Schools Act of 1868 revised the control and organization of seven great public boarding schools of England. In 1894 a commission was appointed which in the following year reported an elaborate scheme for the national organization of secondary instruction, but so far no legislation has taken place as a result of this. Wales and Monmouthshire have a system of inspection of secondary schools. One of the main purposes of the act of 1902 was the support of secondary education by public money. The education authorities are authorized to consider within their areas the needs of secondary education and to take such steps as seem to them desirable, after consulting the Board of Education, to supply or aid in the supply of such instruction. For this purpose the county authorities are empowered to raise a county rate of twopence in the pound, a sum that may be increased with the consent of the Local Government Board. This measure is calculated to render far more effective and comprehensive the secondary schools under Government control that were initiated by the science and art department.

The Scotch have had a public elementary system since 1696, when it was ordained that a school should be established in every parish where one was not in existence. The masters were elected by the landowners and the ministers, and held their places for life or good behavior. The act was amended in 1803 so as to require the salaries of masters to be raised, and in 1861 their examination for the right to teach was transferred from the control of the presbyteries to that of the universities. In the meantime considerable support was granted to the schools from the Government. Among other changes, the English School Code of 1861 was applied in Scotland, but was withdrawn. In 1872 an elementary education act like the English one was passed. The Scotch law is the better of the two, however, school boards being created in every parish, and the practical control of all elementary schools being given to them. In 1893, after several movements in that direction, all children between three and fifteen years of age were freed from school fees in the public elementary schools. Education is compulsory for children between five and fourteen years of age.

The Government grants to Scotch voluntary and board schools are, in general, similar to those in England, but only about one-eighth of the elementary schools are voluntary. For the training of elementary teachers, denominational colleges had made their appearance before 1839. These have been aided by Government grants, and at present over four-fifths of the male and two-thirds of the female teachers have graduated therefrom. The English pension act of 1898 was extended to Scotland.

The secondary instruction in Scotland is in the hands of five classes of schools: burgh schools, academies, parochial schools, mixed burgh and parochial schools, and four public boarding schools like those of England. The burgh schools are supported either by endowment or by burgh funds. They are under the control of the authorities of the burgh and open to the community. Until 1861 the presbyteries controlled them, but at that date this power was transferred to the town councils, and in 1872 to the school boards. These bodies fix the fees. The academies arose in the middle of the eighteenth century as a result of a demand for more economical and scientific instruction. In most cases they came ultimately under the joint control of town councils and proprietors. In 1892 Government grants were made to secondary schools, and their inspection was provided for. For the universities of Great Britain, see UNIVERSITY.

For a further treatment of the English educational system, see GREAT BRITAIN, section on *Education*.

HOLLAND.

The State school system in Holland includes public primary schools, normal schools and courses, burgher schools, higher burgher schools, or secondary schools proper, agricultural schools, and various professional institutions, together with gymnasia, and three State universities. A few of the primary schools are maintained solely by the general Government. Most of them are communal, but a considerable portion of the fund for their support comes from the State. Private primary schools are also subsidized by the Government, in case they maintain proper standards. The primary school system includes, in addition, repetition and evening schools, and both types are maintained by the same agencies and methods as the primary schools in general. So, too, the normal schools are either Government schools, or communal schools with subsidies, or private schools with similar support. The State normal schools, however, give instruction to the majority of the students taking such courses. The higher burgher schools were, in 1894-95, 61 in number. Of these 20 were maintained by the Government, 28 were subsidized communal schools, 12 were communal schools without subsidies, and one a Roman Catholic institution. Of the 29 city gymnasia, 25 are subsidized by the State. It will be seen, therefore, that the policy of Holland is to subsidize such private and local schools as conform to its requirements in character of instruction and qualifications of teachers, and to found State schools only to supplement and complete the work of these agencies.

The history of this school system will serve to explain these peculiarities, and also to make somewhat clearer the complexities of the system itself. In 1784, a 'Society of Public Good' was founded at Groningen by John Nieurenhuysen. Its object was to promote elementary education; and in this it was successful, receiving help from the Government. In 1806 an education law of great importance was passed. It consisted essentially of provisions for inspecting schools and examining and certificating teachers. School districts were organized, over each of which an inspector was placed, whose consent was requisite before any one could teach or be a member of a school committee. The inspectors received for their services only an allowance for their expenses. A principal duty was that of examining teachers for certificates. The provincial and communal administrations were urged by the Government to provide the means of instruction in their localities, to insure a comfortable subsistence for teachers, and to obtain a regular attendance of children in the schools. Free schools for the poor were, as a result, established in the towns and in the villages, schools to which the poor were admitted gratuitously. The authorities made great and successful efforts to gain a large attendance, and teachers were paid better salaries than elsewhere in Europe. In 1811 M. Cuvier found 4511 primary schools in existence, and one in each ten of the population in school.

Up to 1848 only two important steps had been taken in the further development of the system. Normal schools were established in 1816, and the free schools for the poor were supplemented by institutions of a somewhat higher grade where a small tuition fee was required. Since the free schools could be entered only by those who possessed a certificate of poverty, the children of people with moderate means were excluded from them. The private schools for such children were fast becoming inferior to the free schools which were under public patronage, and it was to supply this want that the towns established intermediate schools (*tusschen schoolen*). In addition, French schools, which emphasized modern languages and commercial branches, and Latin schools, preparing for the universities, were founded. These higher schools, however, did not compare so favorably with those of other countries as did the primary ones.

The Constitution of 1848 established liberty of instruction. This conflicted with the provision of the law of 1806 that the authorizations of the municipal council and of the inspector were necessary for even the teacher in a private school. In 1857 this requirement was removed, only the general admission certificate being demanded in such cases. The Constitution of 1848, also, by placing all religious denominations on a footing of equality, gave to the Catholics and liberals a chance to attack the religious instruction in the schools, which according to the law of 1806 was to have been Christian but undenominational. Their agitation led to a strict enforcement of the law, which in turn roused the antagonism of the orthodox Protestants. The result of a bitter contest was the law of 1857, which reaffirmed that of 1806, making more explicit its provision that religious instruction, while undenominational, should yet inculcate Christian virtues. It was also provided that the schoolrooms should at special hours be put at the disposal of religious communions for purposes of instruction. This attitude has been confirmed by the law of 1878.

The law of 1857 also made definite regulations regarding the number and support of schools, the salary and number of teachers, school fees, the primary curriculum, the selection of teachers and school inspectors. Each commune was required to maintain at its own charge what in the opinion of the State's deputies and the supreme Government was a sufficient number of primary schools. If this task was too heavy, the State and the province were to share equally in a grant of aid. It was provided that pupil teachers should aid in the work of instruction. School fees were to be exacted only of those who could afford to pay them. The subjects of primary instruction were defined to be reading, writing, arithmetic, the elements of geometry, of Dutch grammar, of geography, of history, of the natural sciences, and singing. The public schoolmaster was to be selected by the communal council from a list of those who had acquitted themselves best in a competitive examination. A salaried provincial inspector was substituted for the provincial commission of district inspectors. The Minister of the Home Department, assisted by a referendary, was made the supreme authority in matters connected with education.

In 1863 a law was passed organizing secondary instruction as consisting of burgher, higher burgher, agricultural, polytechnical, and industrial schools. This law was amended in 1876 and 1879. The secondary schools are under special commissions and inspectors, and teachers in them are required to have special diplomas, and, except in a few cases, to be university graduates.

The law of 1857 has been twice amended, in 1878 and 1889. In 1878 the school authorities were empowered to increase the curriculum as laid down in 1857, by French, German, English, general history, mathematics, drawing, agriculture, and gymnastics whenever they deemed it expedient. It was also provided that each commune should support the necessary number of unsectarian schools; but 30 per cent. of its educational expenditures were to be contributed by the State, which also undertook to subsidize private schools under certain conditions. An enormous increase in the State contribution to popular education was thus brought about. In 1889 the method of granting the State subsidy was modified. If the school applying for one is found on inspection to conform to the State regulations it will be granted an amount dependent on the attendance, the number of teachers, and extent of the curriculum. All schools having more than forty-one pupils must have at least two teachers, and an additional teacher is required for an average addition of about fifty pupils. When schools have more than the minimum requirement of teachers, and when they cover more than the required curriculum, additional grants are given. The State also furnishes 25 per cent. of the amount necessary to establish a school, and regulates the character and hygienic conditions of the buildings and premises. The law of 1878 instituted a system of pensions for teachers who had reached the age of sixty-five. The annual amount is one-sixtieth of the annual salary for each year of service. The teachers contribute 2 per cent. of their yearly salaries to a pension fund.

The Dutch classify their gymnasia together with their universities under the head of superior instruction. Such instruction is organized into a system by the law of 1876. The three State universities are supported and controlled by the national Government. See UNIVERSITY.

PRUSSIA.

The school system of Prussia may be divided into three departments, elementary, secondary, and higher. The elementary system is designed to educate children of the lower classes whose school training is completed with them. The secondary schools are intended to prepare pupils for the universities or professional schools, which are for the most part classed as superior schools. The elementary schools may be grouped under five classes: (1) The *infant schools.* These are not supported by State funds, nor are the teachers required to have State certificates of capacity. They are, however, under the supervision of local school boards. Their purpose is to care for children whose parents are obliged to go out to work. Children are admitted ordinarily only in their third year, but in some cases even younger children are cared for. (2) The *Volks* *schule*. This takes children between the ages of six and fourteen, and during this period attendance is compulsory for all whose education is not otherwise provided. In the larger communities the sexes are taught separately, but in the country districts this is usually impossible, on account of the lack of teachers and facilities. The school work occupies six hours a day and about forty-two weeks a year. There are three grades and six classes, though the work occupies eight years. The subjects of study are, in the lowest grade, religion, German, arithmetic, singing, gymnastics, and needle-work; in the middle grade, drawing, science, history, and geography are added; and in the upper grade, geometry. This course is prescribed by law, but within its limits selection and arrangement are left to the school board of the district, subject to the approval of the general board of the royal Government. (3) The *continuation schools*. These are usually evening schools, giving instruction to pupils between the ages of fourteen and eighteen. They review the work of the Volksschule, and give some additional work with special reference to trade or industry, or, in the country districts, agriculture. Tuition is charged, but provision is made for those who cannot pay. With the continuation schools may be classed various industrial and trade schools which are day schools, and devote more time and effort to prepare for specific vocations. (4) *Middle schools*. These sprang from the old burgher schools of the Middle Ages. They aim to prepare the children of people with more means for a commercial life, although sometimes they are attended by pupils preparing for the secondary schools. Tuition is charged. Nearly twice as many of these schools as are public are private. A considerable proportion of them are mixed schools. They take the place of the Volksschule, but sometimes continue instruction until the seventeenth year. (5) *Normal schools*. In these there is a preparatory course of three years to which children of fourteen are admitted. This is followed by a two years' course in the women's normals, and a three years' course in men's normals and the one for governesses. In 1900 there were 126 of these institutions, of which all but about twelve were for men exclusively. Students are admitted on examination and the attendance is limited to from thirty to thirty-six in each class. While in the school students receive their support. On graduation, they are placed on the list of available teachers, and required to take what is given them, or pay back the expenses of their education. Before receiving permanent appointment, however, a probation of from two to five years is required, and an additional examination on educational matters must be passed. The normal school course consists of pedagogics, religion, German, history, arithmetic, geometry, geography, drawing, writing, music, and a foreign language.

The secondary schools in Prussia, as in Germany generally, are the various classes of gymnasia and Realschulen. The gymnasia are the classical schools, and have their origin far back in the Middle Ages. They were modernized during the nineteenth century by the introduction of science and modern languages, although they have always retained the humanistic quality as against the Realschulen, which emphasize the scientific studies and modern languages, and omit the classical languages altogether. The gymnasium has a nine years' course. To enter it the pupil must be nine years of age, and have had three years of elementary instruction. The pro-gymnasia give a somewhat shorter course, usually only the six years necessary to gain for their graduates exemption from one year of the voluntary service in the army. Occupying a position between the gymnasium and the Realschule is the Realgymnasium, which omits Greek and gives more attention to sciences, etc. There are also real pro-gymnasia. The Realschule proper gives only a six years' course, but the higher Realschulen have nine years of work. As a result of a conference on secondary schools that met at Berlin in 1900, the three classes of schools having a nine years' course are declared to be equal from the point of view of general culture, and Greek was made optional in the gymnasia. The programme of studies was somewhat revised, and greater latitude allowed the masters in adapting their work to particular needs. For the professional training of secondary teachers there are twelve State seminaries, which admit only a few candidates. There are also connected with many of the gymnasia seminaries conducted by the principals and leading teachers. These institutions all give a one year's course. There are also a number of higher schools giving instruction to girls from six to fifteen years of age. They are supplemented by gymnasia having a four years' course. These institutions, however, are not recognized as preparing for the universities, and the higher schools are controlled by the department for primary education.

The higher education of Prussia is given in the universities, with their four faculties of philosophy, theology, law, and medicine. They are discussed in the article on UNIVERSITY. There are also various polytechnic and agricultural schools that may be included with the schools for higher education.

At the head of the Prussian school system is the Minister for Religious, Educational, and Medicinal Affairs. As Minister of Education alone, his department is subdivided into two parts. The first has control of superior and secondary instruction, and the second of the elementary schools. The Minister of Education represents the schools in the Prussian Parliament, and plans and oversees legislation on school matters, including finance. He distributes the State school money, appoints the members of provincial school boards, confers titles on school officers, judges on appeal all cases involving dismissal from office or other contentions in school matters, besides fixing the normal course of study. Each of the thirteen provinces of Prussia constitutes a division for school administration. The immediate superintendence of secondary schools is in charge of the provincial school boards, consisting of from three to five members and a chairman, who is the president of the province. One of these men inspects the gymnasia, another the Realschulen, and a third the Volksschulen. This board has the power of appointing and dismissing teachers in secondary schools, except in such as are supported wholly or partly by private funds, where the selection is made by a local board from a list furnished by the provincial school board. The appointment of directors of the schools requires the confirmation of the Minister. To the provincial school boards also fall the control of the seminaries for the training of secondary teachers, and the regulation, for all the schools of the province, of the school programmes, regulations, leaving examinations, and of text-books for the higher schools. In each province the general superintendent of the Evangelical Church has the function of inspecting the Protestant religious instruction in the secondary schools, and a Catholic bishop has a similar right regarding Catholic instruction. The provinces of Prussia are divided into thirty-six governments, each of which has a school board consisting of two men appointed by the King for life, four appointed by the provincial school board for six years, and the president of the royal Government. In such schools as are supported largely by the State, this board appoints the teachers. Wherever, on account of extensive local support or private patronage, local authorities are given the naming of teachers, the school board of the Government confirms their appointment or nominates a list from which the selection must be made. It also oversees the conduct and work of the teachers, superintends the elementary schools generally, settles upon new districts and text-books for local schools. The governments are divided into districts, some of which have inspectors, whom the Minister on examination appoints for life, and who devote their whole time to the schools. Other districts have a number of local inspectors, who are clergymen or have some other occupation besides that of school inspection. The district has a school board composed variously in different localities of inspectors, members of local councils, and representatives of religious denominations. This board has the power of erecting and organizing schools, determining teachers' salaries (the minimum being fixed by the Government), increasing pensions, and deciding on property liable to a school tax. Each school has a local school board chosen in cities by the central school board. Sometimes, however, it is elected by the citizens of a community or by a church organization or by a patron, depending largely on the source whence the school derives the larger part of its income. The local board looks out for repairs, supplies, and attendance, but cannot interfere with the internal management of the school. In many cases it has a voice in electing the teacher or fixing his salary. Many cities have established secondary schools, the funds for which are largely contributed by them. Here the local boards have charge of financial matters, choice of teachers, etc., but the work of the school itself is under the supervision of the provincial boards. The most extreme cases of local control arise in connection with the country Volksschulen, under the patronage of the nobility. Here the patron names the teacher, and sometimes even interferes with the course of study and school hours.

Private schools in Prussia are required to conform to State regulations, as to minimum course of study, school methods, etc. They are under State inspection, and can employ none but regularly certificated teachers. The number of private elementary schools is insignificant, but the pupils in middle schools are one-third in private institutions.

Teachers in Prussian elementary schools are ordinarily graduates of teachers' seminaries or training colleges. At the end of each year these institutions hold an examination at which the school inspectors and superintendents of the district and a commission from the provincial school board are present. Practical tests in teaching power are required as well as those on theory. The successful candidate gets a privilege to teach for three years. After two years of satisfactory work a teacher may take a second examination, the passing of which gives him a right to a permanent position and a pension. This examination is largely on educational matters and includes a practical test. Candidates who are not graduates of teachers' seminaries may be admitted to it, and on passing are allowed to teach. The director of the seminary oversees the work of its graduates, and can require them to supply defects by additional work. Those who wish to teach in the higher classes of the middle schools must pass an additional examination given by a special commission, and the same body gives a still further examination to those who aspire to rectorships. To gain the right to teach in the secondary schools a candidate, who is usually from a university, often with a degree, must pass a State examination given by one of the ten examining boards appointed annually by the Minister. Those who pass may receive, according to the character of their papers, any of three grades of certificates in the various subjects, and these entitle them to teach such subjects in the lower three, the lower six, or all the grades of the gymnasia. After passing this examination, a candidate enters either a State seminary (where he receives a valuable stipend) or a gymnasial seminar. Here he is under practical instruction for a year, entering at its successful conclusion on a year of probationary teaching, for which he receives no remuneration. He is then, provided his work is satisfactory, eligible to a permanent appointment.

Elementary teachers receive free rent and fuel, and often a garden. Their annual salaries range from 450 marks (in a few cases even less) to as much as 3800 marks in Berlin, or in the case of rectors even 6000 marks. The average is, however, about 1200 marks, and is smaller in the country than in the cities. Salaries usually are regularly graded, according to time of service, up to a maximum. Women are paid somewhat less than men, and they constitute about 12 per cent. of the total teaching force in elementary schools. After ten years of service the teacher can, if disabled or sixty-five years old, retire on a pension of one-fourth of his salary. This amount increases by one-sixtieth for each additional year of service up to three-fourths of the salary. The pension fund is derived from a State and local contribution, together with a small deduction from the salary of the successor. The annual salaries of secondary school teachers range from 1500 to 5100 marks, and in the case of rectors to 7200 marks. In addition, they receive an allowance for house rent. The same regulations as to pensions that apply to primary teachers apply also to secondary ones, and in fact to most State officials, an exception being professors in the universities.

For the support of schools in Prussia, there are five sources of income. The most important of these is the State itself, which pays about one-half of the total required for teachers' salaries. The other sources are school societies, income from inherited property, Church funds, local taxes, and tuition. In the city schools the local taxes supply the larger part of the income; in secondary schools the tuition furnishes nearly one-half the sum required for support. The country schools, however, receive over two-thirds of their income from the State, the amount being a fixed contribution of 100 marks for each head teacher, 200 marks for each additional regular male teacher, and 150 marks for each female teacher, with 100 marks for each assistant teacher who is in the probation year. The normal schools are supported by the Government, as are also the universities. In the latter tuition is a considerable item. For their organization, see the article on UNIVERSITY.

For the development of the German public educational system, of which the Prussian system is taken as a type, see GERMANY, section on *Education*.

SWITZERLAND.

Each of the twenty-five cantons of Switzerland has its own separate and independent school organization, and there are very few federal regulations on the subject. The Federal Constitution of 1874 empowers the Bund to establish and maintain or assist a university or other institution for 'higher education.' This power has not been used except to continue the support of the Federal Polytechnic at Zurich, and to subsidize various cantonal higher institutions. The Constitution further states that all education, whether public or private, must be under the control of the cantons. They must provide for it, and make it compulsory and gratuitous. That they do this well is evident from the fact that in 1898-99 the ratio of attendance to population was greater there than in any other country in the world, while of the recruits in 1899 only .23 per cent. could not read. All attempts to establish anything like a centralized system have met with determined opposition by those who feared interference with linguistic or religious instruction in the schools. Indeed, the problems of education in Switzerland are more complex than in most countries. Some cantons are predominantly French, others are German, others Italian, and there is still a fourth vernacular, Romansch, extensively spoken. In cantons where one language predominates, another is usually the sole one spoken by a considerable part of the people. Moreover, Catholicism and Protestantism are face to face everywhere, and both fear that the free-thinkers might endeavor to exclude religious instruction from the schools if their control were centralized. The Constitution provides, however, that "it must be possible for the public schools to be attended by the adherents of all beliefs without hurting their freedom of belief or conscience." That not more than 3 per cent. of the attendance is in private schools, which are, moreover, patronized almost entirely by children of non-Swiss parentage, attests the satisfactory nature of the religious instruction in the public schools. A few cantons, as Geneva, exclude it entirely from the public system. Three additional Federal regulations affect education. The first forbids the labor in factories of children under fourteen, and limits that of those under sixteen. The second prescribes an examination for every recruit on entering the army at his twentieth year. The results of this are made known, and it stimulates educational effort, besides bringing into existence improving schools for recruits, and increasing the attendance at continuation schools. The final regulation concerns military drill, which by the acts of 1874, 1877, and 1883 is made a required part of every school programme, to be given to children between ten and fifteen years of age.

At the foundation of the school system of Switzerland we have at present the communal primary schools taking children from six to eleven years of age. After this they go either to the cantonal secondary schools proper, or to the advanced elementary schools, the so-called 'secondary' schools, the district for one of which embraces several communes, or to the communal continuation schools, usually held in the evening. There are also courses for adults given in the communes. The secondary schools are maintained by the cantons, and include professional and technical schools, with others variously styled middle schools, gymnasia, or pro-gymnasia. These are supplemented by cantonal universities and a Federal polytechnic. The teachers are licensed by cantonal governments on examination, or in some cantons on a diploma from a normal school. For the higher grades of work, an additional examination is required. There were in 1900 thirty-eight normal schools in Switzerland, most of them public institutions maintained by the cantons. In most cantons teachers are elected for life, either by a school board or at a general election. They are also usually pensioned at the end of their term of service. This is, in general, partly provided for by a fund to which they make regular contributions.

At the head of education in each canton there is either (1) an educational council, or, (2) an education ministry, headed by a director of education, who is a member of the Executive Council of the canton, or (3) a permanent education council, presided over by a director of education who is a political officer. The Canton of Bern belongs to the second type, and in the control of its schools it represents the extreme of centralization in Switzerland. The Director of Education controls the inspectors and frames the educational budget. His department determines, on consultation with certain authorities, the curriculum and methods of instruction in all public schools. Private schools must receive his authorization and that of the local school inspectors. The communal council votes the money for its primary schools, and nominates a school board to control the expenditure of this and the details of local school management. Several communes combine to form a secondary school, the control of which is in the hands of a commission, whose members are appointed by the various communal councils and the Director of Education. The middle or higher schools are usually cantonal schools, and are controlled by a commission appointed by the Educational Department. On the other hand, the Canton of Zurich has the least centralized of all the Swiss systems. Its central government is of the third type above mentioned. The Educational Council is composed of six men, four of whom are chosen by the Cantonal Council, and the other two by the whole body of teachers. It controls the organization of education in the canton. The commissions that direct the cantonal schools, i.e. the gymnasium, middle schools, higher schools, technical institutes, and training colleges, are appointed by the Cantonal Council on nomination by the Educational Council and Director of Education. For local organization and control of education there are provinces, districts, and communes. Each province has a committee, elected partly by the teachers alone, partly by the rest of the voters. Its function is to visit the schools and supervise their general conduct. There is a district committee elected by the voters to control the secondary school of the district, and determine the amount to be raised from local taxation for its support. For the primary school also there is a district organization, including usually several communes, the voters of which have a general assembly to determine school measures. The communal primary school is controlled by its local board. In Zurich alone of all the Swiss cantons, there are no school inspectors. In these two cantons, Zurich and Bern, we have illustrated the extremes between which the systems of the other cantons fall.

In Switzerland, generally, the support of all universities and higher secondary schools is by cantonal funds, aided occasionally by the cities in which such schools may be situated. The district and communal schools are supported by local taxes with cantonal aid. There exist for such support permanent communal funds made up of fees and gifts, and in all Switzerland they amount to over 58,000,000 francs. Moreover, twelve cantons have a permanent cantonal fund for Volksschule purposes. This does not, however, by any means provide for the support of the schools. Of the total expenditure on primary education, it is estimated that the local authorities furnish about two-thirds, the rest coming from the cantons; but in Geneva, where the French ideas prevail, the canton furnishes 74 per cent. of such funds. In general, in the wealthier cantons the canton furnishes more and the commune less of the total raised. The cantonal grants are made either in proportion to the total expense of the commune, or to its poverty and need for aid, or, as is more commonly the case, according to both these principles. The cantonal money goes largely as a contribution for teachers' salaries, the school equipment being left mainly to the communes. The canton usually contributes a greater proportion of the amount necessary to support the district secondary schools than of that for the communal primary schools. In the raising of school funds the general legislative bodies of communes and cantons usually fix the total amounts, and the distribution of expenditures is left in the hands of the school authorities. In some cases, however, as in Zurich, the communal school board can levy the local school taxes. Of the amount for the support of schools generally, the primary, higher primary, district, and continuation schools get nearly three-fourths; higher secondary and technical education receives less. For the organization of Swiss universities, see UNIVERSITY.

OTHER EUROPEAN SYSTEMS.

The systems already described offer examples that are typical of the education in other European States. In Sweden, elementary and secondary schools are supported by State subsidies and local taxes. Many schools and universities have in addition to such support the income from endowments. Control of schools is in the hands of local boards, but the central Government maintains a system of inspection and requires teachers to be graduates of normal schools. Public elementary education is gratuitous and compulsory between the ages of seven and fourteen. In Austria the ideals and methods of Prussian education prevail. The Italian system has the same general features of State subsidies and local and provincial taxes for the support of both elementary and secondary education. The minimum number of schools, the curricula, and the qualifications of teachers are also laid down by the State. Public elementary education is gratuitous and compulsory between the ages of six and nine. The State inspects all public schools, and private schools must receive authorization by the Government.

In Spain attempts have been made to establish a complete and efficient system of elementary education. The Government determines programmes and inspects schools, but furnishes little assistance to their support. The municipalities bear most of the burden and the compulsory law is not enforced. For most of the children education is free. In Russia about one third of the elementary education is carried on by the Church. Nearly all the rest is controlled and supported by the central Government acting under the Ministry of Public Instruction. The Church also takes part in secondary education, but here the Ministry bears most of the responsibility. There are a small number of locally supported schools and foundation schools.

UNITED STATES.

In the United States, the control and support of the education of the people have been left practically to the several State governments. The central Government has, however, dealt with the matter in a few cases. The Ordinance of 1787 provided that one section of each township in the Northwest Territory should be designated as school land, and that the proceeds of its sale should go to the support of public schools. After States were organized in this region, the funds derived from these lands were turned over to them for educational purposes. Similar grants of land were made to other new States, notably in 1841, in 1849, and in 1860. Up to 1900 about 86,000,000 acres had been devoted to this purpose. These grants were supplemented in 1836 by a gift to the several States of surplus funds in the National Treasury, the sums thus given being by most of them devoted to the support of education. In 1862 the Morrill Act set aside additional lands for the maintenance of colleges, in which agricultural and mechanical arts and military tactics were to be taught, and the State universities generally have been the recipients of these gifts. The central Government established, in 1867, the Bureau of Education, the main objects of which are the collection of statistics and the preparation of reports.

Each of the several States maintains a system of free public schools, including elementary, secondary or high schools, and, in the case of twenty-nine of them, universities as well. The older States, where great colleges and universities on private foundations have for a long time existed, have not in most cases added such institutions.

For the elementary schools three systems of control exist. The first of these is the district system, according to which the control of each school is left in the hands of a board elected by the people of the district in which it is placed. Under the township system all schools that are located within the region of a township are placed under one board. According to the county system, the schools of a whole county are under the control of county boards or school commissions. The district system was developed in New England after the scattering of the population, due to the cessation of the early Indian wars. It spread to the States of the West. Later, owing largely to the opposition of reformers, like Horace Mann, who maintained that the district system meant insufficient support and inexpert supervision for the common schools, New England came to adopt the township system. The county system has been peculiar to the Southern States from the first, and to-day it exists in nine States, all of which except Utah are Southern. The township system exists wholly or partially in eighteen States, and the district system in thirty-three.

With the development of more elaborate school systems, the supervision of the State became a more and more prominent feature. New York, in 1812, created a superintendent of common schools. This example was followed by others, and to-day there are State superintendents in all States. In most of them there is also a State board of education, which usually manages State school funds, and either directly or indirectly determines the qualifications of teachers. For more minute supervision, there is inspection either by a county superintendent or by the township or district committees. In thirty-five States the county supervision prevails. In New England the township school committees do the supervising. In addition, at least 835 cities have superintendents for their public schools. The demand for greater uniformity and effectiveness in the schools, as a whole, has led not only to the creation of larger units for the control or supervision of schools, but also to the establishment of State funds, and the levying of State taxes to supplement local contributions to the cause of education. The State taxes are relied on to raise as much as three-fourths of the school money in some States, and the amount is largest in the Southern States and those of the far West. The North Central and North Atlantic States generally rely more on local taxes, Massachusetts having no regular State tax. The local taxes are raised either in the township or, as in the far West and South, in the county. Where there is a county tax, this may usually be supplemented by a district tax levied by local vote. The levying of this tax is in the hands of the legislative bodies of State, county, or local division, although sometimes the educational bodies have the power of determining the amount to be raised. Frequently State law determines the minimum amount to be raised by local taxation.

In the earlier colonial period secondary instruction was given in what were called grammar schools. These institutions admitted children who had mastered merely the rudiments of English, and prepared them for college. The high schools were, however, preceded by academies. They were introduced into the United States as a substitute for both the grammar schools and the colleges. Many of these academies received, in addition to private endowments, large grants from the States. Some of them grew into colleges and later into universities. Academies for girls were established, and thus the way was paved for the higher education of women. The academies offered a somewhat wider and more liberal course of study than the older grammar schools and colleges, which were concerned mainly with the classics. In this way they led to the more liberal high schools and to the extension of the college curriculum.

The high school sprang up in response to a demand felt in the early part of the nineteenth century for the secularization and State control of secondary education. The English Classical School, later called the English High School, was founded in Boston in 1821. To-day a free public high school has to be maintained in every township in Massachusetts. New York, Maryland, Wisconsin, Minnesota, California, and other States have elaborate State laws governing high schools. In a great number of States their creation and control is left to localities, the actions of which in the matter are not regulated by the State. They are found, however, in all important cities.

The free elementary school may be said to exist in every locality of the United States, however sparsely inhabited. In the Western and Southern States the remoter districts are greatly helped by the contributions from the State funds, which are distributed in such a manner as to favor especially the smaller schools. The high schools, on the other hand, the existence of which is left almost universally to local initiative, are dependent largely on local support. Outlying districts are, in consequence, frequently without them, and when they exist there, the territory that they supply includes ordinarily a number of elementary school districts. Such divisions are either townships, as in New England, or counties, as in Maryland, the South, and occasionally in the West, or simply a convenient grouping of districts into what is called a union high school district. The board governing such schools is usually a specially created one, except where the township or county system prevails. In these cases, as with the district high school, the elementary and secondary schools are both managed by the same board.

The teachers in elementary schools, up to the time of the establishment of county and State supervision, were selected by the school boards at their discretion. To-day, licenses or certificates are universally required before one can be elected to a teacher's position. In New England, however, these are granted by the school committees of the township, and so teachers are licensed by the same board by which they are elected to office. Elsewhere, throughout the Union, the certification is in the hands of city or county superintendents or boards of education, or State superintendents or boards of education. Certificates of various grades are issued in the several States. High school certificates are universally distinct from those for elementary teaching. All are granted either upon examination or upon credentials. Local certificates are valid only in the specific division where they are granted, but are frequently accepted as adequate credentials in other localities. State certificates are for longer periods, or even for life, while the local certificates expire after a few years.

The qualifications required of teachers in both elementary and secondary schools are being made continually higher, and this is true not only in regard to scholarship, but also to professional training. Three State normal schools were established in Massachusetts under the influence of Horace Mann in 1839-40. Since then these institutions have spread all over the Union. In addition, teachers' institutes and university summer schools and extension courses furnish professional training, while the leading colleges and universities have departments of education. In general, the tendency is for a continually greater proportion of elementary teachers to have at least a normal school training, and for high school teachers to be college graduates, who have done special work in the educational departments. Indeed, movements are on foot in several States, as California, to abolish the system of certification or examination altogether, and to grant certificates only to those who are graduates of normal schools or of colleges having professional courses.

The ideal course of study in the modern primary school in the United States, as outlined by the 'Committee of Fifteen' in 1894, includes reading, writing, spelling, composition, arithmetic, geography, simple lessons in natural science and general history, vocal music, drawing, with physical culture, and manual training. In many schools such a programme exists, and in most an effort is made to approximate it. The greatest difficulty arises in the ungraded country schools, where a single teacher is called upon to teach children from five to eighteen years of age, and representing, of course, all or most of the grades of the elementary school. The ideal grammar school course, as outlined by the same committee, in addition to the subjects of the primary grades, consists of English grammar, algebra, and United States history in the last two years, and either Latin, French, or German in the last year. Only in a few cases, however, are the foreign languages actually to be found in the grammar grades of the elementary school.

The course of study in the high schools is usually arranged with a view to presenting to the pupil from one to four different groups of subjects, any one of which he is at liberty to choose. The first of these groups constitutes the old classical course, but includes, besides Greek and Latin, modern languages or English, or both, algebra, geometry, and some history and natural science. What is commonly called the literary course drops the Greek and substitutes therefor more English, modern languages, or history. The scientific course drops Greek and sometimes Latin, laying stress on the sciences and mathematics instead. In some cases the classical languages are abandoned for the sake of English, history, civics, political economy, etc. Another course, which emphasizes preparation for business, and gives instruction in book-keeping, stenography, typewriting, commercial arithmetic, and law and business methods, is frequently found. The tendency is, however, to hand over such a course to a commercial high school or business college. It is a favorite line of work for evening high schools. Practically, all courses embrace algebra, geometry, civics, English, United States history, and physics. The sciences taught in the scientific course include chemistry and often botany and zoölogy. Courses in solid geometry, higher algebra, and trigonometry are often offered in high schools.

Besides the ordinary and the commercial high schools, there have grown up numerous schools of the high school grade, offering instruction in mechanical and industrial lines, and extensive practice in manual training. They represent a demand that existed at the time of the establishment of the high schools, and is to-day extensive and growing. It is that secondary education should be an immediate preparation for life instead of merely for college. The 'accrediting' system, which prevails in Michigan and California, and by which high schools desiring to pass students without examination into the colleges are inspected by the faculties of the State universities, has been criticised for tending to reduce the high schools to mere 'feeders' for the universities. On the other hand, it must be said that the colleges have very extensively modified and enlarged the curriculum of the old days of purely classical instruction, so that each of the courses offered in high schools, except perhaps the commercial one, prepares for some line of collegiate work. Moreover, the 'accrediting' system has been the only system of effective inspection to which the high schools have been subjected, if we do not regard the college entrance examinations as attaining this end. The method of judging school work by the examination of pupils is, however, sometimes used even in elementary schools, where examinations for promotion or graduation are given by county authorities for all the schools of the county.

No effective system of pensioning teachers exists in the United States, although some laws have been passed aiming at this. They have relied on the contributions of teachers, who may join in or not as they choose, and consequently they have never amounted to anything of importance. On the other hand, the salaries of teachers in the elementary schools compare favorably with those abroad, averaging $58.59 a month for men and $50.92 for women in the West, where they are highest, and $35.99 per month for men and $31.43 for women in the South, where they are lowest.

Thirty of the States have compulsory education laws. The common period during which some instruction must be given is from the eighth to the fourteenth year. These laws, though not rigidly enforced, are nevertheless fairly effective, and attendance for at least part of the year is nearly universal for children of school age.

The evolution and present status of higher education in the United States, the most notable features of which have been the development of the State universities and the transformation of the colleges into universities, are dealt with in the article on UNIVERSITY. For a treatment of the American elementary schools, see the article on COMMON SCHOOLS.

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NATIONAL GALLERY. An important picture gallery in London, situated on the north side of Trafalgar Square. It was erected from designs by Wilkins between 1832 and 1838, and originally cost £96,000. It was enlarged in 1860, 1876, and 1886. The gallery, formed in 1824, was rapidly increased and has received important collections of paintings, presented or bequeathed by Vernon in 1847, Turner in 1856, and Ellis in 1876. The Peel collection was purchased in 1871. It has a valuable series of the older Italian artists, and contains the most costly single painting in the world, Raphael's "Madonna degli Ansidei," purchased from the Duke of Marlborough in 1884 for £70,000.

NATIONAL GUARD (Fr. *Garde Nationale*). From 1789 to 1871 the name of the French militia under municipal control, recruited from the burgher class. The French Revolution really brought about the creation of the National Guard, though guards of a like nature had existed in some towns previous to 1789. In that year, however, they were instituted in Paris, on the suggestion of Mirabeau, by the Revolutionary Committee, as a check on the Royalists. The National Guard thus constituted numbered 48,000 men, and Lafayette received the command. Other battalions were organized in the provinces, and very soon, on paper, the total strength of the National Guard of France was 4,000,000—though the actual available force was not more than 300,000. In 1795, after the National Guard had gone through many of the most eventful scenes of the Revolution, it was reorganized on a less democratic basis. The result was that it showed Royalist leanings. It rose against the Convention shortly before the dissolution of that body, but the movement was promptly suppressed by Bonaparte with grape-shot. This was the insurrection of the 13th Vendémiaire (October 5th). For a time the National Guard ceased practically to exist. In 1805, however, the Emperor Napoleon reorganized it and it rendered him good and efficient service, particularly in the disastrous years 1813-14. After 1815 the National Guard was still maintained, but in 1827 it was dissolved by Charles X. Its members were allowed, however, to retain their arms, and many of them participated in the July Revolution of 1830, at which time the National Guard, as an institution, was revived. During the reign of Louis Philippe it was prominent. In 1848 it helped do away with the monarchy and establish the Republic. After undergoing various reorganizations in 1848, 1852, and 1855 it again became firmly established. The National Guard fought in the Franco-Prussian War in 1870, and at the capitulation of Paris its members were allowed to retain their arms. The result was that during the Commune of 1871 numbers of National Guardsmen went over to the Communists. (See COMMUNE.) After the establishment of the third French Republic the National Guard was abolished—its place being taken by the system of universal military conscription. Consult: Poisson, *L'armée et la garde nationale* (Paris, 1858-62); Thoumas, *Les anciennes armées françaises des origines à 1870* (Paris, 1890). For the National Guard of the United States, see MILITIA.

NATIONAL HYMNS. It is only within comparatively modern times that patriotism has found expression through the medium of a *national* song. In the few cases where a national hymn dates back several hundred years, it will be found to have assumed its representative character recently. National music is inseparably connected with folk-music (q.v.), but is a later development, and instead of representing the work of individuals (influenced by similar conditions and surroundings) it embodies the feelings, tendencies, and ideas of a people. In other words, folk-music is individual in its character rather than national. Needless to say, however, it is the forerunner and basis of national music, which often reaches its culmination in the national hymn. The following list of national hymns covers the most important ones. It is compiled largely from Sousa's *Airs of All Lands* (Philadelphia, 1890):

Argentine Republic—"Oid, mortales, el grito sagrado" (1810) (Hear, oh Mortals, the Sacred Call). Music by D. V. Lopez.

Austria—"Gott erhalte Franz den Kaiser" (1797). Words by L. L. Haschka; music by J. Haydn.

Belgium—"La Brabançonne" (national air); by F. Campenhout.

Bohemia—"War-song of the Hussites."

Brazil—"Hymno da Proclamacão da Republica" (1889) (Hymn of the Proclamation of the Republic). Words by Medeiros e Albuquerque; music by Leopoldo Miguez.

Burma—"Kayah Than" (Sound the Trumpet).

Chile—"Dulce Patria" (national air); by Carnicer.

Costa Rica—"De la Patria." Music by M. M. Gutierrez.

Denmark—"King Kristian stod ved hojen

mast" (King Christian stood beside the mast). Words by Ewald; music by Hartmann.

Ecuador—"Salve, Oh Patria."

Egypt—"Salaam, Effendina" (March of the Khedive).

Finland—"Vårt land" (Our Land). Words by J. L. Runeberg; music by F. Pacius.

France—"La Marseillaise" (q.v.). Words and music by Rouget de Lisle.

Germany—"Heil dir im Siegerkranz." Words by H. Harries to music of "God Save the King" (q.v.).

Great Britain—"God Save the King" (q.v.).

Holland—"Wien Neêrlands."

Hungary—"Isten áld meg a Magyart" (Lord Bless the Hungarian).

Italy—"Royal March" (national air); by G. Gabetti.

Japan—"Keemê gajo" (May the Empire Last).

Mexico—"Mexicanos, al grito de guerra" (national air) (Mexicans, at the cry of war); by J. Nunó.

Nicaragua—National air, by Blas Villatas.

Persia—"Salamati Shah." Music by A. Lemaire.

Peru—"Somos libres, seamoslo siempre" (We are free, let us be so ever).

Rumania—"Traeasca Regale" (Long Live the King) (1862). Words by V. Alexandri; music by E. A. Hübsch.

Russia—"Boghe Zaria chrany" (God Protect the Czar) (1830). Words by Zhukovsky; music by A. Lyoff.

Salvador—"Saludemos la Patria" (Let us Hail our Country). Words by J. J. Canas; music by J. Aberle.

Servia—"God in His Goodness." Music by D. Jenko.

Spain—"Himno de Riego." Music by Herta.

Sweden—"Ur svenska hjertans" (Out of the Swedish Heart).

Switzerland—"Rufst du, mein Vaterland," to music of "God Save the King."

United States—"Star Spangled Banner," "Hail Columbia," and "America" (qq.v.). (The first is played in the United States Navy at morning colors; the latter at evening colors.)

Uruguay—"Himmo Nacional de la República Oriental del Uruguay" (National Hymn of the Republic of Uruguay). Music by D. I. Deballi.

Venezuela—"Gloria al bravo pueblo" (1811) (Honor to a Brave Nation). Words by V. Salias; music by J. Sandaeta.

Consult: Engel, *An Introduction to the Study of National Music* (London, 1866); Fitzgerald, *Stories of Famous Songs* (ib., 1898).

NATIONALISM. A term applied to the plan of social reform outlined in Bellamy's *Looking Backward.* The scheme involved the nationalization of the processes of production and distribution. It is a form of socialism which emphasizes the social importance of economic equality.

The first Nationalistic Association was organized by a company of Bellamy's readers in Boston in 1889. A statement of its views condemned the system of competition and expressed the belief that it would gradually be supplanted by a system of universal brotherhood. The movement spread rapidly and by 1891 there were in the United States 162 clubs. In some States, notably California, an active part was taken in politics. In May, 1889, a magazine, the *Nationalist,* was started which existed two years. Its place was then taken by the *New Nation,* founded by Bellamy, which also lasted two years. The Nationalists exercised a considerable influence upon the People's Party, but ceased to play any considerable independent rôle. The movement spread to England, where 'The Nationalization Society' was organized July 3, 1890. See SOCIALISM.

Consult: Bellamy, *Looking Backward* (Boston, 1887); and id., "The Programme of the Nationalists," article in the *Forum* (March, 1894); Ely, *Socialism and Social Reform* (New York, 1894).

NATIONAL MUSEUM. See UNITED STATES NATIONAL MUSEUM.

NATIONAL NICKNAMES (ME. *nekename, ekename,* by faulty liaison or sandhi for *an ekename,* additional name, from *eke* + *name*). National nicknames are as a rule first employed by the people themselves. By the familiar JOHN BULL is meant the English nation. The name was first used in the satire of Dr. John Arbuthnot, *Law is a Bottomless Pit.* The sobriquet of JONATHAN or BROTHER JONATHAN has gone through three distinct phases. First, between 1776 and 1783 it was employed, as a mildly derisive term, by the Loyalists, and applied by them to the Patriots; secondly, between 1783 and 1812 it was adopted by the Americans themselves, who used it to designate a country bumpkin; and thirdly, during the war with England in 1812-15 it came into universal vogue as a national sobriquet. The accepted story, attributing the origin of the term to a remark made by Washington in allusion to Governor Jonathan Trumbull of Connecticut, originated in 1846, and has recently been shown to be without foundation. UNCLE SAM, the familiar sobriquet of the United States government or people, is commonly stated to have originated at the outbreak of the war with England in 1812, when some one, asking what the letters 'U.S.' marked on casks and barrels meant, was facetiously told that they referred to "Uncle Sam" or Samuel Wilson, an obscure citizen of Troy, N. Y., said to have been an inspector or a contractor. This story has not been found earlier than 1842, when it was given in J. Frost's *Book of the Navy,* p. 297. No doubt Frost copied it from some newspaper, but the story lacks proof. The term Uncle Sam has yet to be traced earlier than the fall of 1813, when we read of "Uncle Sam's Men," meaning United States custom house officers, and are told that "*Uncle Sam,* the now popular explication of the U. S., does not pay well." The term appears to have arisen somewhere in the North, perhaps in New York or Vermont; and its origin was presumably merely a jocular extension of the abbreviation U. S., then very common. For three years it ran a career in the newspapers, in 1816 it appeared in a book, and by 1817 its popularity was well established. NICHOLAS FROG, the typical Dutchman, was first used by Arbuthnot in his *Law is a Bottomless Pit.* JEAN CRAPAUD (Toad) is the popular nickname of the French nation, collectively taken, and dates back to the time when the ancient kings of France used for their device in heraldry 'three toads, erect, saltant,' or in a leaping posture, and Paris was called Lutetia, or 'Mudland.' Its streets were so quaggy that the French Court, with a point to its pleasantry, called its inhabitants 'frogs,' since they, like the reptiles, lived in mud. For the French-Canadian we have **Jean Baptiste**, and the French peasant is facetiously called **Jacques Bonhomme**. **Deutscher Michel** is the facetious nickname applied to the German people, and intended particularly to satirize the weaknesses and foibles of the national character, especially their proverbial lethargy, heaviness, and credulity. The name Michael is used in German to designate any simple, uncultured countryman, and it has probably gained this significance by confusion of the Hebrew word with the old German michel-gross. **Sawney** is the sportive designation sometimes applied by the English to the Scotch, and is probably a corruption of Sandy, the abbreviation of Alexander. Sawney has a humor of his own, strong, and irrepressible, that will break out in spite of worldly thrift, kirk-session, cutty-stool, and lectures. It was first given to the Scotch by Coleridge. **Taffy**, the Welshman, is a corruption of David, one of the most common of Welsh names. **Colin Tampon** is the reproachful, contemptuous nickname given to the Swiss in ancient times, and supposed to imitate the sound of their guns. **Paddy**, from Patrick, refers to the Irish. **John Chinaman** is the popular nickname for the Chinese. The first record of this use was in *A Letter to the Committee of Management of Drury Lane Theatre, London, in 1819*. The Russian nickname, **Ivan Ivanovitch**, denotes the typical muzhik.

NATIONAL REPUBLICAN PARTY. See Whig Party.

NATIONAL STANDARDS AND EMBLEMS. See Standard and *National Coats of Arms* (with Plates), under Heraldry.

NATIONAL UNION. A fraternal beneficial society organized for purposes of mutual help and improvement, and incorporated in 1881 under the laws of Ohio. The number of members at the close of 1902 was 60,000; the number of councils 850. The insurance in force amounted to $140,000,000, and the death benefits paid since the date of organization to over $15,000,000.

NATIONAL WORKSHOPS, or Ateliers Nationaux, ȧ'te-lyȧ nȧ'syō'nō'. A plan of giving public employment attempted in France in 1848. The Provisional Government organized on the overthrow of Louis Philippe by the February Revolution passed a decree (February 25th) defended by its socialist members—Louis Blanc, and a few others—declaring the 'right to work' and pledging the Government to guarantee employment for idle workmen. A few days later 'national workshops' were established. As a matter of fact there were no workshops opened; the work provided was in the open air, and consisted largely in planting trees, digging, and constructing roads—works for which few of the applicants were adapted. Their number, however, increased from day to day and at one time reached 130,000. No work could be found for many of the applicants; these received 30 cents a day, while those actually employed were paid 40 cents, although the work they performed was scarcely worth the additional 10 cents. Under these circumstances many workers who were in private employ demanded higher wages or were content to give up their places and remain idle so long as they might receive 30 cents per day for doing nothing. Several attempts were made to bring the scheme within the range of practical feasibility; but political disturbances and personal jealousies made it impossible to carry them out. After four months' trial and a total expenditure of 14,000,000 francs, the system was abandoned when General Cavaignac became Chief of the Executive.

The national workshops are sometimes erroneously confounded with the *ateliers sociaux* in Louis Blanc's plan of labor organization.

NATIVE (from Lat. *nativus*, natal, inborn, from *nasci*, to be born; connected with Gk. γίγνεσθαι, *gignesthai*, Skt. *jan*, AS. *cennan*, archaic Eng. *ken*, to beget). A term applied in chemistry and mineralogy to elements, especially the metals, when found in nature in a chemically free state.

NATIVE BEAR. The Australian koala (q.v.).

NATIVE COMPANION. An Australian Balearic crane (q.v.).

NATIVITY (Lat. *nativitas*, birth, from *nativus*, natal, inborn), The. A frequent theme of painters. The most celebrated representation of the subject is the famous picture by Correggio known as "La Notte" (the night), in the Dresden gallery. The whole picture is illuminated by the light proceeding from the body of the beautiful child. Above is a group of angels, while day is just breaking in the sky.

NATORP, nä'tōrp, Paul Gerhard (1854—). A German philosopher of the Neo-Kantian type. He was born at Düsseldorf; studied in Berlin, Bonn, and Strassburg; and in 1885 became professor at Marburg. His works include: *Descartes's Erkenntnisstheorie* (1882); an edition of Democritus's *Ethics* (1893); *Religion innerhalb der Grenzen der Humanität* (1894); *Platos Staat* (1895); *Socialpädagogik* (1898); and *Platos Ideenlehre* (1903).

NA'TROLITE (from Eng. *natron*, from Ar. *natrūn*, *nitrūn*, native carbonate of soda, from Gk. νίτρον, *nitron*, λίτρον, *litron*, natron, of Semitic origin (cf. Heb. *neter*, from *nātar*, to loose) + Gk. λίθος, *lithos*, stone). A mineral sodium-aluminum silicate of the zeolite group. It crystallizes in the orthorhombic system, has a vitreous, sometimes pearly, lustre, is transparent or translucent, and ranges in color from white or colorless to gray, yellow, and red. Natrolite is found in cavities in basalt and other igneous rocks, at various localities in Bohemia, the Tyrol, Ireland, and Scotland, in Nova Scotia, in the Lake Superior region, and at Bergen Hill, N. J. It is capable of receiving a high polish, and has been used as a gem for rings and other ornaments, especially in the form of the letter N in initial jewelry.

NA'TRON. A hydrous sodium carbonate that crystallizes in the monoclinic system, and is found in nature only in solution, as in the Soda Lakes of Egypt. Of similar character is the *Trona*, an impure hydrogen sodium carbonate, which occurs as thin crusts along the margin of lakes in Egypt, Siberia, Tibet, and on the borders of the Black and Caspian seas. These minerals form the source of the soda salts of the ancient Egyptians, and were used by them in their arts, especially in embalming. Of like character is the carbonate of soda found at the bottom of the lake at Lagunillas near Mérida, Venezuela, which is called by the Indians *Urao*. Similar efflorescences are found in San Bernardino and Inyo counties, California, where they are formed by the spontaneous evaporation of saline waters.

NATTER, nät′tẽr, Heinrich (1846-92). An Austrian sculptor, born at Graun, Tyrol. He studied at the Polytechnicum in Augsburg and at the Academy in Munich. He lived in Munich and afterwards in Vienna. Besides many portrait busts of celebrities, he produced a number of memorial statues and groups, notably the "Zwingli Monument" (1885) at Zurich; the "Haydn Monument" (1887) in Vienna; "Walther von der Vogelweide" (1889) at Bozen; and the heroic statue of "Andreas Hofer" (1892) on Mount Isel, near Innsbruck, his principal work.

NATTERJACK (from AS. *nædre*, Goth. *nadrō*, Ger. *Natter*, adder + *jack*). A common, light-colored, rather smooth toad (*Bafo calamita*), of Western Europe, found in sandy districts. Its active habits have given it the name 'running toad' in some parts of England.

NATTIER, nȧ′tyȧ′, Jean Marc (1685-1766). A French portrait painter, born in Paris. He was the son of the painter J. B. Nattier, and a pupil of Jean Jouvenet. He won the Academy prize in 1700, became a member of that body in 1718, and professor in 1752. He went to Amsterdam in 1715 and there painted portraits of Peter the Great, of his wife, Catharine I., and of members of their suite. If Rigaud is the painter par excellence of the men of his time, Nattier has done as much for the women. There are many portraits by him at Versailles, such as those of Maria Leszczynska, Madame Henriette de France (1751-54), Madame Adelaide, Madame Victoire, and Louise Henriette de Bourbon. Madame de Châteauroux as "Dawn," and Madame de Flavacourt as "Silence," are two of his best known works. "Magdalen in a Grotto" is his only work in the Louvre.

NAT TURNER'S INSURRECTION. See Turner, Nat.

NATUNA (nȧ-tōō′nȧ) **ISLANDS.** A group of islands in the South China Sea, northwest of Borneo, belonging to Holland (Map: Australasia, C 2). They are for the most part densely wooded and mountainous, but have some cultivated tracts which produce maize, rice, sago, and cocoanuts. The area is estimated at 803 square miles, and the inhabitants, who are chiefly Malay fishermen, number about 8000.

NATURAL (from Lat. *naturalis*, according to nature, from *natura*, nature, from *nasci*, to be born; connected with Gk. *γίγνεσθαι*, *gignesthai*, to become, Skt. *jan*, to beget, AS. *cennan*, obsolete Eng. *ken*, to beget). In music, the sign ♮, which, placed before a note, counteracts the effect of a previous ♯ or ♭ and restores the note to its normal or natural place. To counteract a double sharp or a double flat (×, ♭♭) a single natural is used, although it was formerly customary to write a double natural (♮♮). This form is superfluous and incorrect. In a key with many sharps or flats a doubly raised or lowered interval is generally restored to the chromatically altered tone required by the key signature. Thus, in G flat a b♭♭ would be restored, not to b, but to b♭, which is indicated by ♮ ♭. Likewise in a signature with sharps the *natural* sign appears as ♮ ♯.

NATURAL BRIDGE. One of the chief natural curiosities in the United States. It is situated in Rockbridge County, Va., 115 miles west of Richmond (Map: Virginia, E 4). The bridge spans a deep chasm, through which a small stream flows. It is composed of a hard siliceous limestone in horizontal strata, and is the remnant of the roof of a great cave which formerly covered the gorge. This remnant now remains in the form of an arch 215 feet high. The span of the arch is from 45 to 60 feet, and the thickness of its crown is about 40 feet, while its average width is 60 feet. A public road passes across it.

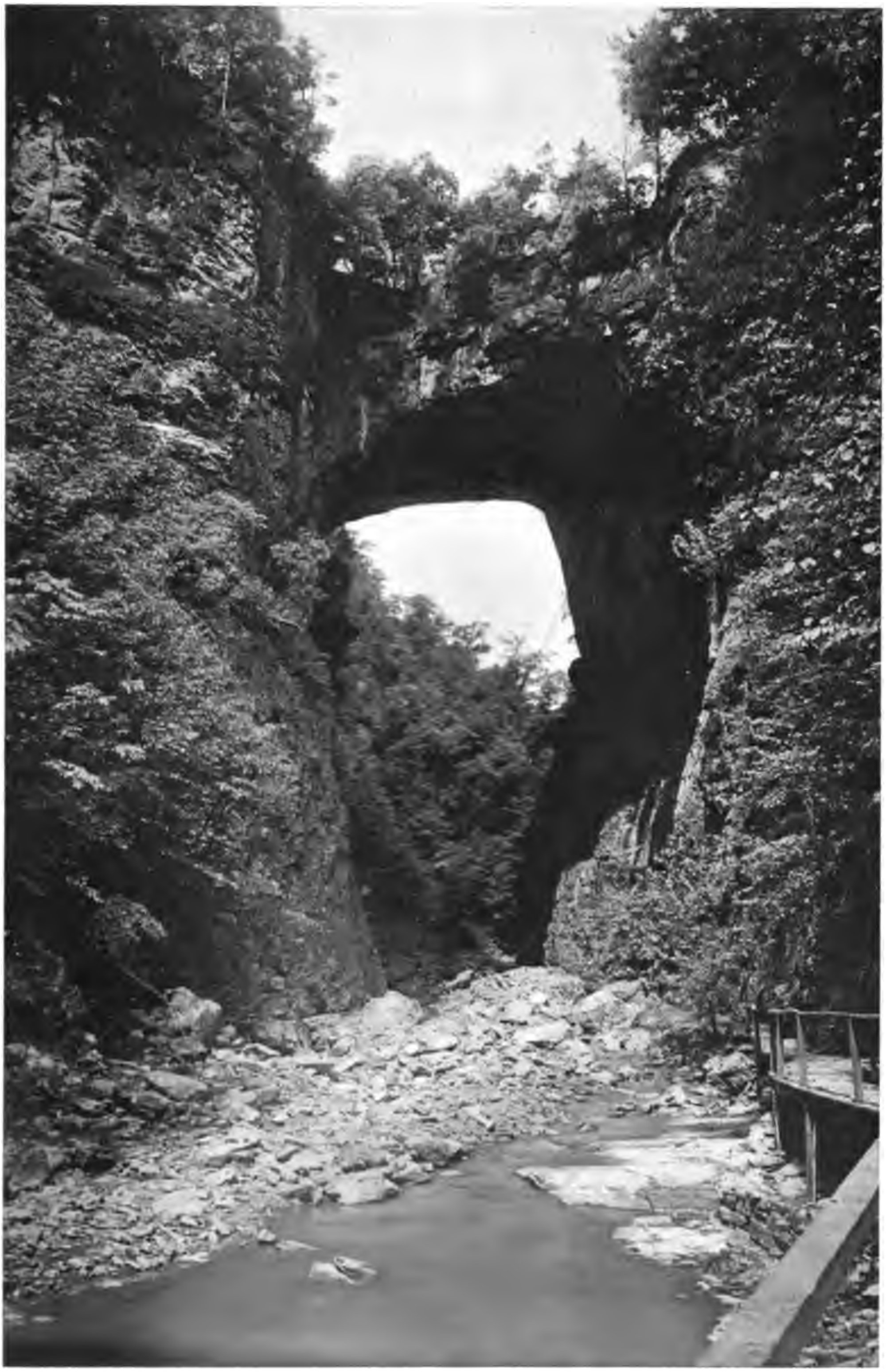
NATURAL GAS. See Gas, Natural.

NATURAL HARMONICS. See Harmonics.

NATURAL HISTORY. A term used at different times and by different authors in a variety of senses. It was applied at first to the study of all natural objects, including minerals, rocks, and all living beings. The study of external nature, and of the phenomena or laws governing the movements of natural bodies, was formerly opposed to metaphysics, history, literature, etc. After a while astronomy and chemistry were eliminated from natural history; then natural philosophy, or what is now called physics, was separated from chemistry. But natural science, as distinguished from physical science, has made such progress that we must now know whether our naturalist is a mineralogist, a geologist, a paleontologist, a botanist, a zoölogist, or a specialist in some narrower department of biological study. At present natural history is confined to the study of organic nature, or biology, and students of general physiology and morphology are called biologists. See Biology; Bionomics.

NATURAL HISTORY OF SELBORNE. A work by Rev. Gilbert White (1789). It was produced from letters written by the author to Thomas Pennant and to Daines Barrington on outdoor life in a Hampshire village. Written in a style simple and entirely free from self-consciousness, it shows wonderful observation of nature, with a charm that made it an English classic.

NATURALISM. The name given in philosophy to any system which seeks to explain the order of the universe by efficient causation alone, without calling in the aid of conscious purpose. (See Causality.) The most prevalent forms of naturalism have been mechanistic, i.e. have attempted to reduce efficient causation to mechanical causation. For instance, the systems of Democritus, Epicurus, and Lucretius attempted to account for the universe as we know it by the fall of atoms. A more elaborate form of the same attempt is to be found in modern materialism (q.v.). But naturalism need not be merely mechanistic. It may recognize the fact that psychic phenomena have laws of their own which cannot be deduced from the laws of motion; for the recognition of unique psychological laws may very well go with a refusal to regard the whole course of nature, physical and psychical, as in any way controlled by an overruling purpose. Many so-called materialists, e.g. Feuerbach,



THE NATURAL BRIDGE

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are not materialists at all, but naturalists in this sense of the term. Opposed to the naturalists are the teleologists. See TELEOLOGY; LOTZE; and consult: Ward, *Naturalism and Agnosticism* (London, 1899); König, *Die Entwicklung des Causalproblems* (Leipzig, 1888-90); Sigwart, "Der Kampf gegen Zweck," in *Kleine Schriften* (2d ed., Freiburg, 1889); Erhardt, *Mechanismus und Teleologie* (Leipzig, 1890).

NATURALISM (in Literature). See REALISM AND NATURALISM.

NATURALISTS, AMERICAN SOCIETY OF. An association organized in 1883, to exchange ideas relating to the problems of natural history. The society now has an active membership of 230. The meetings of the society are held annually.

NATURALIZATION. The act or process by which in any country an alien acquires citizenship. The process consists of two parts, viz. the formal renunciation of the old allegiance and the assumption of a new allegiance. The rights and privileges of naturalized citizens are enumerated and defined by the municipal law of every State. In few or no cases are they the same as those of native-born citizens. In the United States they enjoy the same civil rights as natural-born citizens, and all of the political rights except eligibility to the offices of President and Vice-President. The right of a subject or citizen to renounce his allegiance with a view to acquiring citizenship in another State is now generally recognized. (See EXPATRIATION.) In order to prevent possible conflicts of jurisdiction growing out of the practice of naturalization and the return of naturalized citizens to their native country, it is customary for States to enter into treaties for the regulation of matters relating thereto. Thus, the United States has entered into eleven treaties with foreign powers, in all of which, except that with Great Britain, it is provided that five years of uninterrupted residence with formal naturalization constitutes citizenship on both sides. A majority of them contain the provision that a naturalized citizen returning to his native State shall, after an uninterrupted residence there of two years, be presumed to have renounced his acquired citizenship. It is also a general principle that naturalization does not release an individual from any obligations to his native State which he may have incurred before emigration, as, for example, military service; and if he returns to such State he may be held to the fulfillment of his obligations without being able to invoke the protection of the United States, unless treaty stipulations provide otherwise.

In the United States, the whole matter of naturalization is subject to the regulation of Congress. This power is held to be exclusive, and cannot, therefore, be exercised by the States. However, it is not construed to deprive the State of the right to restrict the civil and political rights of aliens, nor does it prohibit them from granting the suffrage to aliens, or allowing them to hold office. The statutes of Congress provide that any alien, with certain exceptions, may become a naturalized citizen of the United States by making a declaration on oath, before a circuit or district court of the United States, or a district or supreme court of the Territories, or a court of record of any of the States having common-law jurisdiction, at least two years prior to his admission, that it is his *bona fide* intention to become a citizen of the United States, and to renounce at the same time all allegiance to any foreign State, as well as all hereditary titles of nobility which he may hold. This step is known as the declaration of intention, and after it is made the declarant is perhaps morally entitled to a qualified amount of protection from the United States, although it cannot be claimed as an absolute right. (See KOSZTA AFFAIR.) The full admission to citizenship follows after due proof has been furnished that the declarant has resided in the United States at least five years next preceding his admission, and within the State or Territory where the court sits for one year. By the act of 1790 the term of residence required was two years; in 1795 it was extended to five years; and in 1798 it was raised to fourteen years. Since 1802, however, the term has remained at five years. A minor alien who has resided in the United States for a period of three years next preceding his arrival at the age of twenty-one, and who has continued to reside there up to the time of his application, may be admitted to citizenship without the previous declaration, provided he has resided in the United States for a period of five years. Any alien seaman who has served three years on a merchant vessel of the United States subsequent to the date of his declaration may become a citizen by the production of a certificate of discharge and good conduct. The widow and children of an alien who has declared his intention of becoming a citizen, but dies before completing the final steps of naturalization, are considered as citizens upon taking the oath prescribed by law. An alien woman who marries a citizen of the United States, and who herself might be lawfully naturalized, is considered a citizen. Children born outside of the limits of the United States, but of parents who are citizens, are considered as citizens; but the rights of citizenship in such cases do not descend to children whose parents never resided in the United States. Since 1870 the privilege of naturalization has been extended to aliens of African nativity and of African descent. Chinese aliens are excluded by statute of Congress from the privilege of naturalization.

In Great Britain formerly the naturalization of an individual could be effected only by special act of Parliament. It was not until 1844 that a general naturalization law was enacted. This was followed by the comprehensive act of 1870, which with a few changes is the law now in force. By this act it is provided that an alien who has resided within the United Kingdom for a period of five years, and who intends to continue his residence therein, may apply to one of the principal secretaries of State for a certificate of naturalization, presenting such evidence as to residence and character as may be required. It is wholly within the discretion of the secretary as to whether the certificate shall be granted. A naturalized citizen in Great Britain is entitled to all the civil and political rights and privileges, and subject to all the obligations of natural-born citizens, except that when in his native State he shall not be deemed a British citizen unless he has complied with all the laws of that State regarding expatriation. Consult: Davis, *Elements of International Law* (New York, 1900); Woolsey, *International Law*

(New York, 1899); *Revised Statutes of the United States,* title "Naturalization;" and Moore, *Digest of International Law* (Washington, 1903). See Alien; Allegiance; Citizen.

NATURALIZATION. In biology, the establishment of plants and animals in a new region, especially through the agency of man. Primarily, exotic species soon become feral and compete with indigenous species. They frequently never gain a foothold, but if they do they usually spread at first with extraordinary vigor, owing to the absence of their natural enemies. But later an adjustment with the other species in the country occurs, and after that the disproportionate numbers of the introduced form disappear, i.e. the new species becomes adjusted or 'naturalized.' Compare Acclimatization.

NATURAL LAW. Greek Philosophy. Some of the Greek Sophists, and later the Epicureans, held that law and justice were arbitrary conventions established by the weak for self-defense against the natural right of the strong. Socrates, in this as in other matters, antagonized the theories of the Sophists; but it was Aristotle who formulated the conception of natural justice which has remained dominant to the present day. In his view justice is in part legal, in part natural. Legal justice deals with matters which must be regulated, but which may be variously regulated. Natural justice, on the other hand, is not arbitrary; its rules are everywhere similar. The Stoics went further: they asserted that the rules of natural justice were founded on reason, and were therefore discernible by reason; and the later Stoics termed this rational order natural *law.*

Roman Jurisprudence. The Roman lawyers noted the fact that many substantially identical rules were observed by all the Mediterranean nations; and to this common law they gave the name 'law of nations' (*jus gentium*). In the first century before Christ they began to speak of 'natural law.' In the Roman juristic literature the term is used in four different senses: (1) Natural law is identified with universal law (*jus gentium*). This is practically the Aristotelian sense. (2) Natural law is contrasted with the law observed by all nations; e.g. it is said that by nature all men are free, and that slavery has been introduced by the law of nations. This is the Stoic conception of natural law. (3) Sporadically, the Epicurean idea appears, as when it is said that buyers and sellers have a natural right to overreach one another as regards price. (4) Ulpian has a theory which seems to have been peculiarly his own, but to which Justinian gave a factitious importance by including in his Institutes Ulpian's definition: "Natural law is that which nature has taught all living things." The illustrations, which refer to rudimentary family life, are biological rather than legal. Although the Roman jurists referred to the law of nature for the interpretation of their own law, and even drew from it supplementary rules where their own law was silent, they referred far more frequently, and for the same purposes, to 'natural reason' and to 'equity;' and they never ascribed to the law of nature such authority as to question the validity of a Roman rule because it was not in accordance with natural law. See Civil Law; Jus Gentium; Jus Naturæ.

Mediæval Theories. The doctrines of Aristotle and of the Roman jurisprudence were generally accepted in the Middle Ages as authoritative, and many attempts were made to reconcile them. There was a marked tendency to identify natural law with the law of God: in the Decretum of Gratian it is declared that natural law is identical with the Golden Rule. Thomas Aquinas divided all law into four classes: eternal, divine, natural, and human. The eternal law is the controlling plan of the universe, existing in the mind of God. A part of this eternal law has been directly revealed to men; this is the divine law. Another part is discerned by human reason; this is natural law. Except in its fundamental principles, natural law is not immutable, for "it seems to be natural to the human reason that it comes gradually from the imperfect to the perfect." Human law is the application of natural law to particular conditions. The practical influence of these theories upon the development of European law during the Middle Ages was slight. In the development of the English common law, as in the development of the Roman Imperial law, appeals to natural reason were far more frequent than appeals to natural law. In England, however, as well as on the Continent, the general law merchant, which was *jus gentium* in the Roman sense, was recognized as natural law.

Modern Theories. Natural Law as a Factor in Legal Reforms. The general effect of the Protestant Reformation was to free the conception of natural law from ecclesiastical associations and limitations, and to reëmphasize its rational character. Natural-law theories became effective factors in the reform of the law. In the seventeenth century natural law was treated as a source of international law; and many rules which had not yet become rules of international custom attained this position through the writings of Grotius, Pufendorf, and others on 'the law of nature and of nations.' Later, during the eighteenth century and the earlier years of the nineteenth, when the great national codes of civil and criminal law were drawn up in Prussia, Austria, France, and other countries, natural-law theories helped to give the legislators a more independent attitude toward established law and custom. In England utilitarianism played a similar part in facilitating law reform.

Natural Rights as the Basis of Political Revolution. The theory of Cicero and of Thomas Aquinas, that laws in conflict with natural law are not truly laws, developed its revolutionary (not to say anarchistic) possibilities when the interpretation of natural law passed from secular and ecclesiastical authorities to the people at large. The theory that the popular consciousness is the true interpreter of that natural law by which all rulers are bound, found frequent expression before the close of the Middle Ages; e.g. in the writings of Marsiglio of Padua. With the Protestant Reformation these theories became practical forces in matters religious and political, and the tendencies which they represented first obtained a temporary triumph in England under the Commonwealth. Those legal rights which Englishmen had succeeded, through centuries of conflict, in asserting against the Crown were brought by the Levelers into connection with the natural-law theories of the Continent, and thenceforth the rights of the individual to life, liberty, and property were 'natural' rights. To these were soon added the right to participate in the constitution of government. As formulated by Locke and reformulated by Rousseau, these natural-right theories legitimized the revolutions which established the modern constitutional State.

REACTION AGAINST NATURAL-LAW THEORIES. The first noteworthy philosophical reaction against the revolutionary natural-law theories was that of Hobbes (q.v.). Equally hostile to natural-law theories was, especially at the outset, the historical school of jurisprudence. The conception of law as a product of historical evolution in each nation led to the assertion that there could be no such thing as eternal or universal law. With the development of comparative study, however, it is again perceived that beneath all the diversity of national laws there is a substantially uniform element which may be called human or universal or natural. This natural law, however, is substantially the *jus gentium* of the Romans or the 'natural justice' of Aristotle, and not the natural law of the Stoics or of the Middle Ages; for it is not discerned by reason, it is rather revealed by the conduct of the human race. See JURISPRUDENCE and LAW.

The following are some of the more recent works; in them will be found ample references to the older literature. Ahrens, *Cours de droit naturel* (8th ed., Leipzig, 1892); Anzilotti, *La scuola del diritto naturale* (Florence, 1892); Bergbohm, *Das Naturrecht der Gegenwart* (Leipzig, 1892); Gierke, *Johannes Althusius und die Entwickelung der naturrechtlichen Staatstheorien* (ib., 1880); Lorimer, *Institutes of Law: A Treatise of the Principles of Jurisprudence as Determined by Nature* (2d ed., Edinburgh, 1880); Mendizabal y Martin, *Elementos de derecho natural* (2d ed., Saragossa, 1897-99); Meyer, *Institutiones Iuris Naturalis Secundum Principia S. Thomæ Aquinatis* (Freiburg, 1900); Rothe, *Traité de droit naturel* (Paris, 1884-95).

NATURAL RIGHTS. See NATURAL LAW.

NATURAL SELECTION. The evolution idea is as old as the time of the Greek philosophers, but that form of it called natural selection, or Darwinism, dates from 1858, when the theory was stated by Darwin (q.v.) and also by Wallace (q.v.), each independently of the other. Nearly a century earlier Buffon, and afterwards Erasmus Darwin, had suggested that species were mutable, and that all living beings had descended from some primitive type or germ, the transformation having been effected by changes of climate, food, exercise, and so on. But the real founder of the modern theory of organic evolution was Lamarck (q.v.; see also LAMARCKISM). The chief agents or factors of organic evolution which he proposed were changes of environment, of climate, soil, food, temperature, use, and disuse, while he briefly mentions the agency of competition, the results of geographical isolation, and the swamping effects of crossing, besides use-inheritance. Although supported by a few, though well-selected, facts, Lamarck's views were, owing to the influence of Cuvier, and the deep-seated prejudice of the times, ignored and well-nigh forgotten, except to be called up and ridiculed. Yet between the date of Lamarck's death in 1829 and shortly before 1858 nearly thirty naturalists, most of them of eminence, had publicly enunciated in a tentative way evolutional views—among them Grant, Wells, Naudin, D'Halloy, Schaaffhausen, Wallace in 1855, and others. Meanwhile Hutton and Lyell had advanced uniformitarian views in geology. Progress in the knowledge of the flora and fauna of the earth had greatly increased. The cell doctrine had been advanced; the sciences of paleontology, embryology, and morphology had been founded and were rapidly gaining ground.

As early as March, 1852, Herbert Spencer, in an essay published in the *Leader*, advocated the theory of the modification of species by changes of environment, and a few years later adopted the word 'evolution,' applying it to psychology, and later to sociology and comparative religion.

HISTORY OF THE RISE OF THE SELECTION THEORY. Such was the state of certain isolated scientific and philosophic minds, though the rank and file of naturalists were either indifferent or opposed to the theory of descent, when in 1858 the preliminary essays of Darwin and of Wallace were given to the public. Their views, which were destined to give such a decided impulse to biological inquiry, were independently confirmed by several biological experts after years of experience and research in all parts of the globe. The botanist Sir Joseph D. Hooker, when surgeon and naturalist of the *Erebus* in the Antarctic expedition under Sir John Ross, published a flora of New Zealand, a *Flora Antarctica*, and in 1859 published his *Introduction to the Flora of Australia*, in which he advocated the selection theory. Before this (1858) Wallace had spent four years on the Amazon, and afterwards eight years in the East Indian Archipelago, making large collections and careful observations. Meanwhile Charles Darwin, as the naturalist of the *Beagle* for nearly five years (1831-36) during her voyage around the world, was constantly exercising his marvelous powers as an observer. What chiefly led him, as early as 1839, to begin to favor the theory of descent, were his observations on the fossil mammals, the colossal armadillos and sloths, and the like, of South America, which appeared to be the ancestors of the degenerate forms now living; also the occurrence of local species on each of the Galapagos Islands, which he found to be very similar to those of the South American coast, and yet slightly different. The result was that after twenty years of observations, experiments in his garden, and reflection, he elaborated the theory of natural selection.

On the first of July, 1837, he opened his first note-book to record any facts bearing on the origin of species, but "did not become convinced that species were mutable until two or three years had elapsed." More than a year after (October, 1838), he says: "I happened to read for amusement Malthus on *Population*, and being well prepared to appreciate the struggle for existence which everywhere goes on from long-continued observations of the habits of animals and plants, it at once struck me that under these circumstances favorable variations would tend to be preserved, and unfavorable ones to be destroyed. *The result of this would be the formation of new species.*" It is worthy of notice that Malthus was the father of natural selection, that the *Essay on Population* was the source of inspiration of both Darwin and Wallace, and that to this fact is apparently due the exact similarity in, or coincidence of, their views. Darwin's preliminary essay, together with that of Wallace, who had also read Malthus's *Essay on Population* containing nearly identical selection views, was published in 1858. In the following year appeared Darwin's epoch-making *Origin of Species.* His theory was at once accepted by Canon Tristram, Lyell, Hooker, Bates, Huxley, and others in Great Britain; in the United States of America by Asa Gray and Jeffries Wyman, and in Germany by Haeckel, while Fritz Müller, working on the same lines in Brazil, fully accepted and extended his views. That the time was ripe for the development and growth of the evolutionary idea was proved by its speedy and general acceptance by nearly all working naturalists and thoughtful minds. Moreover, the selection phase was easy to understand by laymen, and soon the multitude accepted the new views.

THE NATURAL SELECTION THEORY EXPLAINED. The theory of natural selection is based on the facts of variation. As to the causes of variation, Darwin does not say much in the *Origin of Species.* Basing his theory on the fact that variations are constantly and spontaneously arising, he claimed that the favorable variations have succeeded in the struggle for existence, while those unfit or unfavorable have perished.

He also remarked that as long as the conditions of life remain the same, we have reason to believe that a modification which has already been inherited for many generations may continue to be inherited for an almost infinite number of generations. We are also told that as each land had undergone great physical changes, we might have expected to find that organic beings have varied under nature in the same way as they have under domestication. "And if there be any variability under Nature, it would be an unaccountable fact if natural selection did not come into play." "If, then," he asks, "animals and plants do vary, let it be ever so little or so slowly, why should we doubt that the variations or individual differences which are in any way beneficial would be preserved and accumulated through natural selection, or the survival of the fittest? If man can by patience select variations useful to him, why, under changing and complex conditions of life, should not variations useful to Nature's living products often arise, and be preserved or selected? What limit can be put to this power, acting during long ages and rigidly scrutinizing the whole constitution, structure, and habits of each creature—favoring the good and rejecting the bad? I can see no limits to this power, in slowly and beautifully adapting each form to the most complex relations of life."

GEOMETRICAL RATIO OF INCREASE OF ORGANISMS. "A struggle for existence," says Darwin, "inevitably follows from the high rate at which all organic beings tend to increase." There is a vast destruction of seeds, eggs, embryos, and young. Were this not the case the earth would soon become covered with the progeny of a single pair. Linné pointed out that an annual plant producing two seeds only—and there is no plant nearly so unproductive as this—and these each producing two in the following year, and so on, would in twenty-one years produce over a million plants. The elephant is regarded as the slowest breeder of all known animals, yet a single pair would become in the course of about seven and a half centuries, if all lived to the close of the breeding age, the ancestors of nearly 19,000,000 elephants.

The rate of increase of an animal, each pair producing ten pairs annually, and each animal living ten years, is shown in the following table, copied from Marshall's Lectures:

YEAR	Pairs produced	Pairs alive at end of year
1	10	11
2	110	121
3	1,210	1,331
4	13,310	14,641
5	146,410	161,051
10	....	25,937,424,600
20	....	Over 700,000,000,000,000,000,000

Immense numbers of eggs are laid by certain animals, and yet there are probably no more individuals now than centuries ago, the number of individuals remaining as a whole stationary. The queen bee lays during her whole life a million eggs, the conger eel is estimated to deposit 15,000,000, the oyster from 500,000 to 16,000,000, and a very large oyster may produce even 60,000,000 of eggs. "Supposing," says Marshall, "we start with one oyster and let it produce 16,000,000 eggs, the average American yield, and let half, or 8,000,000, be females and go on increasing at the same rate; in the second generation we shall have sixty-four millions of millions of female oysters. In the fifth generation—i.e. the great-great-grandchildren of our first oyster—we should have thirty-three millions of millions of millions of millions of millions of female oysters. If we add the same number of males we should have in all 66 + 33 naughts. If we estimate these as oyster-shells, we should have a mass more than eight times the size of the world."

Darwin also claimed that natural selection "acts solely by accumulating slight, successive, favorable variation," and can produce no great or sudden modification. It can act only by short and slow steps, hence "the canon of *Natura non facit saltum,* which every fresh addition to our knowledge tends to make truer, is on this theory intelligible."

USE AND DISUSE. Darwin in some cases admits the action of use and disuse. In both varieties and species, he says, use and disuse seem to have produced a considerable effect. His examples are blind cave animals, the burrowing South American 'tucutucu,' which is occasionally blind, and certain moles; also the logger-headed duck, which has wings incapable of flight, in nearly the same condition as in the domestic duck. Instincts he regards as having been slowly acquired through natural selection. See USE-INHERITANCE.

THE GEOLOGICAL RECORD. He then dwells on the geological record, which, although it is very imperfect, yet the facts strongly, he claims, support the theory of descent with modification. The extinction of species and of whole groups of species almost inevitably follows from the principle of natural selection; for old forms are supplanted by new and improved forms. The fact, he says, that the fossil remains of each formation are in some degree intermediate in character between those in the strata above and below, is simply explained by their intermediate position in the chain of descent. The grand fact that all extinct beings can be classed with all recent beings naturally follows from the living and the extinct being the offspring of common parents. Species have generally diverged in character during their long course of descent and modification, and thus the more ancient types are in some degree intermediate between existing groups. Recent forms are more improved and generally more specialized than the earlier ones. Yet certain forms have retrograded, while others have retained 'simple and little improved structures,' being what are called 'persistent types.'

GEOGRAPHICAL DISTRIBUTION. The facts of geographical distribution are also utilized by Darwin, who calls attention to the past migrations of animals from one part of the world to another owing to former climatic and geographical changes. They also explain why on the same continent under the most diverse conditions most of the inhabitants within each great class are plainly related, the reason being that they are the descendants of the same progenitors and early colonists. They explain why oceanic islands are inhabited by only few species, most of these, as those of Madagascar, being peculiar or endemic species. Moreover, the existence of closely allied or representative species in any two areas, as Europe and North America, implies that the same parent forms formerly inhabited both areas. It is also the rule that nearly all the inhabitants of islands have been derived from ancestors which lived on the nearest mainland. Thus the plants and animals of the Galapagos Archipelago, of Juan Fernandez and the other American islands, are closely related to those of the neighboring American mainland, while those of the Cape de Verde Archipelago and other African islands were derived from the opposite African coast.

FACTS OF MORPHOLOGY, EMBRYOLOGY, THE DOCTRINE OF HOMOLOGIES. These were also drawn upon by Darwin. He maintained that adaptive characters, though of paramount importance to the beings, are of hardly any importance in classification, while vestigial characters are often of high classificatory value, the most valuable of all often being embryological characters. "The real affinities of all organic beings, in contradistinction to their adaptive resemblances, are due to inheritance or community of descent."

NATURAL SELECTION NOT THE EXCLUSIVE MEANS OF MODIFICATION. It should be observed that Darwin frankly expressed the conviction that natural selection, though the most important, has not been the exclusive means of modification. He allowed that the absence of eyes in cave animals is not the result of natural selection, saying: "I attribute their loss wholly to disuse."

THE CAUSES OF VARIATION. In the first edition of his *Variation of Animals and Plants Under Domestication*, Darwin, after defining the definite action of the environment, added: "A new sub-variety would thus be produced without the aid of natural selection," but this passage was omitted from the second edition. Besides the *Origin of Species* Darwin published a number of other works, the most important of which was ***The Variation of Animals and Plants under Domestication*** (1868). Toward the end of his life he gave more attention to the causes of variation, which at first he said were unknown, and in the work just cited he says: "Changes of any kind in the conditions of life, even extremely slight changes, often suffice to cause variability" (2 ed., ii., p. 258); and again: "Variations of all kinds and degrees are directly or indirectly caused by the conditions of life to which each being, and more especially its ancestors, have been exposed," adding: "To put the case under another point of view, if it were possible to expose all the individuals of a species during many generations to absolutely uniform conditions of life, there would be no variability" (ii., pp. 253, 255-256). He attributes the differences in races of cats living in Paraguay, at Mombasa, East Africa, and in Antigua, "to the direct action of different conditions of life" (i., p. 49); so with the horses of the South American pampas and of Puno. He refers to Dr. J. A. Allen's conclusions relative to the direct action of the climate in producing geographical varieties of birds, and concludes that "these differences must be attributed to the direct action of temperature" (ii., p. 271). So also, accepting the results of Meehan's comparisons on the leaves of 29 kinds of American trees with their nearest European allies, Darwin candidly admits that "such difference cannot have been gained through natural selection, and must be attributed to the long continued action of a different climate" (ii., p. 271).

The objections to his theory raised by Darwin himself he discusses with his usual candor. Of these the most important is the absence, to use his own words, of the "interminable number of intermediate forms," which must have existed, "linking together all the species in each group by gradations as fine as are our present varieties." He says he can only answer this objection "on the supposition that the geological record is far more imperfect than most geologists believe." The other objection is the existence of two or three castes of worker or sterile ants in the same community.

STATUS OF DARWINISM AT THE PRESENT DAY. Such are the views of Darwin, as published in his *Origin of Species*. Although he pushed the special form of evolution to what one would suppose to be its furthest limits, yet as we have seen he somewhat modified his views later in life. The views of probably a large proportion of the moderate Darwinians at the present time have been expressed in a broad and candid way by Romanes, an able and careful commentator and expounder of the doctrine of natural selection. In his *Darwin and After Darwin* (1892), the most clear and readable exposé of the doctrine, the doctrine is thus stated. All plants and animals are perpetually engaged in the struggle for existence. This strife consists in the fact that in every generation of every species a great many more individuals are born than can possibly survive. Now nature "selects the best individuals out of each generation to live." "And not only so, but as these favored individuals transmit their favorable qualities to their offspring according to the fixed laws of heredity, it further follows that the individuals composing each successive generation have a general tendency to be better suited to their surroundings than were their forefathers. . . . And this follows not merely because in every generation it is only the 'flower of the flock' that is allowed to breed, but also because, if in any generations some new and beneficial qualities happen to arise as slight variations from the ancestral type, they will (other things permitting) be seized upon by natural selection, and, being transmitted by heredity to subsequent generations, will be added to the previously existing type." At the present day an increasing number of evolutionists do not regard natural selection as an active cause, but rather as the result of the action of a number of other agents, comprising the Lamarckian factors of change of environment, use, disuse, isolation, and so on. Undoubtedly, as the result of competition, animals have been driven to migrate, to adopt new habits, and thus to undergo modification. Many agree with Herbert Spencer as to the inadequacy of natural selection to account for the origination of new forms. From probably a third to nearly one-half of the species of plants and animals now existing are climatic, local forms, resulting from the direct action of changes in the conditions of life, such as climate, soil, food, and the like. The great number of species of parasitic animals are the result of the young adopting a fixed or a more or less stationary mode of life. Natural selection is inoperative in the case of blind or eyeless cave and deep-sea animals.

Objections to Natural Selection. The objections now being urged to the special doctrine of natural selection are that, (1) to use Herbert Spencer's words, it is 'inadequate'; (2) the favorable variation may be destroyed by the swamping effects of crossing; (3) natural selection is not analogous to artificial selection; nature is continually eliminating monstrosities, sports, variations, instead of preserving them; they are constantly being bred out in wild plants and animals, or those living under natural conditions of existence. The otter or ancon sheep, which under the breeder's care and watchfulness became a peculiar variety, when permitted to mingle or cross with normal sheep became extinct. Natural selection accounts for the preservation rather than the origination of new or incipient forms and structures. For the causes of variation, it is maintained, we must look to the action of the primary factors of organic evolution, namely to the effects of changes in light, temperature, heat, moisture, dryness, altitude, food, and so on.

(4) It is not necessarily the fittest or most useful structures or individuals which survive. Carnivorous animals in seizing or swallowing immense numbers of eggs, embryos, and adult animals do not select this or that individual, but, on the contrary, old and young, the fit and the unfit, weak and strong, are engulfed in the maw of the whale as it swims through a shoal of minute crustacea; or hundreds of small fishes are indiscriminately, without reference to their fitness, swallowed by sharks. So with aphides existing in hundreds of thousands on some tree, the birds, like old Time of the New England Primer, indiscriminately pick off "all, both great and small." This matter of the survival of the fittest and the extinction of the unfit has perhaps been somewhat exaggerated, although it is granted that competition acts unceasingly in the biological environment.

(5) Darwinians acknowledge, as does Wallace in his *Darwinism*, that no one ever saw a species originated by natural selection; Weismann has frankly affirmed that "it is really very difficult to imagine this process of natural selection in its details; and to this day it is impossible to demonstrate it in any one point" (*Contemporary Review*, 1893, p. 322). Yet a number of temperature species, races, or breeds have been experimentally produced by changes of temperature. The cases of seasonal dimorphism existing in nature have been exactly paralleled by variations in moths and butterflies subjected in the pupa state to cold, or extreme heat; and dry-season and wet-season as well as summer and winter forms have been produced artificially, besides other variations supposed to be extinct phylogenetic species.

(6) The view peculiar to Darwinism is that some individual variation was nursed and preserved, while all the others less favorable died. Some naturalists claim that the better-founded view is that of Lamarck, that the changes of environment simultaneously affected great numbers of individuals in a given region, which became modified by changes of climate, and so on, *en masse*. This certainly appears to be the case in local, insular, or geographical races, varieties, or species. What affects one affects all the individuals in a given area isolated by mountain barriers or other natural boundaries. Where natural selection appears to act is in the case of protective mimicry. The initial causes are changes in the amount of light, of shade, heat, and other physical agents, yet natural selection appears to be operative in bringing out the wonderful cases of mimicry so well known. (See Mimicry.) While therefore the Neo-Lamarckian readily acknowledges that natural selection results after new variations have arisen, there are those who, like the Rev. Mr. Henslow, maintain that in the case of seedlings natural selection is not concerned in bringing about the survival of the fittest, adding: "*A seedling survives among others solely because it is vigorous.*" He claims that as soon as a large number of seedlings appear above ground, "natural selection at once steps in, so to say, with the result that all those with too weak a constitution to maintain themselves fail to withstand the struggle for existence and to come to maturity, the stronger plants only proving themselves the best fitted to survive. This process of selection, however, is quite independent of any modifications in morphological structure, by which 'varieties' or subspecies are alone recognized." The fact that the majority of offspring always perish in infancy he calls 'constitutional selection.'

(7) Darwin expressly regarded most variations as indefinite, chance, fortuitous, spontaneous or promiscuous, 'survival of the fittest,' as Romanes expressed it, "becoming the winnowing fan, whose function it is to eliminate all the less fit in each generation, in order to preserve the good grain, out of which to constitute the next generation. And as this process is supposed to be continuous through successive generations, its action is supposed to be cumulative, till from the eye of a worm there is gradually developed the eye of an eagle." Other variations Darwin called 'definite.' In the chapter of his *Variation of Animals and Plants Under Domestication*, entitled "Direct and Definite Action of the External Conditions of Life," he says: "By the term definite action, as used in this chapter, I mean an action of such a nature that, when many individuals of the same variety are exposed during several generations to any particular change in their conditions of life, all or nearly all the individuals are modified in the same manner."

This appears to be practically the same view as that which was advanced by Lamarck, and which is called by Eimer 'orthogenesis' (q.v.).

Variation as the result of changed conditions is in nearly every case—perhaps four-fifths of all that occur, thus leaving very little scope for the play of chance or fortuitous variations—due to causes of which we are ignorant. Fortuitous variations, in fact, are an almost negligible quantity. Hence the primary postulate of natural selection that variations are in general fortuitous is in the nature of an assumption, and not based on observed facts. As the result of recent investigation we are coming more and more to the view that variation in general is the result of the action of changed conditions of life, conditions both physical and biological, and that natural selection is not an active agent.

(8) Since Darwin called attention to the lack of long series of intermediate links between species, naturalists have been more and more inclined to the belief that such series of connecting variations have never existed, but that nature makes leaps, that species often arise by sudden or 'quick' or saltatorial evolution. Certainly neither in the Paleozoic or later strata, nor at the present time, do we observe these series of minutely graduated numberless annectent forms postulated by Darwin, there still being gaps between the known connecting links. Hyatt, W. H. Dall, Galton, De Vries, and many others, have advocated the view of the rapid or sudden modification of structure involving the sudden appearance of species, especially in Paleozoic times. This is seen by the results of the examination of the Steinheim forms of Planorbis, and of the Tertiary forms of Austrian Paludina, where there are often wide gaps even between the connecting links. The new species of evening primrose raised by De Vries originated suddenly, without preparation or intermediate forms. Even in the great variations observed by C. C. Adams in the forms of the fresh-water snail Io, peculiar to the upper tributaries of the Tennessee River above Chattanooga, the variations are evidently due to the varying nature of the bottoms of the streams, the rapidity of the current, and the forced isolation of the varieties, the different forms, from smooth to very spiny, being closely correlated to the varying nature of each stream, and different sections of each stream from the headwaters to the mouth. In this case there is apparently no action of natural selection, but a direct response to the environment, and the gaps may thus be either marked or slight. In the hundreds of sub-varieties of *Helix nemoralis*, the gaps or intervals between such forms are distinct and well marked.

(9) Natural selection is manifestly inadequate to account for the origin of the principal types or classes of plants and animals. They must have appeared with comparative suddenness, as the result of changes of the conditions of life, inducing new needs, new habits, and the origin by exercise of new organs. Thus the types of cœlenterates, echinoderms, crustacea, flying insects, amphibia, reptiles, birds, and mammals were the result of the action of the changed environment, of effort, use, isolation, and heredity, at a time when the ancestral forms were more plastic than their descendants.

(10) Natural selection, it has been claimed, could not have begun to act until the earth had become sufficiently well stocked with plant and animal life to afford materials for competition and survival of the fittest. The first forms of life must have arisen through the operation of the Lamarckian factors. In conclusion it may be said that it still remains an open question whether natural selection is an active or by any means universal agent in evolution. Finally it may be observed that the processes of evolution are in kind like those of simple growth of the individual organism, and due to the same factors, and as in ontogenesis there is no one predominant factor, so in phylogenesis there is no one predominant factor, no preponderating mechanism such as has been ascribed to natural selection. In the opinion of some expert working naturalists, the greater number of known species have been produced without its aid. It is not of the same nature as artificial selection. Yet the theory is widely accepted, and by its aid Darwin converted the world to a belief in evolution in general.

The views 'widely accepted' as to the relation of natural selection to the other factors of organic evolution may be tabulated thus:

I. Primary factors.

Direct.—Changes of cosmical environment, changes of climate, light, darkness, temperature, dryness, and humidity, physical and chemical constitution of the soil and of waters, mechanical state of the *milieu*, winds, currents of water, biological environment, food, competition, parasitism, symbiosis.

Indirect.—Reaction against cosmical environmental conditions; adaptation, convergence, reaction against biological conditions, mimicry.

II. Secondary factors.

Heredity, vital concurrence, natural and sexual selection, segregation, geographical isolation, amixia, hybridity.

For bibliography, see EVOLUTION.

GERMINAL SELECTION. This doctrine, founded by Weismann, is an extension of the general idea of natural selection. To 'superorganic' selection, ordinary 'individual' or 'personal' selection, Roux's theory of histological ('histonal') or intracellular struggle for existence, Weismann has added the idea of a struggle among the hypothetical 'determinants' within the germ, or germinal selection. J. A. Thompson has indicated the importance of a form of struggle lying between Roux's histonal selection and Weismann's germinal selection, namely, the struggle between gametes or potential gametes, e.g. between young ova, between sperms, even between ova and sperms. "A vivid realization of this visible struggle," says Thompson, "and the sometimes discriminate selection which it implies, may lead naturally to an appreciation of germinal selection, which deals with the wholly invisible." Although opinions may differ as to the existence of this hypothetical phase of selection, the writer just quoted claims that the theory "justifies itself provisionally as a formula unifying a large number of otherwise unrelated facts of inheritance." See WEISMANNISM.

NATURAL THEOLOGY. The systematic arrangement of that knowledge as to God and man and their mutual relations which can be gained from the study of nature to the exclusion of revelation. Such, at least, is the ideal of natural theology and its effort, as it was pursued for a large part of the last century. But it never maintained the actual independence of revelation which it was supposed to maintain. The proofs for the existence of God (q.v.) really presuppose the idea of a holy first cause, and this idea is historically derived from the Christian revelation. Without this suggestion the proofs are inconclusive. But with this allowance to revelation, natural theology has a place and a work in the development and defense of Christian doctrine. It exhibits the conformity of the idea of God to the highest reason of man. The proper founder of the discipline among English-speaking theologians was Archdeacon Paley, who published his *Natural Theology* in 1802. The merits of this work have been lately overlooked, and it has been the fashion with many who never read him to sneer at Paley's arguments. In fact, the book was a very able one, and anticipated the lines of reply by which the first attacks of the more recent propounders of evolution upon the existence of God have been met. In America the rationalizing spirit of the New England Theology (q.v.) led it to lay much weight upon natural theology, and it was generally ostensibly made the basis of the system of theology by theologians of this school, and by most others, during a large part of the century. The arrangement of topics in the best forms of the science were somewhat as follows: Beginning was made with the principle of causation, which was established as a necessary truth, or primal intuition of the human mind. Then came the arguments for the existence of God, predominantly or exclusively the *a posteriori* arguments, for a contriver, governor, creator, preserver, and moral governor. Then followed the natural attributes of God. In making the transition to the moral attributes, it was sometimes the custom to interpose the doctrine of the immortality of the soul, and discussions as to the consistency of the existence of sin in the world with the divine goodness, in order antecedently to remove the most difficult objections to the divine benevolence. Where the moral attributes of God were reduced to the one attribute of benevolence, it was next customary to introduce the theory of human virtue, and to argue from benevolence as the ultimate object of the obligation of the human conscience to the nature of the divine virtue, since man is made in the image of God. Finally, the benevolence of God having been proved, the argument could advance to the Scriptures, the inspiration of which was proved by the need of man for revelation, and the certainty that a benevolent God would supply so grievous a need. This line of discussion was largely broken up at the end of the century by influences emanating from the more subjective schools of German theology, especially from Frank and Ritschl. Besides Paley, consult: Chadbourne, *Natural Theology* (Boston, 1867); Flint, *Theism* (Edinburgh, 1878); id., *Anti-Theistic Theories* (ib., 1879); Janet, *Final Causes* (Eng. trans., ib., 1878); Browne, *Studies in Theism* (New York, 1879); id., *Philosophy of Theism* (ib., 1887); Harris, *The Philosophical Basis of Theism* (ib., 1883); Fisher, *Grounds of Theistic and Christian Belief* (ib., 1883).

NATURAL TONES. A musical term applied to those tones of wind instruments that are produced, without altering the length of the tube (by valves or slides), by increased or diminished force of the air-current. The tones thus produced are always overtones of the fundamental tone. But this fundamental tone can be produced only upon instruments having a wide bore in proportion to their length, like the tuba or trombone; whereas the fundamental cannot be produced upon the trumpet, which, consequently, yields only the higher overtones as natural tones. See HARMONICS.

NATURE PRINTING. A process by which engravings or plates are produced by taking direct impressions of the objects themselves, and printing from them. The process was invented in 1849 by Alois Auer, director of the State printing establishment of the Austrian Empire, and, though very simple, it cannot be applied to any objects except those with tolerably flat surfaces, such as dried and pressed plants, embroidery and lace, and a very few animal productions. The object is placed between a plate of steel and another of lead, both of which are smooth, and polished. They are then drawn through a pair of rollers under considerable pressure, and when the plates are separated it is found that a most beautiful and perfect impression of the object has been made in the leaden plate. This may be used directly as an engraved plate, if only a very few impressions are wanted; but it is too soft to resist the action of the presses for practical purposes; a fac-simile to be used as the printing plate is made in copper by the electrotype process. The inventor published a description of his work in 1854 at Vienna, in which is given a detailed account of the method.

NATURE-STUDY. A modern development of the movement of elementary education toward the study of real objects rather than symbols. It arose in response to a demand voiced as early as the year 1845 in this country by Horace Mann (q.v.) for early training in the inductive method of thought and in the field of nature.

According to generally accepted ideas on nature-study, it must concern itself with the common objects of the child's environment. These the child must be led to examine, to work with himself. The work must be carried on, so far as possible, to strengthen independence of thought and judgment. The beginnings of the study must be based upon the immediate surroundings of the child, and the field of inquiry may be extended further abroad as the later years of the school are approached. The tasks in the earlier years should be chiefly observational. Nevertheless, the experimental method of study should not be neglected. As far as possible, organic forms should be regarded as living things capable of activity and change; the point of view should therefore be dynamic, a matter of great pedagogic importance. The plan of the work may properly be made out so as to include the commoner animals and plants, and the everyday phenomena of inorganic nature. Duplication of work should be avoided by increasing the difficulty of the problems and basing them on different material. It is better to study the materials comparatively as far as possible, so that pupils may learn to discriminate and to form general notions. The exhaustive study of one type is of much less value. Outdoor work should be done; in addition to gardening, studies of the habits and haunts of animals, the appearance and disappearance of the birds, the relations of insects to plant life, the appearance of trees in summer and winter dress, and numerous other similar topics may form the basis of study. It is highly important that the materials should be abundant, that the teacher be not too closely tied to a detailed plan of work, and that he be resourceful in the matter of making the most of what is available. It is important, too, that the pupils should provide their own material, and to this end both the excursion and the garden should be turned to account. It would seem best, on the whole, to devote, at any rate, two periods (one to two hours) a week, or its equivalent, throughout the course. The school garden has in some cases been provided for after-school hours, and this seems to be a reasonable adjustment of the matter.

Consult: Carss, *Course in Nature Study* (in the Horace Mann School); *Teachers College Record*, vol. i., No. 2, for March, 1900 (New York, with an extensive bibliography); Miller, *Course in Nature Study for Public Schools* (Ithaca, 1900, to be obtained through the State Secretary); Hodge, *Nature Study and Life* (New York, 1902); Jackman, *Nature Study for the Common Schools* (ib., 1894); id., *Nature Study for the Grades* (ib., 1899); Lange, *Handbook of Nature Study* (ib., 1899); Scott, *Nature Study and the Child* (Boston, 1901); Wilson, *Nature Study in the Elementary School* (New York, 1899); Bailey, *Garden Making* (ib., 1901).

NATURE-WORSHIP. The worship of all objective phenomena which man regards as liable to hurt or help him, and which even when lifeless are deprecated or invoked as powers having volition. Nature-worship is based on spiritism, but this, not being in itself a religion, but a philosophy, does not imply worship. In many cases the savage simply regards rocks and trees as volitive powers only when they act in a way suggesting volition. So long as a stone, for example, does not interfere with him, he is apt to disregard it altogether; but when it injures him, or he wishes to use it, he assumes, like a child, that it possesses spiritual power expressed by will. Whether then the savage deprecates or placates, the cult of such an object is a religious phase. Even in the lowest stages of human evolution, it may happen that some one object, like the village tree of the Aryan, or the clan mountain of the Munda, or the family snake of some Dravidians, is regarded as tutelary, and offerings and prayers are made to it, although other natural phenomena are either ignored or treated only as inimical spirits. This may be said to be a stage between demonolatry and nature-worship, though a more general cult of phenomena usually accompanies the worship of any one side of nature. Nature-worship, manifold as nature, shows aspects which may be grouped in categories, but in no classification can a sharp line be drawn between the different divisions. In arranging the objects of worship only a rough classification, therefore, will here be attempted. As parts of objective nature on a par with others must be included both man and animals, though these are often put into special categories.

Worship of Elements. As constituents of all nature the elements are worshiped by philosophers, but it is quite doubtful whether, as has often been claimed, the elements were ever worshiped as such by savages, or even by more advanced people till a late period in their development. Mother Earth is a very early divinity, but in this case she is not the element, but a local ground, generally a hill. Water is certainly not worshiped as divine till long after the local stream or spring is, or contains, a divinity. Thus the American Indians worshiped Niagara as a spirit, but did not regard water as a divinity. Ganges and Tiber were local tutelary gods long before abstract (elemental) water was revered. So air is unknown as an early divinity, but as wind personified it was worshiped as Huracan in America and as Wodan in Germany. East Wind is a modern malevolent Hindu god, while to the Mexicans the East Wind was a a beneficent deity. Even fire is revered as a local form before fire in general is regarded as divine. Of all the elements, fire has been most universally worshiped, partly on account of its force and mystery of birth in threefold form, on earth, in the sky, and in the air (lightning), and partly because of its purificatory nature. The cult of this element became the chief religious observance of Mazdeism. Mystic association between mental and physical attributes helped to increase the reverence for elemental gods. Fire and force were associated, water and wisdom, etc. The fish god of Babylonia and the fish god of Polynesia both typify the union of water and wisdom, found also in the worship of the Hindu Varuna. See *Astrolatry*, below.

Litholatry. There are in all four forms of litholatry or stone-worship, the stone appearing to be in general one of the earliest forms of divinity. (1) Of these the most primitive, judging by the fact that it is found among the lowest savages, is the worship expressed by showing religious (superstitious) awe for any remarkable stone. There are three varieties: (a) the worship of a huge rock, scarcely to be differentiated from the worship of a mountain (see below); (b) the worship of a stone peculiar in shape, especially if it suggests a resemblance to the shape of an animal or of man; (c) the worship of a heavenly stone. All three varieties are found among the Finns and Lapps, among the negroes of Africa, and among the South Sea Islanders. To a less degree this form of worship is shared by the Peruvians, but with them it has been overlaid with later forms. In antiquity, remarkable stones, especially aërolites, were worshiped by the Greeks and Romans, and they are to-day an object of reverence to all savages—as, for example, the Eskimo—while even among civilized people the 'Thunder-stone' is regarded with more or less superstitious awe. Any strangely shaped stone is reverenced by the Hindus, especially those in South India, by the inhabitants of the Hebrides, of the Pyrenees, and by the redskins, to mention only a few of the races that worship stones. The Semites, Greeks, and Romans in antiquity, and the Teutons in the Middle Ages, all worshiped stones by anointing them, making offerings (sometimes human sacrifices), and saying prayers to them. (2) By imperceptible degrees the plain stone becomes an idol; that is, it represents a divinity or a divine power. Two forms may be distinguished: (a) when a fetish-stone is discarded from personal use, but is preserved as imbued with divine (mysterious) power in an African 'god-hut.' This shapeless effigy leads to (b) pure idol-worship; that is, where the effigy is due to an attempt to shape the stone to a divine form human or beastly in attributes. Images of gods are recognized by Homer and seem to be referred to in the *Rig-Veda*, but these works represent an advanced stage of culture. Idols are not found among the lowest races. Savages, such as the Bushmen, Patagonians, Eskimo, Andamanese, have no idols. But theists like the Finns and Polynesians are idolaters, as are still more advanced races, the Mexicans, Egyptians, Babylonians, Greeks, and Hindus. (3) The fetish, often a stone, is worshiped. Accident, precedent, any peculiarity prompting the fancy that the object will be beneficent is sufficient to make a fetish. When no longer regarded as useful the fetish is flung away or laid aside in a god-hut. The fetish-worshiper scarcely makes a distinction between the divine power in a fetish and the inherent divinity of a fetish. There are certain clans in Africa which believe that there is a divine power in, but separate from, the object; but most fetish-worshipers probably make no distinction between the power and the thing. (See FETISHISM.) (4) A stone is often worshiped also either as a totem or as the result of totemism (q.v.). The latter stage of worship is so far advanced beyond totemism as to be a new form of nature-worship. It arises in this way. When a totemist sacrifices to his totem he sheds blood near or on a stone which was originally the temporary habitat of the ancestral spirit. The stone itself in the first stage is revered only incidentally; but when successive generations have thus hallowed a stone, the divinity becomes gradually extended to the stone itself, and the primitive tomb-altar becomes itself a thing prayed to as a divinity. So the Australian *Churinga* sticks are revered as homes of the ancestor spirits and the redskin totem-poles are themselves divinities. So sun-stones, symbols of the sun, such as the white sun-stone of the Scandinavians, become divinities, even when the symbol does not (as is often the case) merely conceal an older form of worship. But many worshiped stones were originally only monuments. The long-famed Jupiter Lapis or 'stone Jupiter' is now known not to have been a 'stone god,' a fact which indicates that other stone gods also may have been misinterpreted. As the huge stone is revered, so is a huge cliff or mountain, generally as a local tutelary divinity. Mountains are believed to have an individual life and may beget offspring on rivers, being thus regarded as divine powers, though they usually take animal forms when acting as animate beings. Very old and widespread is the belief that a man's individual life may be deposited in a mountain or tree, and be destroyed only when the divine object is overthrown by a higher divinity.

DENDROLATRY. Under this word may be included the 'worship of trees,' in the strict sense, and the worship of plants, phytolatry, in the general sense of worship of objects of the vegetable world. The terms, however, are not quite coterminous, since plants are revered only as totems or as useful objects, while trees are worshiped for a variety of reasons, either because they are totems, or because they are useful, or beautiful, or fearsome, or as symbols. In this phase of worship it is sometimes difficult to decide whether the divinity resides in the object or is the object. Both views were held by different members of some races. Thus this question became a subject of debate between the Brahmans and the Buddhists. The former held what is undoubtedly the more primitive belief, that the tree itself was an animate person. The Buddhist held, as did the Greek, that there was a spirit (dryad) in the tree. The worship of some form of the vegetable creation was general in antiquity, and has existed almost to the present day in Europe. Only a few hundred years ago the Teutons, for example, worshiped plants and trees, as they did rocks, rivers, and mountains. Traces of this belief are still visible in popular rites and superstitions. Both men and gods were supposed to have sprung from trees. Thus the Algonquin Indians and the Teutons both regarded the ash as the divine progenitor of men, and the mother date-palm was worshiped by the Semites, as other mother trees are to-day worshiped by the Dravidians. There are four varieties of plant and tree worship. The vegetable god, tree, or plant is revered (a) for its peculiar virtues or qualities. Thus in India the *soma* plant was regarded as divine because of its intoxicating qualities, as is the *cuca* plant in Peru; and the modern *peyote* cult of Mexico has the same origin. Or (b) the vegetable is a totem, examples of which are found in the divine corn and cocoanut of America and Samoa, respectively. Thirdly (c), the tree or plant is worshiped as a spirit in the material, as is the case in dryad-worship in Greece and India. Finally (d), the spirit revered is that of reproduction as shown in the vegetable, of which class are the corn mother of the Teutons and the mother date-palm of the Babylonians. To these must be added the sacred grove, as revered by Dravidians, Teutons, Greeks, Romans, etc. The trees of the grove are collectively sacred and may be individually divine; but the grove itself is really a temple of divinities, not a divinity *per se*. Tree-marriages, still common among the wild tribes of India, are a survival of totemism. To avoid the ill luck of a third marriage, even civilized Hindus wed a tree as a third wife.

THERIOLATRY OR ZOÖLATRY. Animal gods already have human characteristics and are quite anthropopathic. Love or fear, as in the case of human gods, prompts that greater respect which with savages constitutes worship. This is especially easy in the case of animals, for savages establish no barrier of soul and reason as peculiar possessions of man between themselves and beasts. A very early belief in metempsychosis (q.v.) taught primitive man to believe that beast soul and human soul were interchangeable. Thus the tiger is worshiped not only from fear, but because a special tiger is often believed to possess the soul of a departed chief. Some animals become divine as totems, but not all. Ordinary pests are deprecated by prayer and offerings. Some animals are worshiped merely because they are useful. The best developed systems of theriolatry are found among the Egyptians, Babylonians, and American Indians. But some of the monstrous beasts of Babylon are adored through symbolism rather than because of totemistic survivals. Reverence alone prompts man to make the image of god-beasts more powerful and mysterious than the natural beasts, and some of the beast forms are clearly symbolic, as in the portrayal of the sun as a swift horse or as a winged bull, or of spring as a winged snake. Of all forms of beast-worship, *ophiolatry* or serpent-worship seems to be most widespread. Other animals, horse, ass, reindeer, bear, tiger, boar, together with a few cases of divine fishes are worshiped by different races; but the snake appears to have been worshiped in every land, either as a soul-receptacle or friendly house-snake, in whose body resides the soul of an ancestor (as in Rome and India), or as a healing and mantic power of wisdom (as in the cults of Babylon and Greece), or as an evil spirit, world-snake or dragon. The negroes of Africa, the Dravidians and redskins among savages, the Mexicans and Peruvians on a higher plane, and the Egyptians, Greeks, Romans, and Semites (including Hebrews) regarded the snake in one or another of these forms as a divine animal. Sometimes the same snake is conceived differently at different times. In Sayce's opinion, Nina, the Babylonian serpent daughter of Ea, the water-god of wisdom, was at first typical only of divine wisdom, and the transference to the conception of the guile-loving evil serpent was due to the influence of the parallel conception of Tiamat, the dragon monster of chaos and evil. The dragon of the Eddas is evil, he is the Midgardswurm that embodies destruction, like the rain-preventing dragon Vritra of the *Rig-Veda*, but beside the latter stands the figure of the 'Dragon of the Deep,' to whom the Vedic Aryan prays as to a beneficent divinity. So Apollo as a healing god is associated with Æsculapius's snake, but destroys the Pytho dragon. Among the Mongoloid Naga tribes, as among the Chinese, the dragon-snake is a world-divinity. Special aspects of snake-worship are the close connection with tree and phallic worship, as found among certain Dravidian tribes, who worship snakes with phallic rites, and the ditch-snake or mound-snake, a symbolic snake among the American wild tribes. Further, and perhaps most fundamental, is to be noticed the close connection between snakes and treasures, which they secrete or guard, as in the case of the Hesperides and many fairy-stories in the West and East. So in Egypt, Osiris in snake-form is associated with wealth, as is the Chaldean Hoa. This trait may be due to the fact that serpents actually hoard jewels and other bright objects. Probably the beauty, poison, and uncanny motion of the snake all combined to make it revered. Under zoölatry must also be noticed the worship of birds, according to more or less definite racial lines of demarcation. Thus the dove is Semitic, and is Greek only as belonging to a Semitic deity; the goose is the most universally revered bird, being worshiped by the Egyptians (sacred to the god Seb), the Japanese, the early Britains, the Romans, and especially by the Dravidians, from the remotest antiquity. Among the Aryans it yielded to the eagle (also the Hittite emblem), but it is still regarded as emblematic of the highest soul in the races to the east of India (Chinese and Japanese), whereas in India itself it has been displaced among the higher classes by the swan. The cock also was widely revered and was sacred to Mars, Æsculapius, Osiris, and to the Hindu battle-god, Kartikeya.

Anthropolatry. Man is worshiped like other animals. Some forms of anthropolatry, however, represent decadent aspects of theism. Thus in Finland and in Persia the national heroes are decayed gods, and get a sort of secondary reverence in their new guise. Ordinarily any hero or great man is revered as being more powerful than other men, and in the primitive mind worship and respect are synonymous. So priests are divine and all kings *ipso facto* are divine in India, China, and Japan to-day as they became in Rome, and are said to be among the South Sea Islanders. Sacrifices made to men who have become gods are recognized in the old Hindu law-books. The only rarity in anthropolatry is where the man-god conception embraces former beast-gods and is enlarged to that of an all-god. Thus Krishna in India amalgamates with animal avatars of Vishnu to make an all-god who appears in human or animal form.

Astrolatry. This 'worship of the heavenly bodies' is a general term (here including for convenience the worship of heaven itself) for what used to be called Sabaism. Sun and moon gods are not always early divinities. They were unknown, for example, to the older Roman cult, though the Romans worshiped earth and sky. The Aryan Hindu worshiped the sun before he did the moon; the Dravidian feared the sun as a malignant demon; while his Munda neighbor worshiped the same power as a beneficent divinity. The Babylonians perhaps worshiped Sin, the moon, before Bel, the sun; the Hottentots worshiped the moon and not the sun, though they revered Dawn. On the other hand, reversing the Roman order, the Aztecs and American Indians worshiped the sun and not the sky. There is no general principle of progression, such as has often been sought. The stars, again, are in some cases the last of the heavenly bodies to be worshiped; in other cases, a stellar mythology antedates solar or lunar gods. It is especially in connection with star-worship that the wildest theories of mythologists have been evolved. According to some scholars, all Semitic and Aryan mythology reverts to star-worship, and this is supposed to have been the chief religion of the Accadians and Hittites, about whose religion, however, we know in fact very little. It is often claimed that sun-worship is posterior to ghost-worship, and in some cases it is probable that a fully developed sun-worship was superimposed upon a more primitive cult, as among the Aztecs; but the Polynesian sun-light spirit is as antique as any god in the South Pacific, and sun-worship appears not only among the earliest Hindus, but also among the savage Mongoloid Munda tribes. Probably in some races sun-worship was as early as any form of nature-worship, and may be as old as ghost-worship. The beginnings of the worship of heavenly phenomena may be seen even among the Central Australians, who invoke the sun and lightning as living powers. The most remarkable development of sun-worship is to be found among the Mexicans and the Peruvians, where it has eclipsed all other forms; the Babylonians, where the highest gods were identified with the sun and moon; the Dravidians, among whom, as among the related Mongolians, sun-worship is generally found; and the Persians, especially in the Mithracult developed out of decadent Zoroastrianism. In Greece sun-worship is represented by Apollo, and in India by Vishnu, but in a rather perfunctory way. Neither of these gods can be said to be worshiped as the sun, though both retain traces of their earlier conception in the disk symbol and mythological characterization as arrow-shooting, pest-bringing, and yet kindly disposed divinities. The sun is represented in many religions, as in India, under the figure of a bull or horse, or bird, or as riding in a car dragged by seven steeds, or as having rays. Sun and moon are the goal of souls in several religions, such as the Polynesian and Hindu.

All worship of phenomena tends to personification. The question how far the thing and how far the spirit in the thing is worshiped cannot be answered categorically, for the answer depends on time, place, and object. Eventually, as in Greece and Germany, in Zeus and Wodan, the physical background almost vanishes, and only spirits remain, conceived as quite human. Even in the earliest stages of phenomenolatry, there does not appear to be any worship of the object as a physical thing, but only as a spirit-holding or spirit-imbued, i.e. spiritualized object, though in this stage spirit and life may not be distinguished. As to whether man first worshiped major or minor objects of nature, opinion is divided, as it is in regard to animism preceding nature-worship. Generally speaking, English scholars hold to animism as the earliest; German scholars to nature in its grander aspects; and the French to minor nature-worship. From an ethical point of view, it is to be observed that pure nature-worship cannot be sharply sundered from 'ethical religions.' Even taboo (q.v.) is ethical, and lofty ethics is found in connection with purely physical gods. The 'eye of heaven' that marks the sin of man is a natural interpretation of the all-seeing sun as soon as a man evolves ethical ideas and attributes them to his gods.

Consult: Tylor, *Primitive Culture* (Boston, 1874); Max Müller, *Natural Religion* (2d ed., London, 1892); Lang, *Magic and Religion* (ib., 1901); Saussaye, *Religionsgeschichte* (Freiburg, 1887); Brinton, *Myths of the New World* (New York, 1868); Moorehead, *Primitive Man in Ohio* (ib., 1892); Fergusson, *Tree and Serpent Worship*, and *Rude Stone Monuments* (London, 1872); Sayce, *Religion of the Ancient Babylonians* (ib., 1887); Jastrow, *Religion of Babylonia and Assyria* (Boston, 1898); Réville, *Native Religions of Mexico and Peru* (London, 1884); Crooke, *Popular Religion and Folk-Lore of Northern India* (Westminster, 1896); D'Alviella, *La migration des symboles* (Paris, 1891); *Lefèvre, La religion* (ib., 1892); Waring, *Forms of Solar and Nature Worship* (London, 1874); Buckland, *Anthropological Studies* (ib., 1891); Frazer, *Golden Bough* (ib., 1900).

NAUBERT, nou'bĕrt, Friedrich August (1839-97). A German composer, born at Schkeuditz, Province of Saxony. He studied at the Stern Conservatorium of Berlin, and became organist and instructor in vocal music in the gymnasium of Neubrandenburg, Mecklenburg-Strelitz. He attained a considerable reputation as a vocal composer of the school of Robert Franz. His publications include soli, duets, trios, quartets, and choral works for four, six, and eight voices.

NAUCK, nouk, August (1822-92). A German classical scholar. He was born at Auerstedt, and after studying at the University of Halle, taught at several gymnasiums at Berlin until about 1859, when he became member extraordinary of the Imperial Academy of Sciences at Saint Petersburg. He remained in that city until his death. His best-known works are: *Aristophanis Byzantii Grammatici Alexandrini Fragmenta* (1848); the complete works of Euripides, with the fragments (1854); an annotated edition of Sophocles (*Sophoclis Tragœdiæ*), based upon Schneidewin (1867); Homer's *Odyssee* (1874) and *Ilias* (1877-79); *Iamblichi de Vita Pythagorica Liber* (1884); select works of Porphyrius, *Porphyrii Philosophi Opuscula Tria* (1860; 2d enlarged ed., *Opuscula Selecta*, 1886); and his greatest work, *Tragicorum Græcorum Fragmenta* (1856; 2d ed. 1889; with the *Tragicæ Dictionis Index*, 1892). The last work is considered the standard edition. Consult Zielinski, *August Nauck* (Berlin, 1894), where his writings are enumerated.

NAU'CRATIS (Lat., from Gk. *Ναύκρατις*). An ancient city of Egypt, situated on the Canopic branch of the Nile, near the modern Nebîreh, 53 miles southeast of Alexandria by rail. It was under King Amasis II. the only place in Egypt where Greeks were allowed to settle and trade, and thus became a very flourishing Greek colony. On the successful excavations of Petrie, consult his *Naucratis* (London, 1886-87). Petrie thinks that the Greek settlements at Naucratis may date from as early a period as B.C. 650.

NAUCY'DES (Lat., from Gk. Ναυκύδης, *Naukydēs*) (called of Argos). A Greek sculptor of the fifth century B.C. He was trained in the manner of Polyclitus I., and was the master of his brother Polyclitus II. A Discobolus, now in the Vatican, is believed to be a copy of a work by him. A gold and ivory Hebe, and statues of Hecate, Hermes, Erinna the poet, and some groups of athletes are mentioned by writers of his time, and later, as works of this sculptor.

NAUDET, nō'dā', Joseph (1786-1878). A French historian, born in Paris. He was made professor of Latin poetry at the College of France in 1821 and was director of the Royal Library from 1840 to 1860. He was also a member of the Academy. His works include: *Histoire de la guerre des esclaves en Sicile* (1807); *Histoire de l'établissement, des progrès et de la décadence de la monarchie des Goths en Italie* (1811); *La conjuration d'Etienne Marcel* (1815); and *De l'administration des postes chez les Romains* (1863).

NAUE, nou'e, Julius (1834—). A German painter and archæologist, born at Köthen, Anhalt. He studied in Nuremberg and in Munich (1861-66). His best-known works include: "The Fairy-tale of Emperor Henry I. and Princess Ilse" (1865-67), in water colors; "Germania," "Roma," and six other great frescoes (1868), for a villa near Lindau; "The Myth of Prometheus" (1872-73), in water colors; "The Fate of the Gods" (1875-77), cycle in fresco; and seven paintings in tempera from the epic "Helgi and Sigrun" (1879). Subsequently he took up the study of Bavaria's prehistoric period, made numerous excavations of mounds, and published *Die prähistorischen Schwerter* (1885); *Die Hügelgräber zwischen Ammer- und Staffelsee* (1887); and *Die Bronzezeit in Oberbayern* (1894).

NAUGATUCK, nạ'gȧ-tŭk. A town and borough (coextensive) in New Haven County, Conn., 17 miles northwest of New Haven; on the Naugatuck River, and on the Naugatuck Division of the New York, New Haven and Hartford Railroad (Map: Connecticut, C 4). It has the Whittemore Memorial Library, Salem School, Whittemore High School, and noteworthy business blocks, and is engaged extensively in manufacturing india-rubber goods, knit underwear, malleable iron, and paper boxes. Naugatuck was first incorporated in 1844 as a town, and in 1893 as a borough; consolidation was effected in 1895. The government, under the charters of 1893 and 1895, is administered by a board of warden and burgesses, annually elected, which has powers of appointment in all borough offices excepting the board of education, chosen by popular vote. Population, in 1890, 6218; in 1900, 10,541.

NAUHEIM, nou'hīm. A noted watering-place in the Grand Duchy of Hesse, Germany, on the Usa, 17 miles north of Frankfort (Map: Germany, C 3). The Kurhaus is surrounded by beautiful grounds. The waters, ranging in temperature from 86° to 95° F. and containing salt, iron, and carbonic acid, are used for both drinking and bathing, and are especially efficacious in cases of intestinal and cutaneous diseases, gout, rheumatism, and heart diseases. Considerable quantities of water and salt are exported. The place is visited annually by about 6000 patients. Population, in 1900, 4505.

NAULETTE, nō'lĕt'. A cavern on the Lesse in the Commune of Furfooz, near Dinant, Belgium. Here, in 1866, Dupont found a human lower jaw associated with bones of the elephant and rhinoceros. The Naulette man is now assigned to the Mousterian epoch (q.v.). Consult Mortillet, *Le préhistorique* (Paris, 1900).

NAUMACHIA, ną-mā'kĭ-ȧ (Lat., from Gk. *ναυμαχία*, naval battle, from *ναῦς*, *naus*, ship + *μάχεσθαι*, *machesthai*, to fight). Among the Romans, a mock naval battle; also, the place used for this purpose. Julius Cæsar was the first to introduce a naumachia into Rome (B.C. 46), causing a portion of the Campus Martius to be transformed into a lake, on which the spectacle came off. Augustus made an artificial lake (*stagnum*) near the Tiber for the same purpose, which was afterwards frequently used for naumachiæ. Claudius also gave an exhibition of the kind on Lake Fucinus, in which nineteen thousand combatants took part. These naumachiæ were not sham fights, any more than ordinary gladiatorial combats. Both sides fought in real earnest until one was utterly overpowered. The crews consisted of gladiators, prisoners, or condemned criminals.

NAUMANN, nou'mȧn, JOHANN FRIEDRICH (1780-1857). An eminent German ornithologist. He was born at Ziebigk, worked on a farm with his father, a skilled ornithologist, and became inspector of the ornithological museum of the Duke of Anhalt-Köthen. He was a clever draughtsman and himself engraved the plates for the illustrations of his *Naturgeschichte der Vögel Deutschlands* (12 vols., 1822-44), a standard work. Naumann wrote, besides: *Taxidermie* (1815; 2d ed. 1848); *Ueber den Haushalt der nördlichen Seevögel Europas* (1824); and, with Buhle, *Die Eier der Vögel Deutschlands* (1819-28). In his honor, the German Ornithological Society named its journal *Naumannia*.

NAUMANN. A family of German musicians. JOHANN GOTTLIEB (1741-1801), the most important member, was born at Blasewitz, near Dresden. He studied under Tartini, Padre Martini, and others, and became Court composer at Dresden in 1764. In 1766 he was appointed kapellmeister at Dresden. He produced many operas, and in 1777 organized the royal orchestra of Stockholm, Sweden. He made several tours throughout Italy and Prussia and was regarded as one of the most important composers of his time. He wrote over 20 operas, 10 oratorios, 18 symphonies, and numerous smaller works, instrumental and vocal. Consult: Meissner, *Bruchstücke aus Naumanns Lebensgeschichte* (Prague, 1803-04).—His grandson, EMIL (1827-88), studied under Von Wartensee and Mendelssohn, and at the Leipzig Conservatory. He was chiefly famous for his valuable and scholarly writings, particularly with reference to church music; and was also the composer of an oratorio *Christus der Friedensbote* (1848), and the opera *Judith* (1848). Among his more important works are *Die Tonkunst in der Kulturgeschichte* (Berlin, 1869-70) and *Musikdrama oder Oper* (1876). He lectured on musical history at the conservatory at Dresden. —KARL ERNST (1832—), another grandson of Johann Gottlieb, became favorably known for his writings and compositions. He was born in Freiberg, Saxony, and received his musical education in Leipzig, completing his musical studies with a two years' period of organ study under Schneider of Dresden. His compositions are principally chamber music, and so far as is known he may be said to have written the first sonata for viola and pianoforte.

NAUMANN, KARL FRIEDRICH (1797-1873). A German mineralogist, born in Dresden. He studied at the Freiberg School of Mines, and at the universities of Jena and Leipzig, and in 1821 made a journey to Norway for scientific purposes. After his return he became an instructor at Jena. A year later he was called to Leipzig as professor, and in 1826 he accepted a similar position at Freiberg, but in 1842 he returned to Leipzig, where he remained until his retirement, thirty years later. Among his writings are: *Anfangsgründe der Kristallographie* (2d ed. 1854); *Elemente der theoretischen Kristallographie* (1856); and *Elemente der Mineralogie* (12th ed. 1885).

NAUMBURG, noum'bo͝ork, or NAUMBURG-ON-THE-SAALE. The capital of a circle in the Province of Saxony, Prussia, situated on the Saale, 30 miles southwest of Leipzig (Map: Prussia, D 3). Its cathedral of Saints Peter and Paul is an interesting building with four towers and many statues, paintings, monuments, and other specimens of early German art. There are a gymnasium and a Realschule. The town manufactures woolens, soap, leather, combs, and sausages. Glass and porcelain painting is also an important industry. The trade in wine is extensive. In 1029 Naumburg became the seat of the bishopric of Naumburg-Zeitz. Population, in 1900, 23,187.

NAUPLIA, ną'plē-ȧ. A town of Greece, the capital of the Nomarchy of Argolis, seven miles southeast of Argos, on the Argolic Gulf (Map: Greece, D 4). It has railroad connection with Corinth. The impregnable situation of its harbor, protected by strong fortresses, renders it of great strategic importance. The Palamidi, a fortification originally constructed by the Turks and later strengthened by the Venetians, is at present utilized as a prison. Owing to its advantageous situation and spacious harbor, Nauplia is of some prominence commercially. From 1824 to 1834 it was the capital of Greece. In mediæval times Nauplia was one of the leading cities of the Peloponnesus. Here in 1831 Capo d'Istria, the President of the Republic, was assassinated. Population of commune, in 1889, 10,879.

NAUPLIUS (Lat., sort of shell-fish, which sailed in its shell as in a ship, from Gk. *ναῦς naus*, ship + *πλεῖν*, *plein*, to sail). A larval stage in the development of certain crustaceans. See Metamorphosis; and Plate of Barnacles.

NAU'SEA (Lat., from Gk. *ναυσία*, *nausia*, seasickness, disgust, nausea, from *ναῦς*, *naus*, ship). A distressing sensation always referred to the stomach. It is unattended by pain, but is usually accompanied by a feeling of general languor or debility, a small and often irregular pulse, a pale, cool, and moist skin, general muscular relaxation, an increased flow of saliva, and a sensation that vomiting will supervene. It is most commonly a *direct* symptom of disease or disorder of the stomach, but sometimes it is a very important *indirect* symptom of disease of some part at a distance from the stomach—as, for example, the brain or the kidney. The nausea which is so troublesome to pregnant women is due to the irritation excited by the enlarged uterus being reflected by nervous agency to the stomach. Among the more common causes of nausea (which may or may not be followed by vomiting) may be mentioned fainting spells, the taking of a general anæsthetic, and surgical shock. It may be provoked by blows upon the head, abdomen, testicles, or ovaries, or by powerful mental impressions such as revolting sights, odors, or sounds, and sudden fright. Other causes are discussed under Vomiting.

NAUSHON, nạ'shŏn′. One of the Elizabeth Islands (q.v.).

NAUSIC'AA (Lat., from Gk. *Ναυσικάα*, *Nausikaa*). In the *Odyssey*, the daughter of the Phæacian King Alcinous. When Odysseus is wrecked on the coast of Scheria, she discovers him and conducts him to her father's court.

NAUTCH, nạch (Hind. *nâch*, from Skt. *nâṭya*, dance, from *nart*, to dance). The term applied especially in Northern India to the dancing girls attached to the temples. The corresponding word in the south of India is bayadere (q.v.). The presence of these girls at temples and their double rôle of attendants on the deity and of courtesans is undoubtedly a survival of the custom formerly widespread, especially in the East, of sacred prostitution. The daughters of nautch girls are generally trained as successors of their mothers. As in like religious customs elsewhere, no social odium attaches to these women. The nautch dancers are completely enveloped in winding drapery, and move with slow and rhythmic motions of the body, while the hands are busied in graceful gesturing and in managing the drapery. The feet are little used. The nautch dance is primarily erotic in character, and now is often regarded by the natives as symbolizing the loves of Krishna (q.v.) and the milk-maids. See Bayadere; Dancing Girls.

NAUTICAL ALMANAC (from Lat. *nauticus*, from Gk. *ναυτικός*, *nautikos*, pertaining to ships or sailors, from *ναύτης*, *nautēs*, sailor, from *ναῦς*, *naus*, Skt. *nâu*, ship). A volume issued annually, and containing primarily the astronomical data required by navigators in the computation or reduction of the sextant observations by which the ship's position at sea is ascertained. The preparation and publication of these almanacs is very costly, and is therefore undertaken as a work of public utility by several different governments. Thus the United States issues the *American Ephemeris and Nautical Almanac;* Germany, the *Berliner Astronomisches Jahrbuch;* France, the *Connaissance des temps;* and Great Britain, the *Nautical Almanac.* To the astronomer, the *Nautical Almanac* furnishes a great mass of important data; it gives the position of the moon in right ascension and declination for every hour, and the sun's latitude and longitude for every day in the year; it shows the obliquity of the ecliptic, the sun's and moon's parallax, aberration, etc., at different times; it supplies the necessary data for the determination of the real or apparent size, position, and motion of the planets and their satellites; it fixes accurately the places of the more important stars, and gives full details concerning eclipses, occultations, transits, and other celestial phenomena occurring during the year. It is generally issued two or three years in advance of its date for the sake of mariners going on long voyages. See Almanac.

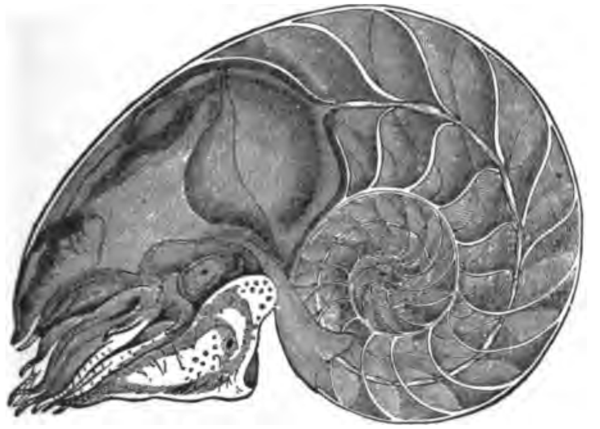
NAUTICAL SCHOOLS. See Naval Schools of Instruction.

NAUTICAL SURVEYING. See Hydrography.

NAU'TILOI'DEA (Neo-Lat., from Lat. *nautilus*, from Gk. *ναύτιλος*, sailor, nautilus, from *ναῦς*, *naus*, ship + *εἶδος*, *eidos*, form). An order of fossil Cephalopoda, equal in rank to the Ammonoidea, containing about 2500 species that range from Cambrian to recent time, and are represented at present by only two or three living species of the genus Nautilus. The most ancient forms were straight conic shells (Orthoceras) which soon became coiled like the modern forms. Many of the extinct genera and species are most important horizon-markers or index fossils. See Cephalopoda; Nautilus; Orthoceras.

NAU'TILUS (Lat., from Gk. *ναύτιλος*, *nautilos*, sailor, from *ναῦς*, *naus*, ship). The pearly nautilus (genus Nautilus) is the only living representative of an immense assemblage of shelled cephalopods of the subclass Tetrabranchiata, which flourished during past geological ages. The shell is coiled in one plane, divided into chambers by partitions or septa, the outermost being called the 'living chamber,' as it contains the animal; the septa are perforated by the siphuncle, which is central or nearly so, and the aperture is wide and spacious. The shell consists of two layers, the outer being porcellanous, the inner pearly, or nacreous, whence the name 'pearly' nautilus. The initial chamber consists of an obtuse incurved cone, marked on the outer surface of its posterior wall by a small scar called the *cicatrix*. It is supposed that a perishable embryonic shell (protoconch) was formed, the presence of which is indicated by the cicatrix.

The body is short and thick, divided into a large obtusely conical head bearing eyes, tentacles, ears (otocysts), and a rounded sac-like trunk. The mouth is surrounded by about 90 external filiform tentacles. The pair of tentacles on the inner or dorsal side are fused so as to form a hood-like lobe by which the aperture of the shell is closed when the animal is withdrawn into the living chamber. Beneath is the funnel (hyponome), not forming a completely closed tube as in the squids, but a locomotive organ, through which, as in other cephalopods, the water is ejected with sufficient force to throw the animal backward. In swimming forward, says Kent, the tentacles are extended radially from the head.



PEARLY NAUTILUS (*Nautilus pompilius*). Seen in section showing the chambers and siphuncle. (Half natural size.)

The mouth is in the centre of the lobes and groups of tentacles, armed with a tongue (radula) and a pair of remarkably powerful horny jaws tipped with carbonate of lime. Olfactory organs and osphradia are present. The animal is attached within the living chamber by two oval muscles. The compartments of the shell are usually said to be filled with air or gas, but according to Verrill they are filled with sea-water, which may be taken in or expelled so as to equalize pressure at varying depths.

Until recently the living nautilus was exceedingly rare, though the empty shells are cast ashore in great quantities in the Pacific and Indian oceans. Yet they have been for a long time trapped in baskets like lobster-traps by the natives of some of the Melanesian and Fiji islands and used as food. Willey at Ralum, in New Britain, succeeded in trapping the nautilus in 70 fathoms of water. He also succeeded at Lifu, one of the Loyalty Islands, in capturing specimens at a depth of only three fathoms. These he kept in a large submerged cage, feeding them daily until his efforts were rewarded early in December, 1894, by finding that they had spawned in the cage, yielding an abundance of eggs. These are not laid in bunches, as is the case with those of the squid, but are deposited separately by the female. Each egg is as large as a grape. There are said to be three species now living in the Pacific Ocean, while the number has been carried up to even four. The two better known species are *Nautilus pompilius* and *Nautilus umbilicatus.*

FOSSIL NAUTILI. Although the family Nautilidæ dates from the Jurassic period, the genus Nautilus is doubtfully referred to the Tertiary. The order Nautiloidea, however, originated as early as the Ordovician; the earlier types were straight and uncoiled, like Orthoceras. Very striking, says Hyatt, is the marvelously sudden rise of the Nautiloidea as a group; it reached its maximum in the Silurian, followed by a decline extending from the Devonian to the Triassic period. Then the forces acting unfavorably upon their existence were arrested, or their violence lessened, and the group has been affected by only very slight changes and an exceedingly slow process of retrogression, until the present time.

BIBLIOGRAPHY. Owen, *Memoir on the Pearly Nautilus* (London, 1832); Parker and Haswell, *Text-book of Zoölogy* (New York, 1898); Cooke, *Mollusks* (Cambridge Natural History, ib., 1895); Hyatt, in Zittel-Eastman, *Text-book of Paleontology* (ib., 1900); Willey, "Pearly Nautilus" (*Zoölogical Results Based on Material from New Britain, New Guinea*, etc., Cambridge, England, 1902; vi., Zoölogy).

NAUVOO, na̤-vo͞o'. A city in Hancock County, Ill., 12 miles north of Keokuk, Iowa; on the Mississippi River, at the head of the lower rapids (Map: Illinois, A 3). It is in a highly productive fruit-growing country, where the leading occupations are wine-making and the culture and shipment of fruit for market, particularly grapes and berries. Saint Mary Academy, conducted by the Benedictine Sisters, is in Nauvoo. The most interesting features in this vicinity are the remains of the old Mormon buildings. Population, in 1890, 1208; in 1900, 1321. Nauvoo was founded by the Mormons in 1840, and rapidly increased in size until in 1846 it had a population of 15,000. In this year the settlement was broken up by the people in the neighborhood. (See MORMONS.) An imposing temple, 130 feet long by 90 feet wide, left unfinished by the Mormons, was destroyed partly by fire in 1848 and partly by a tornado in 1850. In 1850 a company of French socialists, called Icarians (q.v.), under the leadership of M. Cabet, occupied Nauvoo, but their experiment proved a failure, and they abandoned the place in 1857.

NAVA, nä'vȧ. A seaport of Japan. See NAFA.

NAV'AHO, or **NAV'AJO,** *Sp. pron.* nȧ-vä'hō. An important tribe of Athapascan stock (q.v.). Their present reservation in northeastern Arizona and extending into New Mexico and Utah comprises nearly ten million acres, but it is almost entirely an arid desert of sand and rock, unfit for any purpose except scanty grazing. Like other tribes of the same stock, they call themselves simply *Dinĕ*, 'people;' they are called *Apaches de Navajo* in Spanish records at least as early as 1630. They came originally from the far northern home of their kindred, but have incorporated elements from all the neighboring tribes. They were roving and predatory in their habits, and were continually at war with the Ute and the Plains tribes. They were alternately at war or peace with the Spaniards during the early colonization period, but later became so troublesome that in 1705 and again in 1713 it was necessary to bring them to terms by vigorous invasions of their country. In 1744 Franciscan missionaries attempted to civilize them, but in a few years the effort was abandoned. In 1805, in consequence of continued raids, a Spanish force penetrated their stronghold in Tseyi (Chelly) Cañon and inflicted a severe defeat, killing 115 men, women, and children. The lesson, however, was soon forgotten, and between the fall of the Spanish power about 1815 and the American occupation of the country thirty years later they made the stealing of sheep, cattle, and horses from the Mexican settlements a steady and profitable business. With their booty they were enabled to become a pastoral tribe, and they adopted from the more civilized Pueblos a well-developed weaving art. From the Mexicans they learned the simpler forms of metal-working, especially in silver. In 1846 a number of prominent chiefs made their first treaty with the American Government, but, on account of the unfortunate killing of the principal signer three years later, the tribe again became hostile. Hostilities continued with but short intermissions until 1863, when it was determined to deport the entire tribe to the Bosque Redondo reservation on the Pecos River, near Fort Sumner, in eastern New Mexico. In the ensuing winter a mixed force of whites and Ute Indians under Kit Carson invaded the Navaho country and forced their cañon stronghold. Within a year nearly 8500 had been deported to the Bosque Redondo, and it was supposed that not more than 2000 remained at large in their own country, but later developments proved that not more than half, and these not the most troublesome, had been removed. The experiment proved a failure. The stock of the Navaho died or was stolen, their crops failed, and their numbers decreased from disease, escapes, and attacks by the Plains tribes. In June, 1868, a new treaty was made, under which the captives, then numbering 7300, were returned to a reservation set aside in their old country, and were given sheep and cattle with which to begin life anew. Since then they have remained quiet, steadily increasing in wealth and population. In 1884 the reservation was extended to its present dimensions to accommodate their rapidly increasing herds.

The Navaho have a fully developed clan system, including some fifty clans, with descent in the female line. Their government is democratic and local, rather than centralized, since the nature of their country and occupation prevents the formation of large organized bodies, so that each family shifts for itself in the search for temporary pasturage and water supply. They are agricultural to a limited extent. They make some pottery and baskets, but derive their main subsistence from their herds of sheep and goats, together with horses and some cattle. They are well known for the beautiful and durable blankets which they weave from the wool of their flocks, and for their artistic silver ornaments. Although, like most pastoral peoples, they are nomadic, they build at each regular halting place permanent *hogáns*, or circular houses, of logs covered with earth, with a short covered entranceway and smoke-hole at the top. Men and women alike are almost constantly at work caring for their herds, weaving, or laboring at the forge. They have elaborate and spectacular ritual ceremonies and an abundant mythology, with hundreds of sacred songs in the keeping of their priests. Aside from the industries which they have made their own they have adopted but little of the white man's civilization or teaching. They are estimated now at 20,000, less than half of whom are within the reservation limits, the rest ranging on outside pastures or working in the white settlements. Consult Matthews, *Navaho Legends* (Boston, 1897). See Colored Plate of INDIANS.

NAVAHO BLANKETS. See BLANKET, with Colored Plate.

NAVAL ACADEMY, UNITED STATES. The school at which are educated the executive officers of the United States Navy. It was founded as the 'Naval School' in 1845, at Annapolis, Md., with a course fixed at five years, the first and last of which were to be spent at the school; but this plan was not strictly adhered to even at first, and was subsequently changed. In 1849 the course was changed to seven years, the first two and last two being spent at the school, and the three intervening years at sea, and the name of the institution was changed to United States Naval Academy. In 1851 the four years of study were made consecutive, and annual practice cruises were commenced. In 1861 the academy was removed to Newport, R. I., on account of the war. It returned to Annapolis in 1865.

In 1873 the course for cadet midshipmen was extended to six years, the last two to be spent at sea. In 1882 the title of cadet midshipman was changed to naval cadet, which in 1902 was replaced by that of midshipman. Appointments to the different corps were made by the Secretary of the Navy upon recommendation of the academic board; but only enough appointments were made to fill vacancies, all other graduates being honorably discharged. In 1889 the law provided that the cadets of the first class (seniors) should be separated at the beginning of the year into two divisions, and those destined for the line and the engineer corps should pursue separate courses of study during the first class year. In 1889, also, the age of candidates at date of admission, which had been from fourteen to eighteen years, was changed to fifteen to twenty years. In 1899 the act of March 3d consolidating the engineer corps with the line abolished the separate line and engineer divisions at the Academy. The same act increased slightly the numbers in all grades of the service and very much increased the lower grades. The number of graduates thus became insufficient, and in 1900 the number of cadets at the Academy was increased by an act authorizing appointments to the Academy every four years instead of every six. The number of officers in service subsequent to the Spanish-American War was wholly inadequate to the increasing demands of the fleet, and as the only means of adding to the number is through the Naval Academy, an increase in the number of cadets was proposed. This increase, made by Congress in 1902, provided for the appointment of a cadet every two years by each Senator, Congressman, and Delegate in Congress, and 11 by the President.

The course of study and instruction at the institution is much more advanced than the term Academy would imply, and approximates that of many post-graduate technical schools. The course for the first year (fourth class) includes mechanical drawing, algebra, geometry, descriptive geometry, trigonometry, English studies, French, Spanish, and hygiene, and practical exercises and instruction in seamanship, boats, ordnance, target practice, infantry, artillery, battery drill, fencing, gymnastics, dancing, and swimming. The course for the second year (third class) includes trigonometry, conic sections, differential and integral calculus, mechanical drawing, physics, chemistry, naval history, French and Spanish, and practical exercises and instruction in seamanship, boats, signals, ordnance, target practice, infantry, artillery, battery drill, fencing, and steam engineering. The course for the third year (second class) includes seamanship, principles of mechanism, mechanical processes, mechanical drawing, marine engines and boilers, integral calculus and mechanics, physics, chemistry, and electricity, and practical exercises and instruction in seamanship, boats, steam tactics, signals, ordnance, infantry, artillery, battery drill, target practice, fencing, and steam engineering. The course for the fourth year (first class) includes seamanship and naval tactics, gun and torpedo drills, naval ordnance and gunnery, navigation, theory of compass deviations, marine surveying, boilers, naval construction, engineering materials and designing, physics, electricity, and Spanish, and practical exercises and instruction in seamanship, boats, steam tactics, battery drill, target practice, torpedo practice, ordnance, artillery, infantry, fencing, compass correction, navigation, surveying, steam engineering, practical electricity, turret drill, etc.

From the first of June until the first of September the cadets are embarked on practice vessels for the summer cruise, when they are instructed practically in the various duties of their profession. For several years since the Spanish-American War one of the practice vessels has been a battleship temporarily detached from the fleet, the upper classes spending half the summer on her and half on the sailing training-ship *Chesapeake*. Until 1898 most of the buildings of the Academy were very old, many of them dating from the early part of the nineteenth century, and the accommodations for the cadets inadequate as well as unsuitable. The necessary expansion of the institution was brought to the attention of Congress by the war, and a very liberal plan of rebuilding the Academy was adopted. The expenditure authorized was $8,000,000, and the result will be the finest naval institution of learning in the world. About one-half the buildings were under construction in 1902. Consult: Soley, *History of the Naval Academy* (Washington, 1876); Benjamin, *The United States Naval Academy* (New York, 1900).

NAVAL APPRENTICE. See section on *Naval Apprentice*, under Apprentice.

NAVAL ARCHITECTS AND MARINE ENGINEERS, The Society of. An association incorporated under the laws of New York State, with headquarters in New York City. The object of the association is the promotion of the art of shipbuilding. The society holds annual meetings, and has a membership of over five hundred.

NAVAL ARCHITECTURE. See Shipbuilding.

NAVAL CADET. See Cadet, Naval.

NAVAL CONSTRUCTORS. Officers of the United States Navy charged with the design, building, and repair of ships. The corps of naval constructors is filled by appointment of graduates of the Naval Academy who are sent (after graduation) to special technical schools for an additional course in shipbuilding. In 1902 there were twenty-one naval constructors and twenty assistant constructors. The constructors are not allowed a free hand in designs, as the general features are prescribed by the Secretary of the Navy upon the recommendation of the Construction Board, which consists of the chiefs of the bureaus of the Navy Department. The working out of the design, however, is left wholly to the construction corps.

NAVAL CROWN. In heraldry, a rim of gold around which are placed alternately prows of galleys and square sails.

NAVAL INSTITUTE, United States. An organization founded at Annapolis in 1873 by the officers then on duty at the United States Naval Academy. It has for its object the promulgation of knowledge concerning naval affairs among the officers of the naval service. During the first years of its existence it issued occasional numbers of its *Proceedings*, but in a short time the publication was made quarterly, and this has since continued. In addition to papers submitted by officers, the *Proceedings* contain a quarterly review of the naval work of the world in the "Professional Notes," which aim to give all available information concerning new ships, guns, torpedoes, etc., which has become available during the past quarter. Each year the Institute offers a gold medal, a life membership, and a prize of $100 for the best essay on any subject of interest to the service, reserving the right to withhold the offer if no worthy essay is presented.

All officers of the Navy and persons holding positions under the Navy Department are eligible to membership, and other persons interested in naval affairs may be elected as associate or honorary members. The present membership of the Institute includes about two-thirds of all the officers in the navy and is rapidly increasing.

NAVAL LAW. See Military Law.

NAVAL OBSERVATORY. A Government institution situated at Washington, D. C., a division of the Bureau of Equipment in the Navy Department. Its functions are "to determine accurately the positions of the sun, moon, planets, and stars for use in preparing the *Nautical Almanac;* to test chronometers; to issue correct standard time daily; . . . to distribute to vessels of the Navy instruments of precision for navigating purposes; to conduct astronomical investigations of general and special scientific interest; and, since 1894, to publish the *Nautical Almanac.*" It had its origin in a depot of charts and instruments established by the Navy Department under the charge of Lieut. L. M. Goldsborough in 1830. At this depot, "in a small circular building, on a brick pier with a foundation 20 feet below the surface, he mounted a 3-inch transit instrument made by R. Patten of New York City." In 1833 Lieutenant Wilkes, U. S. N., moved the depot to another site on Capitol Hill, and at his own expense built an observatory containing a transit instrument of 3¾ inches aperture and 63 inches focal length; a Borda's circle; a 3½-foot achromatic portable telescope; a portable transit instrument; and a sidereal clock. In the summer of 1838 the Secretary of the Navy directed the superintendent "to make a constant series of observations in astronomy, magnetism, and meteorology, ordering an additional number of assistants (naval officers), and granting authority for the purchase of all necessary instruments." Under these instructions Lieut. J. M. Gilliss, U. S. N., began systematic observations in astronomy with additional instruments as follows: A sidereal clock and a mean time clock; a meridian circle of 5.5 inches aperture furnished with circles 30 inches in diameter; a portable achromatic telescope of 3¼ inches aperture and 42 inches focal length. The work done under his direction at the Capitol Hill depot between 1838 and 1842 was published in 1846 as *Astronomical Observations Made at the Naval Observatory*, being the first American volume of this nature.

A building for this depot was authorized by Congress in 1842 through the efforts of Lieutenant Gilliss. Taking the report of the Naval Committee which accompanied the bill as the exponent of the will of Congress, he, after consulting American and European scientists, prepared plans and erected the Naval Observatory. Soon after the instruments were in place Lieut. M. F. Maury succeeded to the charge of the observatory, remaining as superintendent until 1861, and in addition to astronomical work devoted much of his personal attention to the study of ocean currents and other hydrographic and nautical subjects, which gave him international reputation. He was followed as superintendent by such men as Gilliss, Davis, and Rodgers. Among the earliest of the scientific achievements of the new observatory were the observations of Neptune secured in 1846 immediately after the discovery of that planet, which enabled Sears C. Walker, by identifying two older foreign observations, to discuss the elements of Neptune during his short connection with the Observatory. The adaptation of electricity to record observations by Prof. John Locke, formerly lieutenant in the Navy, resulted in the installation of the first practical chronograph at the Observatory in 1849. With the 9.6-inch equatorial Assistant Astronomer James Ferguson discovered several planetoids between 1854 and 1860. The 26-inch lens made by Alvan Clark, at the time the largest refracting telescope in the world, enabled Prof. Asaph Hall to discover the satellites of Mars in 1877. In 1893 new buildings were completed on a more favorable site on Georgetown Heights, comprising a commodious office building occupied by the offices of the astronomical, nautical instrument, time service, and *Nautical Almanac* departments, while the 26-inch equatorial, a 9-inch and a 6-inch transit circle, and a 5-inch prime vertical instrument are disposed in suitable dome and houses on the south, east, west, and north of a clock-house, the longitude of which is 5h. 8m. 15.78s. W., and the latitude 38° 55′ 14.0″ N. In addition to the instruments named there are a 12-inch equatorial, a 6-inch altazimuth, a 5-inch transit, a 5-inch photoheliograph, and numerous others. The library contains about twenty thousand volumes, and is the most complete astronomical collection in the country. The publications of the Observatory comprise more than fifty large quarto volumes, which contain full details of the work executed, with many valuable scientific memoirs by Professors Asaph Hall, Simon Newcomb, William Harkness, and others.

NAVAL ORDER OF THE UNITED STATES. An hereditary patriotic society organized in Boston, Mass., on November 10, 1890, having for its objects the perpetuation of the deeds of the American Navy through the encouragement of research in naval arts and science and the preservation of historic memorials relating to the Navy of the United States. There are two classes of companions. The first class includes veteran officers and their male descendants; and the second class, enlisted men who have received the United States naval medal for bravery in the face of the enemy. The badge of the order is a gold Maltese cross coated with blue enamel and edged with gold. In the centre of the obverse is the insignia of the Navy of the United States with the motto, 'Fidelitas et Patria'; on the reverse is the insignia of the Marine Corps. There are State commanderies in Massachusetts, Pennsylvania, New York, California, Illinois, and the District of Columbia. Representatives from these commanderies meet triennially as a general commandery. The total membership is about 500.

NAVAL RESERVE. In all the more important navies, in addition to the regular forces serving continuously with the fleet, there are certain others which are drilled and instructed in order to be able to supplement the personnel of the fleet in time of war. In peace these men are largely employed in the merchant marine, in yachts, in auxiliary Government services, or are pensioners or others who have served the requisite length of time for pension or discharge, but are still within the limit of age. In some countries a portion of the naval reserves have not served either in the mercantile marine or the navy, but receive a certain amount of training for such service; while in countries in which service in the army and navy is compulsory the greater part of the reserve is made up of men who have completed the requisite length of active service with the fleet.

The naval reserve of the United States is small (about 4000 officers and men) and consists of battalions or divisions of State naval militia organized at various ports on the seacoast or the Great Lakes. These officers and men served in the war with Spain, and, considering their opportunities for training, they acquitted themselves with great credit and were a most important addition to the strength of the navy personnel. The defects of the system of training and organization were, however, so clearly shown that the establishment of a national naval reserve under the direct control of the Navy Department has been under continuous consideration and is likely to be effected, especially as the number of men likely to be obtained from the naval militia is inadequate to the demands of a strong war fleet.

In Great Britain the naval reserve consists of (1) the royal naval reserve, (2) the royal fleet reserve, and (3) the pensioners. On January 1, 1903, the total of these three classes was 41,540 men; in addition, there were 4200 men in the coast-guard, who are included in the regular effective force of the navy, but are employed in coast-guard duties. The reserves are drilled on board special drill ships, on board vessels of the regular fleet, at various barracks, etc. They receive a small retaining pay and full pay when actually serving. The reserve of the French and

German navies are derived chiefly from honorably discharged men who have served the required term of enlistment and then pass into the reserve. To these may be added the men who have not yet been called upon, but who will be required to serve in time of war, such as fishermen, merchant sailors, and others pursuing such callings as are useful in the war fleet, also those who may elect to serve in the navy rather than the army. On January 1, 1903, the effectives of the French reserve were about 50,000 in number, and of the German about 74,000. The Russian naval reserve is somewhat similarly derived, but contains a greater proportion of untrained men who are unfamiliar with nautical life. Its numbers are not definitely known and the requirements of entry are being changed; a fair estimate is 60,000—of which not more than half have received much training. The Italian reserve, like those of France and Germany, consists of men who have completed the term of active service and have passed to the reserve list. The number has at times exceeded 32,000 and is now probably not less than that. See NAVIES.

NAVAL SCHOOLS OF INSTRUCTION. In the United States the naval schools consist of the Naval Academy (q.v.), Naval War College, Naval Torpedo School, apprentice training schools, and gunnery training schools. The Naval War College is at Newport, R. I., and performs the double function of preparing plans of naval operations and instructing officers in special lines. The torpedo school for both officers and men is located at the Torpedo Station on Goat Island, Newport Harbor, R. I. The principal training station for enlisted men is the one for apprentices at Newport; but there are others at Port Royal, S. C., and San Francisco. The school for seamen gunners is divided between the naval gun factory at Washington and the torpedo station at Newport. Gun captains are trained on the gunnery training ships, which usually have headquarters at Port Royal, S. C.

FOREIGN NAVAL SCHOOLS. The naval school of *Argentina* is at Buenos Ayres. The age at date of admission is fourteen to seventeen years and the course is four years. The instruction is very good in theoretical branches, but the practical nautical exercises are very few.

The greater part of the executive officers of the *Austro-Hungarian* navy are graduates of the naval academy at Fiume; the others are appointed provisionally and serve in the fleet until able to pass a satisfactory examination. The age at date of admission to the academy is fourteen to sixteen years. The course is four years, three months of every year being spent on board a practice ship. There are also gunnery training schools, torpedo schools, and sailing training vessels for men and boys.

The executive officers of the *Brazilian* navy are recruited from the graduates of the naval school at Rio de Janeiro. The limits of age at entrance to the academy are thirteen and seventeen years and the course is three years. The graduates are transferred to the naval college (Rio de Janeiro) for an additional course of four years.

There is a naval academy for the education of officers of the *Chilean* navy at Valparaiso. The course is six years, previous to which the cadet must have completed three years at the military academy at Santiago.

There is a naval school for the instruction of officers in the *Chinese* navy at Nanking, but only a part of the officers are educated there. It may be said that in the appointment of officers, as in everything connected with the navy, there is no system. The course at the academy is four to six years.

In *Denmark*, each year there are ten admissions to the naval school for officers, situated at Copenhagen. The candidates must be from fifteen to twenty years of age and have served nine months in the navy or eighteen months in the merchant marine. After a preliminary cruise of three months they are reëxamined and six of the ten selected, the others being discharged. The course of instruction is four years.

The training of officers and men for the *French* navy is undergoing some changes. The principal naval schools are the Polytechnic School (partly naval), Naval School, superior training school for executive officers, training school for engineer officers, medical, torpedo, machinist, gunnery, and ordnance schools. The naval school proper is on the old line-of-battle ship *Borda* at Brest. The requirements for entrance are high, and the range of subjects quite wide. The age at entrance is from fourteen to eighteen years. The course is two years. After completing the course at the naval school the cadets are promoted to *aspirants* second class, and sent on board a cruising training ship where their instruction is continued for a year. They are then promoted to *aspirants* first class and their training ceases. The school for engineers is a school of engine design and construction. The medical schools are three in number and are located at Brest, Rochefort, and Toulon. The course of study is two years. The torpedo, gunnery, and ordnance schools are for the practical and theoretical education of those officers who incline to become specialists. The machinist school is for the training of warrant and petty officers of this branch for higher grades.

The *German* naval academy is located at Kiel. The candidates for admission must not be more than seventeen years old and must possess certificates of qualification for the upper classes of a royal high school (*Realgymnasium*), or pass an examination in the equivalent subjects. After entering they receive four weeks' practical instruction on shore; the cadets are then sent on board a cadet training ship and pass the winter abroad. Upon their return in the spring they are examined and, if qualified, promoted to ensign (*Fähnrich zur See*). They are then embarked for another full year's course of practical training and theoretical and practical instruction on one of the cadets' and boys' training ships. The young ensigns are then transferred to the naval academy for one year's course of theoretical instruction. At the close of the year the principal examination takes place; after which the ensigns are sent for half a year to the gunnery and torpedo ships and to the marine infantry school for special practical and theoretical courses in gunnery, torpedo, and infantry instruction. After this they are examined, and upon passing are sent for two years' practical training on board battleships or large cruisers; but they are promoted to lieutenant (*Lieutenant zur See*) at the end of the first year.

The naval school of the *British* navy is located at Dartmouth on board the old line-of-battle ships *Britannia* and *Hindostan*, though academic buildings on shore were commenced in 1902. The course is two years and includes instruction in seamanship, navigation, mathematics, and technical subjects. On completing the *Britannia* course the cadets or midshipmen are appointed to seagoing ships carrying a naval instructor who, in conjunction with an officer of the line and an engineer, supervises their instruction. After passing the necessary examinations and completing the required amount (about five years, including time spent on the *Britannia*) of sea service the midshipmen undergo an oral examination in seamanship carried out by three captains. Upon passing this they undergo a college examination at Greenwich, receiving certificates of the first, second, or third class, according to qualifications. This certificate materially affects promotion to lieutenant. After leaving the college the acting sublieutenants go through courses in pilotage, gunnery, and torpedo instruction. The men of the Royal Naval Reserve are drilled on board widely distributed ships for the greater convenience of the merchant sailors who form the principal part of the reserve. The training of firemen, machinists, etc., is carried out on vessels attached to the different dockyards.

The *Italian* naval academy is located at Leghorn (Livorno). The instruction is in two parts: (a) the normal course, and (b) the superior course. The limits of age at admission are thirteen and fifteen years. The normal course is five years in length, the theoretical instruction continuing during eight months of each year and the practical work on board the practice ships about three months. At the end of the course, having passed all examinations, the cadets are appointed midshipmen. They then are sent aboard cruising vessels for at least a year, after which they are commissioned as sublieutenants and are sent to the academy for the superior course of instruction, which comprises two sessions. The first session is obligatory for all sublieutenants, and the examination which takes place at the end fixes the rank of the officers in their grade and affects greatly the question of their advancement by selection (one-third are promoted to lieutenants by selection and two-thirds by seniority). To the second session only those are admitted who have attained a certain standard in their examinations, and these more fortunate young men receive a diploma which has an important influence upon their naval career and their eventual promotion. The naval constructors, constructing engineers, and commissary officers are also graduates of the naval academy. The schools for the enlisted men are five in number. There are also training ships for seamen.

Officers are supplied to the *Japanese* fleet in four ways: first, from the naval academy at Kure; second, by cadets sent to foreign naval schools; third, by promotion from the ranks (rare); fourth, by appointment from the marine school for merchant masters at Tokio. There are also torpedo, engineering, and gunnery schools, and several training ships for seamen and boys.

The naval school for the *Dutch* navy is located at Willemsoord. The age at entrance is fourteen to seventeen years and the course is four years. At the end of the course of four years the cadets pass examinations and are appointed as cadets of the first class. After two years' service in ships of the navy they are again examined, and, if found qualified, commissioned as second lieutenants. The school for naval engineers is at Hellevoetsluis. There are also gunnery and torpedo schools and school-ships for training seamen and boys.

The *Norwegian* naval school furnishes not only the officers of the regular service, but also those of the reserve. Candidates for admission to the school must not be over nineteen years of age and must have served for twenty-one months in the merchant marine. The course at the school is in two parts, inferior and superior. The inferior course is three years long and at the end the cadets become ensigns. Those ensigns who are not destined to form part of the regular navy are, after two years of ordinary service, made lieutenants of the reserve. The superior course has two terms of eight months each. After eighteen months of additional service the graduates of the superior school are promoted to the rank of lieutenant. There are also gunnery and torpedo schools and training ships for the enlisted force.

The naval school of *Portugal* is a polytechnic institution. The course for executive officers consists of three months on a training vessel, one year at the naval school, three months on the training vessel again, and lastly, another year at the school. The graduates are then appointed midshipmen, and after two years of service are commissioned as ensigns. There are gunnery and torpedo schools for both officers and men and training-school ships for boys.

The principal source of supply of officers for the Russian navy is the naval academy at Saint Petersburg. The candidates for entry must be between fourteen and eighteen years of age. The course is four years. At the conclusion of the course the cadets become midshipmen. There is also at the academy a post-graduate course for instruction of officers in strategy, tactics, international law, etc. The other source of supply of officers is the school of navigation and ordnance at Kronstadt. The course is four years and the instruction similar to that given at the naval academy. There are also training schools for the enlisted men with several training ships.

The executive officers in the *Spanish* navy are graduates of the royal naval school. The age of candidates at entrance is from thirteen to eighteen years. The course is three years, after which the cadets become midshipmen, and then serve one year on board a ship detailed as the school of application, one year on board the sailing vessel *Nautilus*, and one year on vessels in service. After a final examination they are commissioned as sublieutenants. There are also floating gunnery and torpedo schools and vessels for the training of seamen and of boys.

The executive officers of the active list of the *Swedish* navy are graduates of the naval academy at Stockholm. The limits of age of candidates at entrance are thirteen and sixteen years. The course at the naval academy is six years (eight months in each year at the school and four months on a practice ship). Upon graduation the cadets are made sublieutenants. They are then sent for six months as instructors in a school (*Exercisskolan*), where the enlisted men receive their naval instruction. This is followed by six months' service of various kinds, including some time spent at the dockyard. They then spend terms with the mobile defense of the coast and the gunnery school, and after eight or nine months in cruising ships they are commissioned as ensigns. There are also schools of the mobile defense, and a school for enlisted men (*Exercisskolan*) already mentioned, and a gunnery school.

In the *Turkish* navy the course of instruction is supposed to last ten years; four years at the primary school of Kassimpasha, four years in the preparatory school on the island of Halki, and two years at the naval school proper, also on the island of Halki. From the naval school the cadets graduate with the rank of lieutenant (*mulazim*).

Consult: the *Proceedings of the United States Naval Institute* (Annapolis); *Journal of the Royal United Service Institution* (particularly the number for October, 1901) (London); Brassey's *Naval Annual* (Portsmouth, 1886 et seq.); *Annual Reports of the Office of Naval Intelligence* (particularly the volume for 1888) (Washington); Soley, *Foreign Systems of Naval Education* (United States Navy Department, Washington, 1880); Buchard, *Marines étrangères* (Paris, 1891). See Naval Academy; Cadet, Naval; Navies; and section on *Naval Apprentice* under Apprentice.

NAVAL SIGNALS. See Signals, Marine.

NAVAL TACTICS. See Tactics, Naval.

NAVAL VETERANS, National Association of. A patriotic society organized in New York City in January, 1887, having for its chief purpose the preservation of the traditions and memories of the United States Navy during the Civil War. It admits to membership any officer, appointed or enlisted man who served in the United States Navy, United States Marine Corps, or United States Revenue Marine Service during any portion of the time between April 12, 1861, and August 25, 1865, and who has been honorably discharged or resigned by an honorable acceptance of resignation. The organization is divided into thirty-nine local associations, and has a membership of nearly 10,000.

NAVAL WAR COLLEGE. See Naval Schools of Instruction.

NAVARINO, nä'vȧ-rē'nō. A town of Greece, in the Morea and in the Nomarchy of Messenia, at the southern extremity of the Bay of Navarino. It is at present officially called *Pylos*. The ancient Pylos was at the northern extremity of the bay, and is now called *Palæokastro* and *Palæo-Navarino*. Population, about 3000. Along the front of the bay stretches the island of Sphagia, or Sphacteria (q.v.). In 1492 the Turks captured Navarino, and held it, with two or three short periods of interruption, till 1821, when it passed into the hands of the Greeks. In 1825 it was taken by Ibrahim Pasha, and on October 20, 1827, in the Bay of Navarino, the allied British, French, and Russian fleets, numbering twenty-four ships and commanded by the British Admiral Sir Edward Codrington, defeated the combined Turkish and Egyptian fleets, comprising eighty-nine ships of war. In this battle sixty of the Ottoman ships were destroyed outright, and the rest were driven ashore in a shattered condition. The Turks lost 6000 men, while less than 200 of the allies were killed. The battle of Navarino brought about the achievement of Greek independence. Consult *Memoir of Sir Edward Codrington*, by his daughter (1873).

NAVARRE, nȧ'vär'. A former independent kingdom on both sides of the western Pyrenees, now constituting the Spanish Province of Navarra (capital Pamplona), and part of the French Department of Basses-Pyrénées. The Province of Navarre has an area of about 4050 square miles. A large portion consists of wooded mountains and well-watered valleys. The region about Pamplona is a treeless plateau. In the south, in the valley of the Ebro, is a fruitful district, called the Ribera (shore). In the southeast is a barren salt steppe. The region is drained by the Ebro, its affluents, the Ega and Aragon, the Arga, an affluent of the Aragon, and the Bidassoa. The population of the province is about 300,000.

History. This territory was occupied in ancient times by the *Vascones*, the present stock of the Basques, and they were never entirely subjugated by the Romans. The Visigoths met with sturdy resistance from the Basques, and had to content themselves with a nominal overlordship. The Basques were enabled to maintain some independence even during the Saracen conquest. Charles the Great, toward the close of the eighth century, conquered their country and made it a part of the Spanish mark. It soon became independent of the Franks and for a time its history is very imperfectly known. Apparently Sancho Garcia (905-925), who wrested the region of the Upper Ebro from the Saracens, was the first to bear the title of King of Navarre. In the form of government the Basque influence and the tribal feelings were strong, and the governmental institutions were primitive. The King was elected, and limited in his power by a council of twelve nobles. The kingdom developed rapidly by conquests. Sancho III., the Great, who died in 1035, was also King of Castile, and Aragon was under his control as a dependency of Navarre. He divided his kingdom among his three sons. Sancho IV. of Navarre was murdered in 1076 and the nobles chose King Sancho of Aragon as their ruler. Until 1134 Navarre was united with Aragon (q.v.). In that year the King of Aragon, Alfonso the Battler, bequeathed his kingdoms to the Templars and Hospitalers. The people of Navarre, dissatisfied, chose the son of Sancho IV. as King and recovered their independence. The country continued under this dynasty for a hundred years, but Navarre, shut in by Castile and Aragon, was prevented from developing by conquests from the Moors. In 1234 Navarre passed by inheritance to Champagne. Queen Joanna of Navarre married Philip IV. of France in 1284, and from that time until the extinction of the Capetian dynasty, in 1328, the history of Navarre was intimately connected with that country. Then the kingdom went, as a dowry, to Philip of Evreux, who married Joanna, daughter of Louis X. Her son was Charles the Bad. (See Charles II. of Navarre.) His grand-daughter Blanche married King John of Aragon, and Navarre was connected with Aragon from 1458 until 1479. John's daughter, Eleanora, who succeeded to the throne of Navarre in 1479, was married to Gaston de Foix, Viscount of Béarn, and thus Béarn was united with Navarre. Eleanora died soon after her accession and was succeeded by Francis Phœbus. His successor, Catharine de Foix, married in 1484 a French noble, Jean d'Albret. In 1512 Ferdinand of Aragon conquered what is now the Spanish portion of Navarre. The kingdom was thus reduced to a small district, to the north of the Pyrenees. Jeanne d'Albret married in 1548 Antoine de Bourbon. Their son, Henry, ascended the throne of Navarre in 1572, and in 1589 became King of France as Henry IV. Navarre was united to France by decree in 1607, but down through Charles X. all French kings bore also the title of King of Navarre. Consult Bordenave, *Histoire de Béarn et Navarre* (Paris, 1873).

NAVARRETE, nä′vȧ-rā′tȧ, Domingo Fernandez (1610-89). A Spanish missionary. He was born at Peñafiel, Old Castile; entered the Dominican Order, and in 1647 went to the Philippine Islands, where he became professor of theology at Manila. Later he made a missionary journey into the interior of China and resided there for a number of years, becoming in time the head of his Order in China. During a persecution he was imprisoned at Canton, but escaped and reached home in 1673. In 1677 he became Archbishop of Santo Domingo. He published the first volume of his work, *Tratados históricos, políticos, éticos y religiosos de la monarquía de China* (1676); but the second volume was suppressed by the Inquisition. A projected third volume was never published. Consult Navarrete's China, in *Churchill's Collection of Voyages and Travels*, vol. i. (London, 1744).

NAVARRETE, Francisco Manuel de (1768-1809). A Mexican poet, born at Zamora. He entered the Franciscan Order and ultimately became professor of Latin at the University of Valladolid. He attained some reputation, especially for his bucolic poetry. A collection of some of his works was printed as *Entretenimientos poéticos del P. Navarrete* (1823).

NAVARRETE, Juan Fernandez, properly Fernandez-Navarette (c.1526-79), surnamed El Mudo (the Mute). A Spanish biblical painter, born at Longroño. He studied in different parts of Italy, especially at Venice under Titian, and returned to Spain after twenty years, with his reputation well established. In 1568 he was made painter to the King, and employed on the decorations for the Escorial. Among those still surviving are a "Saint Jerome," "Christ at the Pillar," "The Nativity," "The Martyrdom of Saint James," and a "Holy Family." In 1576 he painted his most famous picture, "Abraham and the Three Angels," for the Escorial, and in 1577-78 he further painted eight pictures representing the "Apostles," the "Evangelists," "Saint Paul," and "Saint Barnabas." Among his other works are "Saint John in Prison," Hermitage, Saint Petersburg, and "The Holy Family," Weimar Museum. Navarrete's manner shows the influence of his master, Titian, and he plays an important part in the technical development of the Spanish school. He died at Toledo, March 28, 1579.

NAVARRETE, Martin Fernandez de (1765-1844). A Spanish navigator and author, born at Avalos, Logroño, Spain. He entered the Spanish navy in 1781, served in the West Indies and in the Mediterranean, and took part in the combined French and Spanish attack on Gibraltar in 1782. He became a lieutenant in 1789, and, having already attracted attention by his writings on naval questions, was commissioned to collect documents relating to the history of the Spanish navy. From 1796 to 1806 he was detailed on special service in the Department of Marine, resigning in the latter year rather than recognize Joseph Bonaparte. He again took office after the restoration, became a recognized authority on naval affairs, and in 1823 was appointed director of the hydrographic office. Subsequently he was chosen Senator and made a Councilor of State. His greatest work was his *Colección de los viajes y descubrimientos que hicieron por mar los españoles desde fines del siglo XV.* (7 vols., 1825-65). He also wrote a *Life of Cervantes*, published with a new edition of *Don Quixote* (1820); and left material for two posthumous works, *Disertación sobre la historia de la náutica* (1846) and *Biblioteca marítima española* (1851).

NAVAR′RO, Madam. See Anderson, Mary Antoinette.

NAVARRO, nȧ-vä′rô, Pedro (1446-1528). A Spanish general, who greatly developed the use of mines in war. His early life is obscure. In 1500 he was employed by Gonsalvo de Córdova in the campaign against Naples. He was very successful in his use of mines against the famous Castello Nuovo in 1503, and was made Count of Alvetto by Ferdinand of Aragon. Navarro joined the French army after the battle of Ravenna (1512), and contributed largely to the success of the campaign of Marignano (1515). In Lautrec's disastrous campaign against Naples, Navarro was captured, taken to that city and imprisoned there. His death followed immediately.

NAVAS DE TOLOSA, nä′vȧs dā tô-lō′sȧ, Las. A village of Andalusia, Spain, 37 miles north of Jaén, noteworthy as the scene of a battle (July 16, 1212) between Alfonso VIII. of Castile, aided by a large army of Crusaders, chiefly French and English, and an army of Moors under Mohammed ibn Abdallah. The Christians were victorious and permanently broke the Mohammedan power in Spain. Here also, in 1812, a battle took place between the Spanish and French.

NA′VE (ML. *navis*, nave of a church, ship, Lat. *navis*, ship). A term used most commonly in connection with church architecture, and with two meanings. In the first place it denotes the higher middle division where there are three or five divisions; as in a church of the type established in the fifth century in the Christian basilicas of Italy. The side divisions are called aisles, and nearly all large Christian churches have had 'three aisles;' the word aisle in this case covering nave as well. A few large buildings are five-aisled, and the Cathedral of Antwerp is a seven-aisled church, but the nave is nearly always the middle and much the broadest and highest part. There are some churches, especially of the later Gothic period, which have aisles and nave of the same height; such are the cathedrals of Carcassonne and Erfurt, and of Vienna in Austria; but the central division remains the widest and is still the nave. In the ordinary form of church, where the nave is much higher than the aisle, the uppermost part of it is called the clearstory, and the large windows in the clearstory walls transmit much the largest amount of daylight to the interior.

The same use of the term for the middle and widest and highest division exists in the description of a Roman basilica, or bath establishment (thermæ; see Bath), or any building which is lighted in part by windows in the wall of a higher division rising above the roofs of the lower divisions; thus it is disputed whether the middle part of the Ulpian basilica at Rome was roofed, and was a real nave, or open to the sky like a court.

The original meaning of the word was, however, different. It applied to all that part of a church which was farthest from the sanctuary, that is, that part into which the people entered from out of doors, excluding, however, the narthex or porch. For convenience, and because the majority of Christian churches in the West are oriented (see ORIENTATION), this may be called the Western part.

In the churches of the basilica type, then, all to the east of the great transept was the nave; and this use of the term continues. Thus, if we are speaking of a cruciform church, we speak of the eastern part as the choir; the middle part, which has its greatest length athwart the main lines of the church, we call the transept, and all west of the transept (except porch or tower) is the nave. In this sense, the nave includes the middle division and the side divisions, and we are compelled to say of the cathedral of Le Mans, for instance, that the nave consists of a nave and two aisles, while the choir has a nave and four aisles. These are difficulties only to be overcome by the use of explanatory phrases.

NAVESINK (năv′*e*-sĭŋk) **HIGHLANDS.** A chain of hills forming a bold headland inside of Sandy Hook, in Monmouth County, New Jersey (Map: New Jersey, D 3). They are important landmarks to ships approaching New York. On them are located two first-class lighthouses, fifty-three feet high, both of which show fixed white lights. The adjacent region, which is very beautiful and easily accessible from New York City, attracts many visitors.

NAVEZ, nȧ′vȧ′, FRANÇOIS (1787-1869). A Belgian biblical and genre painter. He was born at Charleroi, November 16, 1787, and first studied under Isidore and Joseph François. He was a pupil of the Academies of Brussels and Ghent, and studied with David, in whose manner his works are executed. From 1817 to 1822 Navez was at Rome, after which he settled permanently in Belgium. He was made director of the Brussels Academy, and died at Brussels, October 12, 1869. Among his best works are the "Nymph Salmacis and Hermaphroditus" (1829), Ghent Museum; "Elijah Raising the Shunamite's Son" (1821), and the "Meeting of Isaac and Rebecca" (1826), Haarlem Pavilion; "The Holy Family" (1851), Antwerp Museum; "The Spinning Women of Fondi" (1845), New Pinakothek, Munich; and "Hagar and Ishmael in the Desert," Brussels Museum.

NAVICULAR DISEASE (Lat. *navicularia*, relating to ships, from *navicula*, diminutive of *navis*, ship). A disease of the horse, consisting in strain of the strong flexor tendon of the foot, at the point within the hollow of the fetlock where it passes over the navicular bone. It is most common among the lighter breeds of horses, and especially where the pasterns are upright, toes outturned, and work is early and severe on hard roads. It soon gives rise to a short tripping yet cautious gait, undue wear of the toe of the shoe, wasting of the muscles of the shoulder, and projecting or pointing of the affected limb while standing. Give rest, remove the shoe, shorten the toe, and apply hot poultices, changed every few hours. Laxative medicine and bran mashes may be ordered. After a few days, and when the heat and tenderness abate, cold applications should be given; after another week the animal may be placed for two months in a grass field, where the ground is soft and moist; or, if sufficiently strong, at slow farm work on soft land. Division of the nerve going to the foot removes sensation, and consequently lameness, and hence is useful in relieving animals intended for breeding purposes or for slow work. The operation, however, is not to be recommended where fast work is required, for the animal, being insensible to pain, uses the limb as if nothing were amiss, and the disease rapidly becomes worse. See HORSE.

NAVIES (OF. *navie*, from Lat. *navia*, ship, variant of *navis*, Gk. ναῦς, *naus*, Skt. *nâu*, OIcel. *nōr*, ship, *naust*, naval station; connected with Gk. νεῖν, *nein*, to swim). The term navy is applied to the armed force of a country which operates on the water or in coast and harbor defense. The history of navies goes back to the earliest days of ships, for no sooner were such craft built than their value as weapons of war was at once seen. The Chinese were among the earliest of navigators, but little is known concerning their ancient fighting craft. The most ancient war vessels of which the details are known were those of the Egyptians, and the date assigned to them is B.C. 3000. At the same time it is evident that there were many other peoples that possessed fighting vessels, and that the Egyptians were far from paramount; for they had repeated naval combats with the Mysians, Phocæans, and Phœnicians, and probably also with the Pelasgians, Daunians, Oscans, Cretans, and Sicilians. It is therefore impossible to fix any sort of priority to the possession of naval defense. Herodotus says: "These Phocæans were the first of all the Greeks who undertook long voyages, and they are the people who discovered the Adriatic and Tyrrhenian seas, and Iberia and Tartessus (a part of modern Spain). They made their voyages in fifty-oared galleys and not in merchant ships." At this time, and for a long time subsequent and anterior, the shapes of merchant and war vessels were quite different, the former being broad and suitable for carrying cargo and the latter narrow and sharp so as to make speed. In addition, the war vessels were built with rams and other warlike appurtenances, while the merchant vessels made a much greater use of sails.

The command of the sea, so far as the Mediterranean was concerned, finally passed to the Phœnicians. Of their cities, Tyre soon took the lead in wealth and power, reaching its zenith about B.C. 1000, when the expression 'a Tyrian sea' became "a proverbial expression for a sea whose navigation was prohibited to all but those who claimed the ownership thereof." After a more or less complete naval supremacy lasting many centuries the power of the Phœnicians began to wane through the repeated assaults of the Assyrians, who attacked Phœnicia by land. Notwithstanding great numerical inferiority, the Phœnicians managed, though defeated, to preserve their independence, though in 870 they were compelled to pay tribute. In 724-720 Tyre was captured, but not destroyed, and in 650 the Tyrians threw off the foreign yoke. But the devastating wars of the past two hundred years had so reduced the population that soon after their reassertion of independence their slaves rose and mastered the city. Very soon after this the Egyptians made themselves masters of Phœnicia, but in 605 the Chaldeans drove them out. The naval power of the Phœnician fatherland had now become of little importance, but her colonies were wealthy and flourishing. In the sixth century Carthage declared its independence, and though it never attained the masterful position of the parent State, for a century or more it was, upon the water, the most powerful of the Mediterranean States.

The decline of the Phœnician naval power permitted the rise of that of the Greeks and Persians. The confederated Greek fleets completely defeated the Persians at Salamis (B.C. 480). The naval supremacy of Athens was destroyed in the Peloponnesian War (B.C. 431-404).

The Romans found it necessary to build a war fleet when they came in conflict with the power of Carthage. Their first success was the defeat of the Carthaginian fleet at Mylæ (B.C. 260). With the fall of Carthage the naval power of Rome became paramount in the Mediterranean. Finally the battle of Actium (B.C. 31) cut off the last opposing naval force in the Mediterranean, that of Egypt.

Early in the Middle Ages the countries about the Baltic and North seas, which had been sending out their rovers in every direction, began to develop organized naval power. The predatory expeditions of the Norsemen show organized power, though the actual warfare was mostly upon land. The songs and stories of the Scandinavians and Danes contain many accounts of sea fighting, but the accounts are so intermixed with fable and poetic imagery that it is hard to separate fact from fiction. It is not until the ninth or tenth century that we begin to reach anything approaching reliable history. The first great sea fight of which we have a full account is that between King Olaf Trygvasson of Norway and the allied Powers of Denmark and Vendland, which were assisted by the Norwegians of the Province of Viken (from which the name of Viking is derived). Notwithstanding his brave and able defensive fight, Olaf was overcome by weight of numbers, defeated, and killed. This was in the year 1000. In 1014 Olaf the Saint assisted the Saxons to capture London, which was occupied by the Danes. This fight is interesting from the fact that it was won by a fleet fighting against land forces. The culmination of the naval power of Norway was reached soon afterwards under Harald Hardrada. About five years before the landing of William the Conqueror in England, Harald destroyed the Danish fleet in a fiercely fought action at Nisaa. In 1066 he started with a fleet and army to assist Earl Tostig, brother of Harold of England, who was in rebellion and had fled to Norway. The ambition of the Norwegian King in this instance caused his death, for he was killed in battle at Stamford Bridge, September 25, 1066—three days before the landing of the Normans and less than three weeks before the battle of Hastings. After the death of Harald Hardrada the Norse sea power declined.

When, after the fall of Rome, there ceased to be any dominant power in the Mediterranean, there was an increase of piracy and robbery on the sea and along unprotected coasts. The geographical position of Italy caused it to be the natural doorway to merchandise entering Europe from the East or moving in the opposite direction. The development of maritime trade thus brought about caused the Italian commercial cities to be the heaviest losers by piracy, and made it necessary for them to establish naval forces. Of the Italian States, Venice, Pisa, and Genoa took the lead in commerce, and all gradually developed powerful navies. The army of Venice was composed chiefly of mercenaries and commanded by one because it was feared that a native might use its power to overturn the Government; but the navy, from which nothing of the kind was feared, became the pride of the people. The Senate encouraged the nobles to trade and serve in the fleet and they became merchants and admirals.

In the ninth century the Saracens had become powerful and troublesome in the Mediterranean, where their piratical armed vessels and strong fleets were the terror of every merchant who had a venture on the sea. They carried their depredations to the coast of Italy, so that in 842 the Venetians coöperated with the Greeks in sending a naval expedition against them. The hostile fleets met at Cortona. The Greeks fled at the first attack of the enemy, but the Venetians fought against vastly superior numbers until their loss was so great as to make further resistance impossible, when the few survivors endeavored to make their escape. For a quarter of a century the humiliation of defeat rankled in the Venetians, and finally they sent out a new force which gained a decisive victory over their enemies on the same spot. During the next six or seven centuries the Pisans, Genoese, and Venetians strove for naval and commercial supremacy with each other and with the Saracens and their natural successors, the Turks. Genoa and Venice profited by the Crusades, furnishing ships, munitions of war, and provisions to the Crusaders. Pisa succumbed to Genoa in the great sea fight off Meloria in 1284. Previous to this Genoa and Venice had entered upon their great struggle for supremacy. Both republics extended their territories by land and sea, and Venice held most of hers until the rise of the Turkish Empire, when she lost many of her islands and seaports, which constituted an almost uninterrupted territory from the head of the Adriatic to Asia Minor and the Bosporus, including Cyprus, Crete, and the Morea. The contest between Venice and Genoa for control of the Mediterranean continued at intervals until 1380, when the Genoese fleet and army which had threatened Venice were captured at Chioggia by the Venetians under Admiral Vettor Pisani, one of the greatest of naval commanders. After the battle of Chioggia the military and naval power of Genoa declined quite rapidly. Venice, on the contrary, continued to grow in wealth, power, and extent of territory until at the close of the Middle Ages the Turks became dominant in the eastern Mediterranean, while at the same time the Republic had to withstand the combined arms of the covetous Christian powers.

The Turks, who had firmly established themselves in Europe, dreamed of universal conquest and were expanding their territory at every opportunity. At last in 1571 Venice, Philip II. of Spain, and Pope Pius V. united in a great effort to put an end to the aggressive naval power of the Moslems, and the combined fleet, under Don John of Austria, dealt an irreparable blow to Turkish prestige in the battle of Lepanto. This victory did not arrest the decline of Venice, whose commercial prosperity was greatly affected by the change in the channels of trade which had been brought about by the discovery in 1497-98 of the water route to India.

Spain made a strong effort to become a great maritime nation, but ultimately failed, partly from governmental mismanagement, partly from various causes connected with the temperament of her people or with the country's environment. In 1588 she sustained a crushing blow in the defeat of the Invincible Armada, which was to conquer England.

Though the fact was not yet recognized, Neptune's sceptre was passing to northern nations, the English and the Dutch. But good sailors as the Dutch were, they were too few in number and too poor long to cope with their great rival, and Britain became mistress of the waves. Alfred the Great is commonly regarded as the founder of the British navy. Before his time the various petty kings had naval forces, but Alfred combined them into an English fleet and took command of it against the Danes in person, and England's first naval victory was gained in his reign off the coast of Essex. Alfred's grandson Athelstan fostered the maritime spirit of his people as regards both commerce and naval affairs. He granted the title of 'thane' to any merchant who had made three voyages on the high seas in his own ship freighted at his own expense, though this was a title previously confined to men of noble rank and extensive landed possessions. Edwy the All Fair is said to have had large fleets, and under Canute the Great English maritime commerce assumed large dimensions. After the Normans had firmly established their rule they also encouraged the growth of shipping and provided for its defense. Henry II. and Richard Cœur de Lion are both known to have had strong naval forces, and under John it was decreed "that any ships of other nations, though at peace and in amity with England, should be made lawful prizes if they refused to strike to the royal flag." Such an arrogant assumption is not likely to have been made unless the power to carry it out existed, and we know that John's fleet gained a victory over the French in the harbor of Damme. During the century which followed a sort of piratical war existed between England and France and the coasts of both were ravaged by the freebooters on either side. At length, in 1340, the English fleet, commanded by Edward III. in person, won the great victory of Sluis, the French losing nearly their whole force of three hundred vessels and 20,000 men killed, wounded, and prisoners. According to Charnock, this was the first action in which beaked galleys were wholly laid aside and vessels propelled chiefly by sails relied upon. From this time there was no particular improvement in the British navy (except that heavy guns were placed on board ship) until the reign of Henry VIII., who gave great attention to the fleet, building several relatively very large vessels, of which by far the greatest was the *Henry Grace de Dieu*. She carried 72 guns and 700 men and her tonnage is variously stated at from 1000 to 1500.

Henry VIII. was the first sovereign in Europe to establish a corps of officers for sea service only; and he did more for the navy than any preceding monarch, using improved models for his ships and employing many Italian shipwrights (then the best in the world) in their construction. He greatly increased the number of vessels and established the arsenals at Portsmouth, Woolwich, and Deptford. Edward VI. and Mary paid little attention to the fleet, but Elizabeth recognized its vital importance and increased the number of ships and their size, besides improving the condition of the officers and gathering vast quantities of naval stores. From her reign to the present day the British navy, though not without rivals, has never been equaled.

In this brief review of the history of ancient and mediæval navies only those are considered which have been of greatest importance in the different periods. This has excluded a very large number from mention except so far as their histories are bound up with the histories of others. The greatest apparent omission is in the case of France. Her navy has always been respectable and occasionally very powerful, but it has never been paramount, and its prestige suffered at different times from defeats brought about by governmental neglect and mismanagement. It has not been to France what that of Great Britain has been to the British Islands and Empire, an absolute necessity. Her fleet has been built up or neglected according to the prevailing policy of the Government.

Modern naval development may be said to have begun with the rapid increase in the size of ships which took place at the close of the fifteenth century (see GUNS, NAVAL); and mediæval history finally closed with the battle of Lepanto in 1571, the last great action in which rowing galleys played an important part. From this time the sail-propelled man-of-war was gradually improved until early in the nineteenth century, when sails began to give way to steam. During this period the British navy managed to retain its general supremacy, though the temporary rise of the Dutch naval power seriously threatened it; and for a few years Louis XIV. managed to maintain a French fleet which was superior to the British, and with which Admiral Tourville defeated the combined British and Dutch forces off Beachy Head (1690). Two years later the French fleet was destroyed at La Hogue by the allied British and Dutch. From this time forward the superiority of the British navy was undoubted. Though it lost many single-ship actions with the French and Americans, no foreign navy could stand before its full strength.

After the close of the Napoleonic wars the great naval Powers were Great Britain and France alone. In the second rank were Spain, Russia, the Netherlands, and Turkey. In the third were Austria, Denmark, the United States, the Two Sicilies, Sardinia, Portugal, and Prussia. In 1860 the conditions were much the same, except that the United States had risen to the second category, the Netherlands had sunk to the third, the Kingdom of Italy was forming, and that of the Two Sicilies tottering to its fall; while Greece, Brazil, Peru, and Chile had organized naval forces.

During the American Civil War the navy of the United States, whose history and present condition will be found fully treated under UNITED STATES, became greatly expanded, but from 1865 to 1881 it steadily declined, until it reached the point of almost absolute uselessness so far as the ships were concerned, and ceased to be a factor among the naval armaments of the Powers. In 1866 the North German Confederation took over the Prussian navy and made some additions; and the fleet again received some increase of strength in the decade following the formation of the German Empire. Italy began to develop a fleet as soon as the Kingdom was established, but the disastrous battle of Lissa in 1866 caused a temporary check, and it was not until 1872 that she adopted the building policy that in a dozen years brought her up into the first rank of naval Powers. Russia began to reconstruct her fleet after the close of the Crimean War and has pursued a steady and unwavering policy of naval increase from that date to the present. In 1881 the United States began to rebuild the navy, but it was not until 1890 that battleships of the first class were commenced. After completing four large armorclads in 1878-80, Germany added little to her fleet until 1888-89, when a programme was adopted which included the construction of 28 ships of various types. Japan organized its navy on a modern footing soon after the close of the Civil War in the United States, and slowly added to it until after the battle of the Yalu (1894), when she began to build the fine vessels that have made her navy the most powerful outside of Europe, with the exception of that of the United States. Of the Powers of the second rank, Austria-Hungary is first. After the War of 1866 she did little for several years, and then (1872-78) built only three ships of much importance. In 1887 she launched two small armorclads, and in 1895-96 three coast defense vessels. Then was instituted a shipbuilding policy which, if persisted in, may soon place her among the great maritime Powers. Turkey, which had a powerful navy about 1880, has allowed it to fall into decay, and had not in 1903 a single ship of the first or even of the second class.

So far as the collective strength of their heavy fighting ships is concerned, navies are considered to rank as follows in 1903: 1, British; 2, French; 3, Russian; 4, United States; 5, German; 6, Italian; 7, Japanese; 8, Austrian. To the lesser Powers it is difficult to assign places. The relative positions of the United States and Germany are disputed, though all authorities agree that their forces are very nearly equal. At the opening of the twentieth century the French and Italian navies have been falling behind their rivals, and the Russian is hardly holding its own. If the present conditions remain unchanged, it seems likely that in a very few years the United States and Germany will be superior at sea to all other Powers except Great Britain, and will be striving with each other for second place.

The condition of the various navies in 1901-02 was as follows:

MODERN NAVIES.

Argentina. The Argentine navy is the most powerful one possessed by a South American State. In May, 1902, the fleet consisted of 4 high-speed armored cruisers of 6840 to 7180 tons (launched 1895-98), 1 third-class battleship of 4267 tons (launched 1880, but recently rebuilt), 2 armored coast-defense vessels of 2336 tons (launched 1890-91), 2 armored coast-defense vessels of 1558 tons (launched 1874-75, but being reconstructed), 3 high-speed protected cruisers of 3200, 3570, and 4780 tons (launched 1890-95), 1 small partially protected cruiser of 1442 tons (launched 1874), 2 torpedo gunboats of 1070 and 520 tons (launched 1890-93), 3 gun vessels of 550 to 820 tons, 1 cruising school-ship of 2750 tons (launched 1897), 1 torpedo school-ship of 1100 tons (launched 1880), 4 torpedo-boat destroyers of 280 tons, 2 torpedo boats of 110 tons, 6 of 85 tons, 4 of 52 tons, 10 of 16 tons, and 1 torpedo mining boat. In addition there were building in Europe two high-speed armored cruisers of 8500 tons, and in Buenos Ayres a submarine boat was reported as under construction. The former by a treaty signed in 1903 between Argentina and Chile were to be disposed of, while further disarmament was contemplated. The naval academy is located at Buenos Ayres. There is a small naval station at La Plata and a torpedo school and torpedo-boat station at Buenos Ayres, but the principal navy yard will be at Bahia Blanca when the works which were under construction in 1902 are completed.

Austria. The navy of Austria is in power of its fighting ships eighth in rank among the navies of the world and sixth among those in Europe. For many years no new vessels of importance were added to the fleet, but in 1893 the armored cruiser *Kaiserin Maria Theresia* was launched and three small battleships were commenced; and since that time the annual building programme has steadily increased. As reorganized in 1901 the Navy Department forms an autonomous section in the Ministry of War under the control of a vice-admiral, who is commander-in-chief of the fleet and marine forces, and who represents the Minister of War in the discussions of the budget of the Navy Department. The department consists of the marine cabinet, the general staff, and three administrative sections divided into eight bureaus. The naval budget for 1901-02 amounted to 46,690,820 crowns ($9,478,236.46; 1 crown = $0.203), an increase of 3,200,000 crowns on that for the previous year. The principal navy yard is at Pola (which is the headquarters of the fleet), but there is another at Triest, and several small stations along the Dalmatian coast. The tabular statement later in this article gives the strength of the Austrian fleet.

Belgium. The seacoast of Belgium is only 42 miles long, and there are no very important seaports except the interior one of Antwerp. For fishery protection there is a small armed steamer of 684 tons, but there is no navy properly so called.

Brazil. Among the navies possessed by South American nations the navy of Brazil is third in power. The principal navy yard, together with the naval academy and apprentice school, is located at Rio de Janiero, but there are other naval stations at Pernambuco, Santa Catalina, and Bahia. The fleet consists of 2 small battleships of 5700 and 4950 tons (launched 1883-85, but rebuilt in 1893-96), 2 new coast-defense armorclads of 3162 tons (launched 1898-99), 4 protected cruisers of 4537, 3450, 2750, and 1300 tons (launched 1890-96), 3 cruisers of 1414 to 1911 tons (launched 1877-90), 5 torpedo gun vessels of 500 to 1030 tons (launched 1892-98), 1 old monitor of 1000 tons, 6 small river monitors of 340 to 470 tons, 15 first-class torpedo boats, 7 second-class torpedo boats, 6 third-class torpedo boats, 2 submarine boats (Goubet type—Paris, 1895), 2 new submarines (projected), 6 armed merchant steamers, 16 small gunboats of 137 to 726 tons, 2 old armorclads of about 1500 tons used as floating batteries, 3 small transports, and several small vessels used for river service.

Bulgaria. The navy of Bulgaria consists of one small gunboat and four royal yachts; the personnel is variable and uncertain.

Chile. Of the navies of South American countries, the navy of Chile is second in power, being exceeded only by that of Argentina. The naval school for officers is at Valparaiso. The principal dockyard is at Talcahuano, though there are naval stations at Valparaiso and Llica and smaller ones elsewhere. The fleet consists of 1 third-class battleship of 6900 tons (launched 1890), 1 fourth-class battleship of 3500 tons (launched 1874, but rearmed about 1890), 1 old monitor of 1870 tons (launched 1865), 2 high-speed armored cruisers of 7000 and 8500 tons (launched 1896-97), 1 protected cruiser of 4500 tons (building in 1902), 4 protected cruisers of 3600, 4420, 2080, and 2080 tons (launched 1890-96), 1 new steel-sheathed cruising training ship of 2500 tons (launched 1898), 3 torpedo gunboats of 750 to 860 tons (launched 1890-96), 4 torpedo-boat destroyers of 300 tons (launched 1896), 6 torpedo boats of 130 tons, 13 smaller torpedo boats, several small vessels and old gunboats, and a number of merchant steamers which are held at the disposal of the Government in case of war. In 1902-03 negotiations were concluded with Argentina by the terms of which the war vessels under construction in Europe were not to be added to the fleet, and the reduction in vessels and armament was provided for.

China. The navy of China was never an organized force. The fleet was made up of squadrons supported, officered, and manned by different sections of the Empire, and the squadrons were called the Pe-chi-li squadron, Fu-chow squadron, and Canton squadron. The war with Japan swept away all the armored vessels and many of the unarmored ones and left the navy in a deplorable state, from which it has not yet recovered. There is not now, and there has not been at any time, any well-considered plan of supplying officers to the fleet, although there has been for many years a naval school at Nanking at which a few officers are educated by foreign instructors. What officialism and corruption failed to do in weakening the fleet, incompetency in the older officers accomplished. The principal dockyard is at Fu-chow, but there is a naval arsenal at Shanghai and small yards at Tien-tsin and Canton. The vessels possessed in 1902 in the different squadrons were 2 protected cruisers of 24 knots speed and 4300 tons (launched 1897-98), 5 protected cruisers of 2500 to 2950 tons (launched 1883-97), 3 cruisers of 2200 tons (launched 1883-90), 9 cruisers of 1200 to 2100 tons (launched 1875-87), 1 steel screw training ship of 1800 tons (launched 1895), 6 torpedo gun vessels of 850 to 1030 tons, 12 gunboats of 340 to 580 tons (launched 1869-95), 1 special service vessel (cruiser and cable ship) of 1400 tons, 1 armored gunboat of 200 tons (launched 1875), 6 small wooden floating batteries for river operations, 22 gunboats belonging to river and customs service of 120 to 850 tons, 4 dispatch vessels and training ships of 1200 to 1500 tons (launched 1869-79), 3 armed transports, 1 sailing training vessel of 400 tons, and 21 torpedo boats of 27 to 120 tons (launched 1885-99). Four torpedo-boat destroyers built by Schichau in 1898-99 were captured by the allied forces at Taku in 1900 and added to the British, French, German, and Russian navies.

Colombia. The navy of Colombia consists of 2 gunboats of about 400 tons, 2 armed yachts, 1 barque-rigged sailing vessel of 315 tons register, and 2 sailing cutters used in the revenue service.

Costa Rica. The only war vessel possessed by Costa Rica is a small torpedo boat built by Yarrow in 1892.

Denmark. Though necessarily small, the Danish navy has an excellent reputation as regards organization and efficiency. At the head of it is the Minister of Marine, who is assisted by a superior officer (usually a vice-admiral or rear-admiral) who has the title of 'director-general.' The Navy Department is divided into four principal sections: (1) Secretariat; (2) Admiralty; (3) Commissariat and Accounts; (4) Justice. The chief of the secretariat is the director-general; of the admiralty, a captain in the navy. The other two sections have civilian heads. The only dockyard is the royal arsenal, Copenhagen. The fleet consists of 2 armored vessels of 3470 tons (1 launched 1899, 1 building in 1902), 1 fourth-class battleship of 5370 tons (launched 1878, undergoing reconstruction), 6 armored vessels of 2080 to 3290 tons (launched 1868-96—older vessels rebuilt recently), 3 protected cruisers of 1290 tons (launched 1890-92), 2 protected cruisers of 2580 and 2900 tons (launched 1882-88), 4 small cruisers of 560 to 1570 tons (launched 1862-76), 6 gunboats of 215 to 360 tons, 4 surveying vessels of 95 to 145 tons, 1 torpedo mine boat of 389 tons, 1 royal yacht of 770 tons, about 20 special service vessels, receiving ships and hulks, 9 first-class torpedo boats of 90 to 143 tons, 4 second-class torpedo boats of 50 to 82 tons, 15 third-class torpedo boats of 15 to 44 tons.

Ecuador. The navy of Ecuador consists of one small cruiser of 811 tons (launched 1885, repaired 1900), two iron steamers lightly armed, and one torpedo boat of about 85 tons.

Egypt. Egypt has no navy, properly speaking. The armed vessels possessed by the Government are sixteen steam and sailing vessels of the coast guard service of 10 to 450 tons, three dispatch vessels of 330 to 700 tons, one transport of 3700 tons, thirteen shallow-draught river gunboats, and three royal yachts, which carry small guns.

France. The success of the French navy in war has never been proportional to its strength. This has been due to disorganizing forces from without the service which have prevented efficiency. Since the fall of the Empire the navy has greatly improved, and seems to be at present highly efficient; certainly, the ships, armaments, and equipments are of the best, and the personnel of apparently equal excellence. At present the French navy is second to that of Great Britain only, but for financial reasons the number of new ships now in hand and proposed is insufficient to enable France to maintain her present relative lead, and it is likely that within the next decade her navy will be surpassed by those of both Germany and the United States. It seems likely that the French naval authorities have realized the drift of naval matters for several years, and that the special attention that has been paid to the development of submarine boats is due to the hope of obtaining a defensive naval weapon which, at little expense, would enable the French coasts to be adequately protected. The French Navy Department is presided over by a Minister of Marine, a civil officer who is a member of the governmental Cabinet. Until 1902 the executive head was the chief of the naval general staff, but this was changed, and the chiefs of bureaus are directly subordinate to the Minister of Marine, the chief of the staff sinking to the level of a bureau officer. The sections or bureaus of the department are: (a) General Staff; (b) Office of the Minister of Marine; (c) Personnel; (d) Material; (e) Ordnance; (f) Submarine Defenses; (g) Hydrography; (h) Central Control (financial inspection); (i) Accounts; (j) Pensions. There are in addition six consultation or advisory boards: (a) Superior Naval Council; (b) Board of General Inspectors; (c) Council of Works; (d) Commission on Equipment; (e) Commission on Machinery and Plant; (f) Board to Classify Officers for Promotion. The principal naval arsenals (see ARSENAL) are located at Cherbourg, Lorient, Brest, Rochefort, and Toulon, but there are others at Saigon (Cochin-China), Bizerta (Africa), Fort de France (West Indies), etc. By far the greater part of the executive officers are graduates of the Naval Academy at Brest, but many are now obtained from other schools, especially those promoted from the enlisted force. The men are enlisted voluntarily or drafted from the *conscription maritime*. The strength of the fleet is shown in the statistical table later in this article.

GERMANY. The navy of Germany is of comparatively recent origin. The Prussian navy and that of the North German Confederation were both weak. After the formation of the Empire a number of armored ships of importance were built, but it is only within the last dozen years that Germany began to take rank as a great naval power. From 1890 to the present the building of powerful new ships has proceeded steadily. After completing the vessels of several small building programmes, the Government in 1898 prepared a 'sexennate' programme, which was approved by the Reichstag. This provided for the construction of 7 new battleships, 2 armored cruisers, and 5 small cruisers, besides replacing vessels which had become antiquated. The bill laid down the principle that the life of a battleship and of a coast-defense ship should be considered as twenty-five years, that of a large cruiser as twenty years, and of a small cruiser as fifteen years; after which times the vessels are to be considered as antiquated and replaced. In 1900 a much more comprehensive law was passed. This provided that not later than 1916 the German fleet should consist of 38 battleships, 20 large cruisers, 45 small cruisers, and 16 divisions of torpedo boats. Should the finances of the Government permit, the programme will be completed earlier than 1916, and it now seems probable that this will be the case. In 1902 the Government also proposed to ask legislative authority to construct two battleships, five cruisers, and a torpedo division (six boats) in excess of the programme provisions. In 1889 the administration of the German navy was reorganized; all matters connected with *personnel*, command of the fleet, mobilization, strategy, tactics, etc., were placed under the *Oberkommando*, and all matters connected with construction, dockyards, and *matériel* were put under the *Reichsmarineamt*. The *Oberkommando* was presided over by the commanding admiral of the navy, and the *Reichsmarineamt* by a vice-admiral acting as Naval Secretary of State under the Chancellor of the Empire. The two sections were wholly disconnected and were brought into harmony with each other by the Marine Cabinet acting advisory to the Emperor. In 1899 this organization was changed. The title of *Oberkommando* was changed to *Admiralstab*, and the office of *Oberkommandant*, or commanding officer of the navy, abolished. Additional authority was given the *Reichsmarineamt*, and the Emperor and his advisers in the Naval Cabinet exercised direct control of naval affairs.

The Imperial naval arsenals are at Kiel, Wilhelmshavn, and Danzig; the Naval School and Naval Academy are at Kiel. The composition of the fleet is given in the comparative tables further on.

GREAT BRITAIN. The British navy has been the most powerful navy in the world for three centuries, and it is to-day more than equal to the combined forces of any two Powers—probably equal to any four in actual warfare, as allied forces never can develop their full strength from lack of one supreme directing authority. The Naval Department is administered by the Board of Admiralty of six persons, consisting of the first lord, first sea lord, second sea lord, junior sea lord, controller, and civil lord. Theoretically, the members of the board are equal in authority; practically, the first lord is supreme. He has supervision over all departments, prepares the naval budget and programme, and is responsible to Parliament for the affairs of the navy; he is therefore necessarily a member of Parliament. The first sea lord (a flag officer) has charge of movements of the fleet, detail of executive officers, discipline, naval intelligence, deputy adjutant-general of marines, gunnery training establishments, naval reserves, hydrographic office, etc. The second sea lord (a flag officer) has charge of the intelligence department as far as it affects mobilization, manning the navy, training schools for boys, engineer officers, personnel of naval reserves, etc. The junior sea lord (usually a flag officer) has charge of transports, medical department, coal for the fleet, certain officers' allowances, chaplains, and naval instructors, and the intelligence department as regards mobilization so far as it affects the preceding. The controller (a flag officer) has charge of naval construction, dockyards, ordnance material, stores (except coal for fleet), and expense accounts. The civil lord has charge of naval works, general accounts, Greenwich Hospital, civil personnel. The first lord is assisted by the financial secretary and the permanent secretary. The former deals with all financial questions, assisted by the accountant-general and the director of navy contracts, the latter being also under the superintending lords as regards purchases made for their several departments. The financial secretary is a member of Parliament and of the party in power, and through him all Parliamentary statements are made in the House of Commons, unless the first lord be a member of that House. The permanent secretary superintends all correspondence in the name of the board, prevents the various departments from acting independently, and provides for the due execution of orders.

The total personnel of the British navy on April 1, 1902, amounted to 118,625; it will be increased during 1902-03 to 122,500. The sum total of the naval budget for 1902-03 was £31,255,500.

The principal dockyards are at Bermuda, Cape of Good Hope, Chatham,* Devonport,* Esquimalt (British Columbia), Gibraltar, Halifax, N. S., Haulbowline (Cove of Cork), Hong Kong, Jamaica, Malta, Pembroke,* Portsmouth,* Sheerness,* Sydney. Of these, the ones marked with a star are first-class yards in all respects. Secondary yards and naval stations exist at Ascension Island, Bombay, Calcutta, Colombo, Dartmouth, Delagoa Bay, Deptford, Greenwich, Plymouth, Portland, Sydney, Trincomali, Wei-hai-wei, and London (West India Docks). Naval cadets of the line are educated at the Royal Naval School at Dartmouth. The Royal Naval College at Greenwich is for post-graduate courses. The engineering college is at Keyham, and there are engineering schools at all the principal dockyards. The gunnery and torpedo schools are both located at Portsmouth. (See NAVAL SCHOOLS OF INSTRUCTION.) The strength of the British fleet is given in the table on a following page.

GREECE. The navy of Greece is naturally small, but it is by no means insignificant. The quality of its officers and men and their organization and training have never been tested by war, as practically no use was made of the fleet during the war with Turkey. In 1901 the Government decided to expend annually the sum of 2,500,000 drachmas ($482,500) for the purpose of repairing and adding to the fleet. The fleet consists of 3 small battleships of 4885 tons (launched 1889-90, rebuilt 1897-1900), 1 old armorclad of 1774 tons (launched 1868, reëngined 1897), 4 small cruisers of 1000 to 1800 tons (launched 1879-85), 1 old school-ship of 1300 tons, 11 gunboats of 380 to 410 tons (launched 1859-84), 1 torpedo depot ship of 1100 tons, 1 old training ship of 2030 tons (launched 1869, reëngined 1897), 3 torpedo mining vessels, several smaller vessels of no particular military value, 31 torpedo boats of 18 to 85 tons (launched 1878-85), 2 old Nordenfeldt submarine boats, purchased in 1886 (probably useless), 20 torpedo vidette boats.

HAITI. The Haitian navy consists of one steel gunboat, 260 tons; one iron corvette, 1200 tons; two iron sloops of from 500 to 900 tons; and one gun vessel of 900 tons. The steel gunboat *Crête à Pierrot*, 940 tons, was sunk by the German gunboat *Panther*, as a punitive measure, September 7, 1902.

ITALY. The modern Italian navy dates from 1860, when the fleets of Sardinia and the Two Sicilies were combined. Immediately after the formation of the Italian Kingdom the construction of a powerful navy was commenced. The newly constructed fleet received a severe setback at Lissa in 1866, but it was continually added to, and in 1890, so far at least as ships were concerned, it was the third navy in the world. It then reached the limit of size permitted by the national finances. Since 1890 it has preserved about the same strength of fleet, but the increases in the navies of the United States, Russia, and Germany have forced Italy to sixth place in naval rank. The head of the navy is the Minister of Marine (an admiral), who is assisted by the 'superior council' of the navy, composed of 1 vice-admiral (or admiral), president; 3 vice-admirals (or rear-admirals), 1 director-general of the civil personnel, members; 1 rear-admiral (or captain), who is a member and secretary; and lastly the chief of the bureau or office whose affairs are under consideration. By the law of November 23, 1889, the Navy Department is divided into 10 sections, as follows: (1) General Staff and Cabinet, which consists of (a) cabinet of the minister, which coördinates the different branches; (b) questions of a general military kind, strategy, and tactics, auxiliary fleet, defense of the coast, and fleet manœuvres; (c) rules and arrangements concerning the service, discipline, dress, etc. (2) Direction of the service as regards personnel. (3) Naval Construction. (4) Armament and Equipment. (5) Merchant Marine. (6) Hydrographic Service. (7) Medical Department. (8) Military Engineering (fortifications, works, etc.). (9) Office of Revision. (10) Accounts.

The Naval Academy and College is located at Leghorn. The principal dockyards are at Castellamare, Spezia, Venice, Taranto, and Naples; naval stations at Genoa, Messina, Licata, Cagliari, and Palermo. The Italian fleet as it existed in 1902 is summarized in the table given later in this article.

JAPAN. The modern Japanese navy may be said to have commenced with the purchase of the armored ram *Stonewall* (renamed *Adzuma*), which was built for the Confederate navy and sold to Japan at the close of the Civil War. Since then the strength of the navy has steadily increased, but it was not until 1894 that it began to take rank among the navies of the great Powers. In that year two large battleships were ordered, and during the next eight years four more battleships and six large armored cruisers were built. These accessions placed the Japanese navy in 1902 seventh among the naval forces of the world. The principal navy yards are at Yokosuka, Kure, Saseho, Onohara, and Nagasaki. The comparative tables show the strength of the fleet.

MEXICO. Until 1901 the navy of Mexico consisted of a small cruising training ship of 1200 tons (launched in 1891), and four gunboats of 425 to 450 tons (launched 1874-75). In 1901 a building programme was laid down providing for the construction of eight gunboats of 1000 tons and 16 knots, and two torpedo boats. Two of the gunboats in 1902 were nearly completed.

MOROCCO. The navy of Morocco consists of a small cruiser of 1200 tons (launched 1892) and one gunboat of 450 tons (launched 1898).

NETHERLANDS. In the days of sailing vessels the navy of the Netherlands was a powerful one, but the great cost of modern fighting ships has prevented the Netherlanders, a naturally seafaring race, from maintaining a powerful fleet. The navy is represented in the Cabinet by the Minister of Marine. The administration, presided over by the Minister, consists of a chief (a captain) of the general staff, 1 director of naval construction, 1 director (commander) of the personnel, 1 director (captain) of pilotage, 1 director (captain) of the hydrographic service, 1 inspector of pay, provisions, and clothing, 1 medical inspector.

The executive officers are educated at the Royal Naval Academy at Willemsoord, while the engineers are educated at the special engineer school at Hellevoetsluis. The naval arsenals are four in number and located at Amsterdam, Hellevoetsluis, Willemsoord, and Fijenoord. There are small stations abroad in Surinam, Curaçao, Borneo, Sumatra, Java, and Celebes. The fleet consists of 3 small battleships of 4950 tons (building in 1902), 1 battleship of 5400 tons (launched 1874), 2 coast-defense ships of 3375 and 2490 tons (launched 1866 and 1891), 3 coast-defense ships of 3520 tons (launched 1894), 13 monitors of 1520 to 2200 tons (launched 1868-78), 5 armored river gunboats of 352 to 388 tons (launched 1870-79), 1 armored cruiser of 4600 tons (launched 1892), 6 protected cruisers of 3900 to 4033 tons (launched 1896-99), 3 cruisers of 3400 tons (launched 1876-82), 1 protected cruiser of 1703 tons (launched 1890), 64 gunboats of 175 to 1298 tons (launched 1874-1900), 5 surveying vessels of 300 to 800 tons, 42 special service vessels, receiving ships, school-ships, etc., 39 torpedo boats of 45 to 90 tons, 3 torpedo boats of 140 tons, 33 torpedo boats of 29 to 37 tons.

NORWAY. The navy of Norway is entirely separate from that of Sweden, though, of course, both fleets would be combined in case of war. With the possible exception of that of Sweden or Denmark, the Norwegian navy is the oldest in Europe. In proportion to its population, Norway has a greater mercantile marine and furnishes more mariners than any other country, but the great expense of modern fighting ships prevents the maintenance of a large naval force, or an attempt to do more than defend the coast. The government of the navy is confided to the commanding officer of the navy and the Minister of Marine and Posts. The last-named is an administrative office and constitutes the ministry proper; both branches have their headquarters at Christiania. The commanding officer of the navy is a rear-admiral, and he is assisted by a captain, while a second captain is stationed at Stockholm as naval aid to the King.

The executive officers of the active service and those of the reserve are educated at the royal naval school. Norway possesses but a single military port, that of Horten, near Christiania. There are five naval establishments, of which that of Karljohansvorn at Horten is the only shipbuilding yard; the others at Bergensund, Trondhjem, Fredriksvaern, and Christiansund are naval depots and supply stations. The fleet consists of four small battleships of 3400 to 3850 tons (launched 1896-99), 4 monitors of 1448 to 2000 tons (launched 1866-72—rebuilt 1895-98), 1 protected cruiser of 1113 tons (launched 1891), 1 cruiser of 1370 tons (launched 1896), 1 torpedo gun vessel of 380 tons (launched 1896), 2 wooden cruisers of 1006 and 1610 tons (launched 1862-80), 12 gunboats of 190 to 635 tons, several small gunboats, sailing training ships, etc., 10 torpedo boats of 90 tons (launched 1897-1901), 21 torpedo boats of 27 to 65 tons (launched 1882-1901), and 6 submarine boats (building in 1902).

PERSIA. The navy of Persia consists of an armed dispatch vessel of 1200 tons (launched 1885—remodeled from merchant steamer).

PERU. Previous to the war with Chile the Peruvian navy was of some importance, but a large sea-going monitor was captured by the Chileans, an old monitor (purchased in the United States) was sunk, and an armored frigate was wrecked while chasing a Chilean gunboat. The naval force in 1902 consisted of a wooden cruiser of 1658 tons (purchased in France in 1900—launched 1877), 1 cruiser of 1700 tons (launched 1881—a sister to the U. S. S. *Topeka*), 1 gunboat of 420 tons (launched 1883), 1 small iron cruiser (launched 1891), 1 screw frigate (training ship), 1 armed transport of 1400 net tons measurement (launched 1863), and several paddle steamers.

PORTUGAL. From time to time plans have been made for increasing the strength of the Portuguese fleet, but aside from an occasional cruiser the financial resources of the country have been unable to meet the demands of the naval programme. The Navy Department forms part of the Ministry of the Marine and Colonies. It is presided over by a vice-admiral with the title of director-general, and consists of the divisions of (a) personnel and (b) material. The only naval arsenal is at Lisbon, where is also located the naval college, a sort of polytechnic institute in which all the officers of the navy are educated—even the medical officers having a final course there. The fleet consists of 1 old armored coast-defense ship of 2480 tons (launched 1875), 1 protected cruiser of 4280 tons (launched 1898), 2 protected cruisers of 1800 tons (launched 1898), 2 cruisers of 1660 and 1765 tons (launched 1896-99), 4 small cruisers of 1110 to 1429 tons (launched 1864-84), 21 gunboats of 160 to 729 tons (launched 1873-1902), 25 river gunboats of 34 to 300 tons (launched 1888-1902), 1 transport of 3000 tons, 3 training ships, a number of small craft, 1 armed royal yacht of 950 tons (launched 1899), and 11 torpedo boats of 31 to 60 tons (launched 1880-93).

RUMANIA. The Navy Department in Rumania is a branch of the Ministry of War. The officers hold military titles and are overshadowed by the army in every way. There is a naval school for the instruction of petty officers, but a military education is apparently sufficient for the higher officers. There is a small navy yard at Galatz at which gunboats are occasionally built. The fleet consists of 1 protected cruiser of 1325 tons (launched 1887), 4 gunboats of 104 to 400 tons (launched 1862-86), 1 armed yacht of 350 tons, 6 torpedo boats of 55 tons (launched 1888-95), 8 second-class torpedo boats and launches of 10 to 32 tons (launched 1882-95), and 12 gunboats and coastguard vessels of 45 to 110 tons (launched 1873-93).

RUSSIA. The Russian navy really dates from the time of Peter the Great, though the dwellers in the lands now belonging to Russia along the shores of the Baltic have been seafaring people from time immemorial. The navy and Navy Department are presided over by the general admiral, who is always one of the Imperial family. He has under his orders an Under-Secretary of State having the rank of vice-minister and called the director of the Ministry. The general admiral is assisted and advised by a board of admiralty consisting of 4 admirals, 5 vice (or rear) admirals, and 1 lieutenant-general of naval corps. The Minister of Marine or director of the Ministry is an admiral appointed by the Emperor. The subdivisions of the Ministry are: (1) General Staff; (2) Chief Naval Judicial Court; (3) Material and Supplies; (4) Technical Committee; (5) Scientific Committee; (6) Hydrographic

Bureau; (7) Medical Bureau; (8) Chancellerie; (9) Administration of Courts-Martial; (10) Archives.

The naval schools are the naval academy, at Saint Petersburg, naval college (higher course at the naval academy), school of navigation, ordnance, and naval construction at Kronstadt, and marine engineering school. The present plans are to combine all the schools in one establishment. The principal dockyards are the New Admiralty Works at Saint Petersburg, Galernaya Island Yard at Saint Petersburg, Kronstadt arsenal, Nicolayev dockyard, Sebastopol arsenal, Windau dockyard, Libau dockyard, Port Arthur (Liao-tung Peninsula), Vladivostok, Sveaborg, Revel, Archangel, Baku, Batum, Nicolayevsk (Amur), and Kagala (Oxus). The number and displacement of the vessels of the fleet are given in the table. The transport service between Russia and Eastern Siberia is carried on by the Russian Volunteer Fleet, which receives a large subsidy from the Russian Government. It consists of 18 steamers of 7650 to 12,000 tons (launched 1891-1900), and 1 of 2700 tons (launched 1895). The vessels of the Black Sea Steam Navigation Company, 12 in number, mostly of about 2400 tons, are fitted to receive armaments and act as auxiliary cruisers or transports in time of war.

Santo Domingo. The naval force of this little republic consists of 1 small gunboat of 322 tons (launched 1894), 1 cruiser of 1000 tons (launched 1896), 1 cruiser of about 1000 tons (rebuilt in 1896-97).

Sarawak. The navy of this little Bornean State consists of three small gunboats of 118 to 300 tons (launched 1875-84).

Siam. The navy of Siam consists of 1 protected cruiser of 2500 tons, 8 gunboats of 260 to 800 tons, 1 old floating battery of 950 tons, 1 old depot ship of 545 tons, 6 dispatch vessels of 100 to 700 tons, 1 torpedo boat of 45 tons (launched 1888), and 43 small steamers for river and coast service.

Spain. The navy of Spain received a serious setback in the Spanish-American War, losing about half the fleet. During 1901 the navy was reorganized, and soon after it was proposed to construct a new and powerful fleet of 8 battleships of 12,000 tons, 4 cruisers of 8000 tons, and a limited number of smaller cruisers and torpedo vessels. All the old vessels not actually needed have been or are to be sold, the arsenals and naval establishments are being reorganized, and other improvements are contemplated. It is hoped by these means so to reduce the unnecessary expenses that a fine fleet can gradually be built and maintained without adding greatly to the expenses of the Government. The navy is presided over by a Minister of Marine, formerly a naval officer, but the incumbent in 1902 was a civil official. He is assisted by a council of 9 persons, of whom 5 are officers of the navy, 1 is a Senator, 1 a Deputy of the Cortes, 1 an inspector-general of engineers, and 1 a field marshal of artillery. The central administration consists of: (1) Section of Personnel; (2) Section of Equipment; (3) Section of Navigation and Maritime Industries; (4) Section of Naval Construction; (5) Section of Naval Ordnance; (6) Section of Accounts; (7) Section of Administrative Affairs. The reorganization of the navy in progress in 1902 may effect considerable changes in these arrangements. The principal dockyards are located at Ferrol, Cadiz (La Carraca), Trubia (army gun-factory where naval guns are made), Bilbao, and Cartagena. There are, in addition, several naval stations and supply depots. The naval school is located on the old wooden frigate *Asturias*. All executive officers are required to pass through the school; the course is three years, after which the cadets serve as midshipmen for further instruction. The fleet in 1902 consisted of 1 battleship of 9900 tons (launched 1887—partly rebuilt 1897-98 and 1900-01), 2 old battleships of 7000 tons (launched 1863-65—rebuilt as armored cruisers 1897-98), 1 armored cruiser of 9090 tons (launched 1895), 3 armored cruisers of 7000 tons (launched 1896-1900), 1 protected cruiser of 5372 tons (building in 1902), 2 protected cruisers of 5000 tons (launched 1891-92), 2 protected cruisers of 1875 and 2030 tons (launched 1898-1900), 1 small protected cruiser of 1040 tons (launched 1890), 2 cruisers of 3090 and 3342 tons (launched 1879-87), 3 cruisers of 1152 tons (launched 1885-88), 10 torpedo gunboats of 570 to 830 tons (launched 1889-97), 1 torpedo-boat destroyer of 386 tons (launched 1886), 4 torpedo-boat destroyers of 370 to 400 tons (launched 1896-97), 1 armed yacht of 1800 tons (purchased 1898), 7 training ships of 800 to 4000 tons, 1 transport of 2000 tons, 42 gunboats of 37 to 525 tons (launched 1877-95), 16 torpedo boats of 65 to 108 tons (launched 1885-1901).

Sweden. The navy of Sweden has been very much increased during the last fifteen years, and now possesses many effective coast-defense ships. The navy is presided over by a Minister of Marine with headquarters at Stockholm; the Minister is either a naval officer or civilian. The department comprises four bureaus, viz.: (a) The Cabinet of the Minister; (b) The Bureau of Personnel; (c) The Naval Staff; (d) The Bureau of Material. The school for executive officers (there are no marine engineer officers in the navy) is located at Stockholm; the full course is six years.

There are two naval arsenals, one at Stockholm and one at Karlskrona. The fleet consists of 4 small battleships of 3650 tons (building in 1902), 7 small battleships of 3100 to 3450 tons (launched 1886-98), 4 single-turret monitors of 1500 to 1580 tons (launched 1865-75—reconstructed 1898-1902), 9 very small single-turret monitors of 240 to 460 tons (launched 1869-76—nearly all recently rebuilt), 3 cruisers of 1530 to 2000 tons (launched 1870-86), 7 torpedo gunboats of 670 tons (launched 1896-99), 15 gunboats of 190 to 640 tons (launched 1861-84), 12 miscellaneous vessels, 12 vessels of 170 to 2858 tons, used as school-ships, training ships, and floating barracks, 1 torpedo-boat destroyer of 320 tons (building in 1902), 5 torpedo boats of 44 to 85 tons (building), 15 torpedo boats of 60 to 85 tons (launched 1884-1900), and 13 second-class boats of 34 to 44 tons (launched 1882-1902).

Turkey. The reduction of revenue entailed by the Turco-Russian War of 1877-78 caused Turkey to let her navy become wholly ineffective for purposes of war. About 1890 it was decided to rebuild some of the most available vessels of the fleet, and now all the old ships have either been rebuilt or are in process of reconstruction. The Navy Department, however, needs reconstruction more than the ships, for so long as present prac-

Number and Displacement of Vessels of Different Classes, Built and Building, for the Principal Naval Powers, November 30, 1902.

Type.	United States.				Great Britain.			
	Built.	Tons.	Building.	Tons.	Built.	Tons.	Building.	Tons.
Battleships, first class (above 10,000 tons)	10	112,329	9	131,200	41	551,160	11	167,750
Other battleships and coast-defense ironclads	10	41,002	2	6,428	5	40,740	...	....
Armored cruisers	2	17,415	8	111,800	17	158,300	20	205,700
Protected cruisers, first class (above 6000 tons)	2	14,750	3	28,880	21	201,950	...	....
Protected cruisers, second class (3000 to 6000 tons)	12	47,100	6	18,600	52	228,480	4	17,760
Unprotected and partially protected cruisers (above 1000)	23	32,111	...	....	48	105,630	2	1,140
Gunboats (below 1000 tons and of or above 400 tons)	6	4,020	...	....	84	70,645	...	....
Torpedo-boat destroyers	12	5,259	4	1,620	108	35,066	23	11,455
Torpedo boats, first class (above 100 tons)	25	3,913	5	1,116	19	2,971	9	1,746
Torpedo boats, second class (below 100 tons)	6	285	...	....	151	6,076	...	....
Submarine boats	1	75	7	840	...	....	9	1,305
Total displacement	109	278,259	44	300,484	546	1,401,018	78	406,856

Total built and building: United States, 153—578,743 tons. Great Britain, 624—1,807,874 tons.

Type.	France.				Germany.			
	Built.	Tons.	Building.	Tons.	Built.	Tons.	Building.	Tons.
Battleships, first class (above 10,000 tons)	20	225,667	6	87,780	9	100,969	5	62,779
Other battleships and coast-defense ironclads	19	87,303	...	....	23	110,886	...	....
Armored cruisers	15	105,324	10	110,546	3	28,146	2	18,238
Protected cruisers, first class (above 6000 tons)	4	31,513	...	....	...	....	...	....
Protected cruisers, second class (3000 to 6000 tons)	17	68,783	1	5,595	10	50,120	1	3,250
Unprotected and partially protected cruisers (above 1000)	18	32,840	...	....	30	61,250	5	13,446
Gunboats (below 1000 tons and of or above 400 tons)	25	14,151	...	....	10	9,029	1	900
Torpedo-boat destroyers	16	4,764	18	5,388	35	11,815	6	2,100
Torpedo boats, first class (above 100 tons)	38	5,665	...	....	47	7,080	...	....
Torpedo boats, second class (below 100 tons)	186	13,379	26	2,319	38	3,420	...	....
Submarine boats	12	1,553	22	1,704	...	....	...	....
Total displacement	370	590,942	83	213,332	205	382,715	20	100,713

Total built and building: France, 453—804,274 tons. Germany, 225—483,428 tons.

Type.	Japan.				Russia.			
	Built.	Tons.	Building.	Tons.	Built.	Tons.	Building.	Tons.
Battleships, first class (above 10,000 tons)	6	84,300	...	....	11	124,231	8	105,754
Other battleships and coast-defense ironclads	2	9,287	...	....	13	72,962	...	....
Armored cruisers	7	60,600	...	....	8	70,193	...	....
Protected cruisers, first class (above 6000 tons)	...	....	...	....	5	32,380	4	26,340
Protected cruisers, second class (3000 to 6000 tons)	10	41,226	2	6,730	5	18,612	5	15,200
Unprotected and partially protected cruisers (above 1000)	14	25,570	...	....	8	10,057	...	....
Gunboats (below 1000 tons and of or above 400 tons)	12	6,906	...	....	11	6,277	...	....
Torpedo-boat destroyers	15	4,597	4	1,500	27	7,222	27	9,374
Torpedo boats, first class (above 100 tons)	18	1,240	6	900	39	4,670	10	1,500
Torpedo boats, second class (below 100 tons)	58	4,302	10	850	93	4,826	...	....
Submarine boats	...	....	...	....	...	....	1	....
Total displacement	142	238,028	22	9,980	220	351,400	55	158,168

Total built and building: Japan, 164—248,008 tons. Russia, 275—509,568 tons.

Type.	Austria-Hungary.				Italy.			
	Built.	Tons.	Building.	Tons.	Built.	Tons.	Building.	Tons.
Battleships, first class (above 10,000 tons)	...	....	2	21,200	9	116,596	7	88,553
Other battleships and coast-defense ironclads	9	57,430	2	16,600	2	19,290	...	....
Armored cruisers	2	11,520	1	7,300	5	31,891	1	7,294
Protected cruisers, first class (above 6000 tons)	...	....	...	....	...	....	...	....
Protected cruisers, second class (3000 to 6000 tons)	2	8,128	...	....	6	20,554	...	....
Unprotected and partially protected cruisers (above 1000)	8	15,620	...	....	15	30,209	...	....
Gunboats (below 1000 tons and of or above 400 tons)	10	5,670	...	....	16	12,774	...	....
Torpedo-boat destroyers	...	....	...	....	9	2,833	2	650
Torpedo boats, first class (above 100 tons)	6	858	...	....	13	1,706	4	560
Torpedo boats, second class (below 100 tons)	63	3,759	...	....	124	8,140	...	....
Submarine boats	...	....	...	....	1	105	1	....
Total displacement	100	102,985	5	45,100	200	244,098	15	97,057

Total built and building: Austria-Hungary, 105—148,085 tons. Italy, 215—341,155 tons.

N. B.—Vessels launched before 1878, unless reconstructed and rearmed, are not included in these lists. Unprotected cruisers and gunboats do not include converted merchant vessels or yachts.

tices prevail the vessels will soon become useless for lack of care. The Minister of Marine is an admiral appointed by the Sultan. The department is divided into four bureaus, viz.: (1) Personnel; (2) Material; (3) Construction; (4) Medicine and Hygiene. The only great dockyard is the arsenal of Constantinople; this is a large and very excellent establishment as regards plan and arrangements, but is not properly kept up, and much of the machinery and fittings cannot be used. The personnel of the fleet consists of 6 vice-admirals and 11 rear-admirals with the rank of *pasha;* 130 captains, 25 commanders of superior grade, 55 commanders of inferior grade, 300 lieutenant-commanders—all with the rank of *bey;* 250 lieutenants, and 200 sub-lieutenants—with the rank of *effendi;* 400 engineers, 60 surgeons, 100 commissary officers, 110 pay officers. The enlisted force on paper is about 15,000 men; in fact, it rarely exceeds 3000, and sometimes is considerably less. For many years the larger vessels of the navy swung around their buoys in the Golden Horn without moving and without sufficient men on board to move them. The fleet consisted in 1902 of 1 battleship of 10,650 tons, which has been under construction at the arsenal of Constantinople for nearly ten years, and in 1902 was still far from being ready to launch; 7 old battleships of 5600 to 9120 tons (launched 1864-74, and very thoroughly rebuilt, modernized, and rearmed 1895-1902), 5 old battleships of 2050 to 2720 tons (launched 1868-72, but in 1902 undergoing thorough reconstruction), 1 armored coast-defense gunboat of 330 tons (launched 1864), 3 protected cruisers of 3250 tons (building in 1902 at Philadelphia, Elswick, and Kiel), 2 protected cruisers of 4050 tons (building at arsenal in Constantinople—work practically suspended for many years), 6 small cruisers of 643 to 1815 tons (launched 1892-96), 3 torpedo gunboats of 450 to 900 tons (launched 1890-92), 4 torpedo-boat destroyers of 180 to 270 tons (launched 1894-1900), 22 torpedo boats of 42 to 150 tons (launched 1884-92), 6 gunboats of 200 tons (2 completed 1894—others building), about 25 special service vessels.

UNITED STATES. The head of the Navy Department is the Secretary of the Navy, a civil officer, and a member of the Cabinet; and the Assistant Secretary is also a civil officer. The department is divided into eight bureaus, Navigation, Ordnance, Equipment, Construction and Repair, Steam Engineering, Yards and Docks, Supplies and Accounts, and Medicine and Surgery; and there is in addition the office of the Judge Advocate-General. The Bureau of Navigation has charge of the personnel and the direction of the fleet; the duties of the other bureaus are indicated by their titles. Under the Bureau of Navigation are the Office of Naval Intelligence and the Naval Academy; under the Bureau of Equipment are the Hydrographic Office, the Compass Office, the Naval Observatory, and the Nautical Almanac Office. The Board of Construction, which passes on the general features of new ships, is made up of the chiefs of the Bureaus of Navigation, Ordnance, Equipment, Construction and Repair, and Steam Engineering. Strategical and tactical matters are controlled by the General Board, which is similar to the general staff of foreign services. For further and detailed information, see *Navy* in the article on the UNITED STATES.

URUGUAY. The navy of Uruguay consists of 3 small gunboats of 270 to 400 tons (launched 1883-91), 1 dispatch boat of 400 tons (launched 1882), and 1 transport of 260 tons. The senior officer has the rank of rear-admiral.

VENEZUELA. The navy of Venezuela previous to the difficulty of 1902-03 with the European Powers consisted of 2 armed steamers of 500 to 832 tons, a torpedo gunboat of 571 tons (launched 1891; purchased from Spain 1899), and several river gunboats (built in England 1891-93).

See ARMOR PLATE; SHIP, ARMORED, where will be found a complete bibliography; GUNS, NAVAL; GALLEY; SHIPBUILDING; TACTICS, NAVAL; TORPEDO BOAT.

NAVIGABLE RIVER. See RIVERS, NAVIGABLE.

NAVIGATION (Lat. *navigatio*, a sailing, from *navigare*, to sail, from *navis*, ship + *agere*, to lead). In a broad sense, all means whereby the ship is made to proceed from place to place, but in a more technical sense, only those means whereby the course of the vessel is directed or ascertained.

HISTORY OF NAVIGATION.

The early history of navigation is wrapped in obscurity. The Egyptians had vessels large enough to be called ships about 3000 years B.C., and perhaps long before this. The Chinese also built ships at a very early date. The appliances for navigating these vessels must have been few and rude, and a voyage of a few hundred miles was regarded as a great undertaking. Considering the difficulties under which they labored, the voyages of the Phœnicians must be regarded as daring ventures. They spread their merchant fleets throughout the Mediterranean, navigated Solomon's squadrons to the Persian Gulf and Indian Ocean, and planted colonies everywhere.

Principal among these colonies was Carthage. The Carthaginian fleets passed the Pillars of Hercules, and, with no better guide than the stars, are believed to have sailed northward to the British Isles, and southward for some distance along the west coast of Africa. In B.C. 611 a Phœnician expedition fitted out by Pharaoh Necho started to circumnavigate Africa, a feat which is said to have been actually accomplished. From the eighth to the fourth century B.C. the Greek States gradually developed the art of navigation, and at the time of the Peloponnesian War the Athenians appear to have been skillful tacticians, capable of concerted manœuvres. In the fourth century B.C. Alexander the Great destroyed the power of Tyre, transferring its commerce to Alexandria, which became the centre of trade for the ancient world. Rome wrested from Carthage its naval power, and took its vast trade into the hands of the Italian sailors.

During all this period the average size of the vessels had been continually increasing. Sails were known, and some knowledge was evinced even of beating up against a foul wind; but oars were the great motive power; speed was not thought of, a voyage from the Levant to Italy being the work of a season. During the time of the Roman Empire no great progress seems to have been made, except in the size of the vessels; but regular fleets were maintained, both in the

Mediterranean and on the Atlantic coast of Gaul, for the protection of commerce.

The barbarian nations of the North developed the art of navigation in their own way. The Saxons, Jutes, and Norsemen began to roam the ocean in every direction; in small vessels they trusted more to the winds than to oars, and, sailing singly, gradually acquired that hardihood and daring which ultimately rendered them masters of the sea. The Norsemen extended their voyages to Iceland, Greenland, and Newfoundland, while they first ravaged and then colonized the coasts of Britain, France, and Sicily.

In the Middle Ages the Venetians, the Genoese, and the Pisans became the carriers of the Mediterranean Sea. Their merchants traded to the farthest Indies, and their markets became the exchanges for the produce of the world. Their constant rivalries gave occasion for the growth of naval tactics. So rich a commerce tempted piracy, and the Mohammedan corsairs spread over the Mediterranean, and, passing through the Straits of Gibraltar, ravaged the Atlantic coast.

The mariner's compass (q.v.) came into quite general use in the thirteenth century, and rendered the seaman independent of the sun and stars, so far as simple steering was concerned. The variation of the compass from true north seems to have been observed as early as 1269, but it was not until the voyages of Columbus that much attention was paid to it.

It was not until the thirteenth century that the employment of the mariner's compass brought about the development of practical nautical charts. (For ancient cartography, see GEOGRAPHY and MAP.) These first appeared in Italy; they were constructed by the aid of the compass and took the name of compass charts. The oldest of them is the so-called Pisan chart, which belongs probably to the middle of the thirteenth century, and it covers the whole of the Mediterranean. The earliest chart of which the exact date is known appears to be that of P. Visconte (1311). These charts are all plane, and together with other early ones are chiefly of the Mediterranean; but some of those appearing in the fourteenth century show the Azores, the Canaries, and the coast of Africa as far as Cape Bojador.

The translation and dissemination of Ptolemy's works in the fifteenth century caused a great improvement in maps and charts, and the subsequent labors of Copernicus and Mercator brought them to a very satisfactory state, considering the lack of geographical information. Mercator (1512-94) engraved an extensive atlas. Edward Wright, who published in 1599 a work entitled *Certain Errors in Navigation Detected and Corrected*, gives a complete exposition of the proper method of constructing a Mercator's projection, together with other information of value. In what is known as Mercator's projection, meridians are straight lines parallel to each other, and are crossed by the parallels of latitude at right angles. In order to preserve the proportion that exists in the curved surface of the earth and render the track of the ship (loxodromic curve) a straight line on the chart, the meridians are expanded or increased in length. The augmented latitudes are computed and published in a table of 'meridional parts' by means of which the parallels of latitude are placed. In Mercator charts of great extent the areas of portions differing much in latitude are greatly out of proportion, but contiguous areas differing little in latitude compare fairly well.

The rude character of the early instruments used in navigation prevented close determination of a ship's position at sea. Watches were unknown until about 1530, when Gemma Frisius immediately recognized the possibility of using them for the purpose of ascertaining the difference of longitude between two places. These early timepieces were very defective, however, and it was not until 1765 that Harrison was awarded £10,000 by the British Government for his chronometer, a second £10,000 which he received being paid in 1773 after further trials of his invention.

The date of the first attempts at determining latitude by measuring the altitude of heavenly bodies (at first, the fixed stars) is unknown, but Columbus is said to have had a cross-staff (see SEXTANT) for this purpose. Somewhat later the astrolabe was devised. In 1594 the celebrated navigator Davies published in his pamphlet entitled *The Seaman's Secrets* a modification of the cross-staff. In using this instrument the observer stood with his back to the sun looking at the horizon through a sight at the end of the staff, while the shadow of a movable projection fell on the sight box. In 1729 Pierre Bougeur devised an improved form of Davies's instrument. This was followed almost immediately by the invention of the quadrant by Hadley in England, who described his instrument in a paper to the Royal Society in May 1731, and by Thomas Godfrey of Philadelphia, who made an instrument as early as 1730 that was used at sea in August, 1731.

The earliest work devoted specially to navigation was that of Pedro de Medina, published at Valladolid in 1545. In 1530 Gemma Frisius wrote upon astronomy, cosmogony, and the use of globes. In 1537 Pedro Nuñez (Nonius), cosmographer to the King of Portugal, published a work on astronomy, charts, and some parts of navigation. In 1556 Martin Cortes published at Seville *The Art of Navigation.* Davies, in *The Seaman's Secrets,* defines three kinds of sailings—horizontal, paradoxical, and great-circle. The paradoxical embraced latitude, longitude, and distance, and combined what are now called traverse and Mercator's sailings. He also gave a clear description of great-circle sailing and the proper method of accomplishing it.

Among the developments in navigation in the nineteenth century were the patent log, the Thomson sounding machine, the Thomson compass, the Ritchie liquid compass, compensation of the deviations of the compass, and the great-circle sailing chart. Almost all the old appliances were much improved, and steam propulsion has greatly simplified navigating problems. Charts (q.v.) are undergoing constant correction and are, considering all things, wonderfully accurate, but much can yet be done and is being done. The most serious enemies of the navigator of the present day are fogs and irregular currents.

MODERN ART OF NAVIGATION.

In the merchant service vessels are taken in and out of port by a pilot. When the vessel is ready to leave port, the pilot (or captain in the United States Navy) takes charge. Men are stationed at the wheel for the purpose of steering and others at the lead to take soundings. Then by means of buoys, beacons, landmarks, ranges, etc., the ship is kept in the channel. When there is any danger that she may touch bottom, soundings are taken steadily at short intervals. For convenience in entering or leaving port at night, harbor lighthouses and lighted buoys are placed in proper locations. For convenience in navigating many channels, ranges are established. That is, two objects are placed in such a manner that by steering so as to hold them in line the ship is kept in the deep water of the channel. Many of these ranges are formed by two lighthouses and can therefore be used at night.

When the outer buoys and dangers are passed and the vessel is in deep water the pilot is discharged. The position of the vessel is then carefully ascertained by compass bearings or other means. This is called taking the *departure* and may be done at any time before losing sight of the land.

The further navigation of the vessel is effected by means of: (a) dead reckoning (q.v.); (b) compass bearings, or horizontal angles, if proceeding along the coast with the land in plain sight; (c) the lead (q.v.), so long as the depth is not much over one hundred fathoms; (d) observations of the heavenly bodies.

Navigation by means of dead reckoning consists in determining the position of the ship by means of the record of courses and distances sailed which is kept in the log-book (q.v.). (See SAILINGS.) When the course of a vessel is along a coast with objects in sight which may be identified and which are marked on the chart, it is possible to obtain the position of the ship at almost any time during the day, and, by means of observations of lighthouses, frequently during the night. When the water is not deep and the coast not clearly visible, an approximate position can be obtained by soundings, but these are not always to be relied upon except within rather wide limits, whereas by compass bearings of objects on shore or by measuring the horizontal angles between three objects the exact position may be determined if the chart is reliable—and charts of much frequented coasts are generally very reliable.

When far from land, the most accurate way of determining the ship's position at any time is by observations of the heavenly bodies. Of these, the most useful is the sun, but observations of the moon, planets, and stars are also taken. The general practice is to determine the longitude by means of the sun in the morning and afternoon, the time when it bears about east or west being the most favorable, and to determine the latitude about noon, when the sun bears north or south. The altitude of the sun above the horizon is measured by means of a sextant (q.v.) and the exact time ascertained by means of a chronometer regulated to Greenwich (in American and British vessels) time. The chronometer may not show the exact Greenwich time, but its error and rate of gaining or losing is known, having been carefully determined in port. From the altitude of the sun its zenith distance is obtained (zen. dis. $= 90° -$ alt.); the declination of the sun from the equator can be obtained from the *Nautical Almanac;* and the latitude is known with sufficient accuracy from previous observations and dead reckoning. By solving the oblique spherical triangle whose vertices are at the pole, the zenith, and the sun, and of which three sides (as given above) are known, the hour-angle of the sun east or west of the meridian is ascertained. Correcting this by adding or subtracting the 'equation of time' (derived from the nautical almanac) the mean local time is obtained. The difference between this and the Greenwich time of the chronometer gives the *longitude in time,* which is reduced to degrees in the usual manner.

The simplest method of obtaining latitude, and the one most commonly used, is what is called "latitude by meridian altitude." This is taken at the time the sun bears north or south as it crosses the meridian. The observer knows the approximate longitude. A short time before the body reaches the meridian, he begins to take altitudes of it (usually the sun is taken). As soon as the altitude stops increasing and begins to decrease he knows that the sun has crossed the meridian and that the maximum altitude obtained is the one sought. If h is the altitude thus obtained and d is the declination of the body obtained from the *Nautical Almanac,* then the latitude $= 90° - (h + d)$, the sign of d being *plus* if the body is on the same side of the equator as the ship and *minus* if on the opposite side. If a meridian altitude cannot be obtained, a spherical triangle must be solved, in which case the time must be as near noon as possible, otherwise a considerable error in latitude may result from a small one in observation or time.

The ship's position when ascertained is *plotted* (i.e. correctly located) on the proper chart and a line drawn connecting it with the preceding position. The continuous line joining the various positions is called the ship's track and shows her latitude and longitude at the different parts of her voyage. As soon as a position is determined and placed upon the chart the navigator determines the course for the next day, or next few hours as the case may be, by finding the course which must be steered to arrive at the point desired. This operation is facilitated by the outline drawing of a compass placed on the chart, the circumference of which is divided into degrees. By means of parallel rulers the direction of the new course is transferred to this compass and the correct course ascertained. The course thus obtained is either the *true* course or *magnetic* course, according to the character of the chart compass, some of which are laid down with the north point directed toward the true north and some with it directed toward magnetic north.

If the log-book of the ship is carefully kept and the speeds and courses accurately determined, the navigator may each day determine not only his position, and the course and run since the previous day, but also the ocean currents, because —neglecting errors in observations, etc.—the difference between the course and run by log (or the dead reckoning) and the actual course and run as determined by astronomical observations is due to current. He also frequently checks the table of compass errors by bearings of the sun —the correct directions of the sun being computed.

BIBLIOGRAPHY. The following reference works may be consulted by the reader in search of further information: Walker, *Navigation* (Baltimore, 1888); Coffin, *Navigation and Nautical Astronomy,* revised by Commander C. Belknap, U.

S. N. (New York, 1899); and *Bowditch's Practical Navigator,* published by the Hydrographic Office, United States Navy, Washington (new editions every three or four years, but all recent editions substantially the same).

Much information in regard to navigation is contained in the following articles: ALMANAC; ASTRONOMY; COLLISIONS OF VESSELS; COMPASS; DEAD RECKONING; FOG-SIGNALS; HELM; LATITUDE AND LONGITUDE; LEAD, SOUNDING; LOG; LOG-BOOK; RULES OF THE ROAD; SAILINGS; SEAMANSHIP; SEXTANT; SOUND, SOUNDING; STEERING; TACKING AND WEARING.

NAVIGATION, FREEDOM OF. The right which all nations possess of unrestricted passage over the high seas. While the right is now universally admitted, it is only within the past century that the question has become a settled one. Formerly claims of territorial jurisdiction were made over large portions of the ocean, and these claims have led to much controversy and frequent international disputes. (See MARE CLAUSUM; BERING SEA CONTROVERSY, etc.) But the question of national control in its present phase is reduced to the application of the rule to broad arms or recesses of the sea, narrow seas inclosed within the territory of a single State, straits leading to inland seas, such inland seas and navigable rivers rising in one country and discharging through the territory of another.

Of the first class, bays are generally conceded to belong to the States to which the embracing promontories belong, unless the headlands are so far separated as not to permit of effective defense. Thus Delaware Bay was in 1792 declared to belong exclusively to the United States, and a like claim for Chesapeake Bay would hardly be contested, although the Bay of Fundy is held to be a part of the high seas.

The straits over which international controversy has chiefly arisen are those leading into the Baltic and Black seas. Denmark claimed exclusive control over the former by prescriptive right. As early as 1319 certain prescribed tolls were levied upon the Dutch, an attempt to increase which a century afterwards resulted in war. In the seventeenth century England and France contracted to pay the same Sound Dues that the Dutch paid. This continued until about 1855, when an arrangement was made whereby, on the payment of 35 million rix-dollars (about $17,500,000), Denmark relinquished her claim to tolls, and agreed to properly police and protect the passage. The United States' share of the capitalized tariff was $393,011. Previous to Russia's acquisition of the northern coast of the Black Sea it was Turkish water, but by the Treaty of Adrianople (1829) entrance through the straits into the Black Sea and navigation thereon was permitted to Russia and Powers friendly to her. But according to the ancient custom all foreign vessels of war had been prohibited from entering the Bosporus and the Dardanelles, and this inhibition was continued under the Treaty of London (1841) between Turkey and the five Powers. By the Treaty of Paris of 1856 the Black Sea was neutralized, but in 1871 Russia secured the abrogation of this provision of the treaty and has the right of maintaining her fleets of whatever size in the Black Sea. Turkey may in time of peace lawfully open the straits to her friends, although unfriendly to Russia, whenever it may seem necessary to provide for her own safety.

When a navigable river runs between two States both are guaranteed its unmolested use and the line is held to run along the middle of the stream. But when a river rises in the territory of one State and discharges through the territory of another, international law does not admit the moral claim sometimes asserted by the upper State to right of navigation to the mouth. Yet nearly all such streams flowing through the territory of Christian nations have now been opened by international agreement. By the act of the Congress of Vienna (1815) declaring free the use of certain streams separating or traversing the territory of different Powers, the Rhine and Scheldt were opened to navigation. This act also opened most of the other European rivers, excepting the Danube, which by the Treaty of Bucharest and later by that of Adrianople (1829) was made free for common commercial use to Turkey and Russia. Later by the Treaty of Paris (1856) this also came within the application of the concert of the Congress of Vienna. At the close of the Revolutionary War Spain held the territory at the mouth of the Mississippi and refused the United States outlet to the Gulf of Mexico. The Louisiana Territory was subsequently ceded to France, and its purchase by the United States in 1803 removed the question. The Saint Lawrence was thrown open to the United States by the reciprocity treaty of 1854 with Great Britain, which also included the reciprocal use of the Upper Lakes and the freedom of Lake Michigan to Canadian subjects. In South America the freedom of the Rio de la Plata to commerce was guaranteed by a series of treaties from 1853 to 1859; while the Amazon was in 1867 declared by Brazil to be open to all nations. The Stikine, Yukon, and Porcupine rivers of Alaska, rising in British territory, were opened to the subjects of England and the United States by the Treaty of Washington (1871), while the Congo and Niger in Africa were opened under an agreement for an international commission provided for by the Congo Conference of 1884-85. Consult the authorities referred to under INTERNATIONAL LAW. See also HIGH SEAS.

NAVIGATION ACT. The name applied to each of a series of acts, known collectively as 'The Navigation Acts,' passed by the English Parliament, beginning with 1645, for the purpose of protecting the shipping of Great Britain and her colonies, of injuring the shipping of the Dutch, the chief rivals of the English, and of exploiting, for the benefit of England, the commerce of the English colonies. See NAVIGATION LAWS.

NAVIGATION LAWS. The early restriction placed upon commerce was but one phase of the application of the economic doctrines advocated prior to the time of Adam Smith, prohibiting exports, regulating intercourse, and generally obstructing the operation of economic laws. The first recorded British navigation law belongs to the reign of Richard II. (1381), and required the shipment of merchandise by the "King's liege people" in "ships of the King's liegance." Subsequently a more liberal policy was pursued. With the discovery of the New World and the consequent growth of colonial dependencies, both the importance of navigation laws as a question of policy and their sphere of influence were greatly extended. England, France, Spain, Portugal, and Holland by their restrictions prohibited all commercial intercourse between their colonies and other nations; and Spain even treated the crews of foreign ships wrecked upon her coasts as pirates. In 1645 the English Parliament passed an act prohibiting the importation into England of whale oil and other products of the whale fisheries, in any vessels except such as were owned in England and were manned by English seamen. This act was the first of a long series of acts which are known collectively in history as "The Navigation Acts." The acts of 1651 and 1660—the latter of which is known officially as "The First Navigation Act"—served as the basis of the British legislation in this field for almost two hundred years. In general, the objects of these acts, as of the succeeding ones, were to protect the shipping of England and her colonies, and to exploit the trade of the colonies in the interest of the mother country. The chief feature of the acts of 1651 and 1660 was the prohibition of the importation into England of foreign products except in English ships or in the ships of the country of production. In 1663, by what is usually known as the 'Second Navigation Act,' it was ordered that "none of the products of the English plantations or factories . . . in Asia, Africa, or America shall be carried anywhere (except to other plantations) till they be first landed in England, under the forfeiture of ships and cargoes." The English restrictive measures neither destroyed the Dutch commerce of the seventeenth century nor stamped out American shipping interests of the eighteenth. The Lloyd's register of 1775 returned for the three years next preceding, 2311 vessels of American build as against 3908 of British construction. The chief features of the British Navigation Code, which was essentially identical with that of all maritime nations, as it existed down to the time of its repeal in 1849, required: That no foreigner could own, wholly or in part, an English ship; the captain and three-fourths of the crew must be British subjects; foreign products must be imported in British ships or in ships of the country of production; products of Asia, Africa, and America could not be imported into Great Britain *from any European port* in any ship whatsoever, and such products could be imported from any other place only in British ships or those of the country of production. No coastwise trade was permitted in foreign ships to the United Kingdom or between different British possessions, and trade of any kind was permitted only by special authorization. The effort to evade these restrictions involved great waste of capital, while the adoption of a more liberal policy has resulted in no diminution of the prosperity of the British Merchant Marine.

The American navigation policy began with the treaty of commerce entered into with France in 1778, which included a provision to take as the "basis of their agreement the most perfect equality and reciprocity." But the liberal tone of this instrument was discontinued when, under the influence of the New England representatives the framers of the Constitution in 1789 gave to Congress an unrestricted power to enact navigation laws (U. S. Con., Art. I., § viii., clause 3). In 1789-92 the foundation of the American system was laid by the levying of tonnage dues and import taxes after the English custom so drastic in nature as to give American shipments a practical monopoly of American commerce. This was followed by a registration act (1792) and the closing of the coasting trade to foreign shipping in 1793. After the close of the War of 1812 the two countries somewhat modified their attitude toward each other, and a treaty was entered into placing their ships upon a reciprocal footing in the ports of the United States and Great Britain and suspending somewhat the discriminating duties charged upon the goods carried. This tendency gradually resulted in England in the Reciprocity Acts of 1824 and the final repeal of her navigation laws.

The American system continued practically unchanged. In addition to those already stated, some of its more vexatious provisions which prevailed for three-quarters of the nineteenth century forbade or restricted the registration of foreign-built or foreign-owned vessels, the repair of vessels abroad, without payment of duty on materials used in repairs, or foreign vessels in the United States, without duty on entry of repairs, and compelled all vessels to first report at a port of entry and conform to the customs regulations before they could proceed to the port of delivery to discharge their cargoes; and foreign vessels could discharge only at the port of entry.

Meanwhile, American shipping had undergone various changes consonant with the economic forces in operation during this period. From 1815 to 1842 with an abundant natural supply of building material coupled with American ingenuity, it increased 70 per cent., but with the change from wooden to iron vessels, this advantage was shifted in England's favor and during the period following the Civil War the depression in freight rates and the more lucrative opportunity furnished for the investment of American capital in other directions resulted in the decrease of the American merchant marine. The decrease was also accentuated by the law forbidding any but American-built vessels to carry the American flag. The changed conditions of the past decade, however, and the modification of the statutory restrictions—by an act of 1892 foreign-built vessels of 8000 tons burden, and a speed of twenty knots an hour, which are owned in a certain part by Americans, can fly the American flag—have invigorated ship-building and shipping interests generally in the United States.

Under the provisions of the act of 1884 owners can now fill vacancies in the positions of officers below captain by aliens when in foreign voyages; seamen can be discharged at foreign ports on mutual application of master and seaman without payment of additional wages; seamen are allowed only one month's pay in case of injury to the vessel; consular fees for services to vessels and seamen are paid by the United States Treasury. Ship-building is encouraged by permitting a drawback on imported materials equal in amount to the duty paid, if the vessel is built for export. Vessels must now have the port of registry, or the place where the owner resides, if in the same district, painted upon their sterns. Vessels in trade with contiguous foreign territory no longer are required to pay a capitation tax on passengers, thus putting vessels trading with

Canada and Mexico on equal terms with the railroads, and more liberal mail laws have been passed. By the act of 1886 the tonnage rates were reduced to 3 cents per ton, not to exceed 15 cents per ton per year in the aggregate on each entry of all vessels from any foreign port in North America, Central America, the West Indies, Bahamas or Bermudas, and a rate of 6 cents not to exceed 30 cents upon all vessels entering from foreign ports, the President being authorized to suspend this duty so far as it was in excess of tonnage and other duties imposed by the country of their home port. The further act limiting the liability of ship-owners for the ship's debts, excepting wages, to the amount of his interest has proved a great benefit. The United States Shipping Commissioners were established by the act of 1872, and later, by the act of 1884, were placed under the control of the Treasury Department, as was the Bureau of Navigation, established in that year.

NAVIGATORS' ISLANDS. See SAMOAN ISLANDS.

NAVILLE, nȧ'vėl', EDOUARD HENRI (1844—). A Swiss Egyptologist, born at Geneva, June 14, 1844. He studied at the university of his native city, King's College, London (1862), Bonn (1866), and at the Faculté des Lettres, Paris, receiving his degree in 1867. During his university career he paid much attention to Egyptology, and in 1868 he followed the courses of Lepsius at Berlin. The following year he went to Egypt, and in 1870 he published as the result of his investigations there his work, *Textes relatifs au mythe d'Horus recueillis dans le temple d'Edfou* (Geneva). His *La litanie du soleil* appeared in 1875, and his *Inscription historique de Pinodjem III.* was published at Paris in 1883. In 1874 Naville was commissioned by the London Congress of Orientalists to edit the text of the Egyptian *Book of the Dead* (q.v.). Naville spent the next ten years collecting material in the libraries and museums of Europe. The results of his labors appeared in *Das ägyptische Todtenbuch der 18. bis 20. Dynastie* (1886), one of the most important works in the history of Egyptology. Beginning in 1882, Naville usually spent his winters in Egypt conducting investigations for the Egypt Exploration Fund, and his work in this direction produced most valuable results. In 1891 he became professor of Egyptology in the University of Geneva. Among the most important of Naville's works, in addition to those already mentioned, are: *The Store City of Pithom and the Route of the Exodus*, Egypt Exploration Fund Memoir i. (1885); *Goshen and the Shrine of Saft el Henneh*, Egypt Exploration Fund Memoir iv. (1887); *The Festival Hall of Osorkou II.*, Egypt Exploration Fund Memoir x. (1892); *Ahnas el Medineh*, Egypt Exploration Fund Memoir xi. (1894); *Deir el Bahari*, Egypt Exploration Fund Memoirs xii., xiii., xiv., xvi., xix. (1894-1901).

NAVY, DEPARTMENT OF THE. One of the nine executive departments of the United States Government, created by act of Congress of April 30, 1798, and charged with the general control and administration of the navy. From 1789 to 1798 the management of naval affairs was under the control of the War Department. At the head of the department is a secretary, who is a member of the Cabinet, appointed by the President with the advice and consent of the Senate, and receives an annual salary of $8000. As the President is by the Constitution the commander-in-chief of the navy, the Secretary is generally subject to his direction. It is his duty to execute such orders as the President may give relative to the administration of naval affairs, including the procurement of naval supplies and the construction, armament, equipment, and employment of vessels of war. A variety of specific duties are imposed upon him by law, in which cases he is not subject to the direction of the President. He makes annual report to the President of the operations of the Navy Department. His deputy is the Assistant Secretary, who is appointed by the President, and who during the absence or incapacitation of the Secretary acts in his stead, taking the title of acting Secretary. An act of June 8, 1880, authorized the appointment of a judge-advocate-general of the navy from the marine corps or the navy with the rank of colonel or captain. It is his duty to receive, revise, and record the proceedings of courts-martial, courts of inquiry, boards for the examination of officers for retirement and promotion in the naval service, and to give opinions on such legal questions as arise in the course of the administration of the navy. Another officer of importance attached to the Navy Department is the commandant of the marine corps.

By an act of July 5, 1862, eight bureaus were established in the Navy Department, at the head of each being a chief, appointed by the President from among the officers of the navy. These are, the bureaus of (1) Yards and Docks; (2) Equipment; (3) Navigation; (4) Ordnance; (5) Construction and Repair; (6) Steam Engineering; (7) Medicine and Surgery; and (8) Supplies and Accounts. See *Navy*, under UNITED STATES.

NAVY REGISTER. An annual official publication of the United States Navy Department. It gives a list of the officers of the navy and marine corps in order of their rank, a list of retired officers, a statement of resignations, retirements, dismissals, and deaths since the publication of the previous register, the number of stations with the ships on each and the names of officers attached to them, and an enumeration of the ships of the navy, with some details of their character, present condition, and service.

NAVY YARD. The principal navy yard of the United States is located at Brooklyn, N. Y., on the East River. There are three dry docks at this yard and one under construction. Here also is located the naval clothing factory which makes the uniforms for the enlisted men. The other important navy yards of the United States are at Norfolk (Va.), League Island (near Philadelphia), Boston, Mare Island (San Francisco Bay), and Port Orchard (Puget Sound); there are less important yards at Portsmouth (N. H.) and Pensacola (Fla.), and a yard of considerable importance is being developed at Charleston, S. C. In England the term dockyard (see DOCKYARDS, ROYAL) is equivalent to the American designation navy yard. The great naval establishments on the Continent of Europe are generally termed arsenals (q.v.).

NAWANAGAR, nŭ-wä'nŭ-gŭr'. A seaport of India. See NOWANAGAR.

NAX'OS (Lat., from Gk. *Νάξος*). The largest, most beautiful, and most fertile of the Cyclades.

It is situated in the Ægean, midway between the coasts of Greece and Asia Minor. Extreme length, about 20 miles; breadth, 15 miles. Population, in 1896, 15,608. The principal products and articles of export are wine, corn, oil, cotton, fruits, and emery. The wine of Naxos (the best variety of which is still called in the islands of the Ægean *Bacchus wine*) was famous in ancient as it is in modern times, and on this account the island was celebrated in the legends of Dionysus and Ariadne. The island also contains good quarries of marble of a rather coarser grain than that of Paros. They were worked in the sixth century B.C., as is proved by the unfinished statues found in them, among which is a famous colossus, some 34 feet in length. The most flourishing period in the history of the island seems to have been in the sixth century B.C. under the rule of the tyrant Lygdamis. In B.C. 490 it was ravaged by Persians, and later joined the Delian League, from which (B.C. 469) it was the first to revolt. The island now became a dependency of Athens. After the conquest of Constantinople by the Latins, it became in 1207 the seat of a dukedom, founded by the Venetians, and in 1566 was seized by the Turks. It now forms a portion of the Kingdom of Greece (q.v.). Naxos, the capital, with a population of 2000, is situated on the northwest coast, contains Greek and Catholic churches, and a castle built by the Venetians, and is the seat of a Greek and a Latin bishop. Consult: Ross, *Reisen auf den Inseln des Aegäischen Meeres*, i. (Halle, 1840); Tozer, *Islands of the Ægean* (Oxford, 1890); Curtius, *Naxos* (Berlin, 1846); Duget, *De Insula Naxo* (Paris, 1867).

NAY'LER, JAMES (c.1617-60). An English Quaker. He was born at Ardsley, in Yorkshire. In 1642 he became an adherent of the Parliament, and served for about eight years under Fairfax and Lambert. While in the army he began to preach as an independent, but in 1651 was led by George Fox to become a Quaker, and for three years was Fox's literary coadjutor. But popularity, especially with women, turned his head. His followers fancied that he resembled the pictures of Christ, and they called him 'Jesus' and the 'Lamb of God.' He was arrested on charges of blasphemy, tried before Parliament, and sentenced to the pillory, whipping, branding, and imprisonment for two years. The whole punishment was inflicted. He was released in 1659, recanted his errors, and was again received by the Society of Quakers. A collection of his writings was published in London in 1716, and his *Memoirs* in 1719 and reprinted in 1800.

NAZ'ARENE (Gk. Ναζαρηνός, *Nazarēnos*, more frequently Ναζωραῖος, *Nazōraios*, from Ναζαρά, *Nazara*, Ναζαρέθ, *Nazareth*, Nazareth). A term applied to Jesus to indicate that He came from the somewhat obscure Galilean town Nazareth (q.v.), which was not connected with any Messianic prophecies or expectations (cf. John i. 46 and vii. 41). 'Jesus the Nazarene' (i.e. 'Jesus of Nazareth') became a popular term used by friend and enemy alike (quite frequently in the Gospels and Acts). When the Gospel of Matthew was written the term was considered a fulfillment of Isa. xi. 1. (Matt. ii. 23). It was thus an easy transition for the Jews to speak of the early Christians as the sect of Nazarenes (Acts xxiv. 5). Throughout the obscure and checkered development of Jewish Christianity the name was preserved, until in the fourth century 'Nazarenes' meant those Jewish Christians who, unlike the Ebionites (q.v.), were quite loyal to Jesus' teachings and not strongly anti-Gentile in their sentiments. Their general traditions and usages were, however, more Jewish than Christian. They had a Gospel of their own, made no use of Paul's Epistles, and were looked upon unfavorably by many orthodox Christians. While the Ebionites, however, grew ever more bitter toward Catholic Christianity, these seem to have gradually become lost in the greater Gentile Church. Their Gospel, known to us mainly through Jerome, was probably the same as that called by other writers the Gospel of the Hebrews, and was in existence as early as 150. All the evidence indicates that it was a secondary form of Matthew, with certain additions and variations. The work was by no means heretical in its tendencies. Later writers, from the fourth century onward, were inclined to class it as apocryphal, probably on account of the differences between it and the canonical Matthew, and also because there was no place for a fifth Gospel. The Gospel used by the more bigoted Jewish-Christian sect of Ebionites was not identical with the Nazarene Gospel, but a secondary form of the Greek Matthew. Consult: Zahn, *Geschichte des neutestamentlichen Kanons*, ii. 2 (Leipzig, 1892); Nicholson, *Gospel of the Hebrews* (London, 1879); Resch, *Agrapha* (Leipzig, 1889); Kruger, *History of Early Christian Literature* (New York, 1897).

NAZARENES, or **NAZARITES**. A group of German painters. See PRE-RAPHAELITES.

NAZ'ARETH (Gk. Ναζαρέθ, *Nazareth*, Ναζαρά, *Nazara*, from an Aramaic word of uncertain form and meaning). A town of ancient Galilee, famed as the place where Jesus passed His childhood. The New Testament records are singularly silent as to the details of the life of the Holy Family in Nazareth. The only passage giving any light is Matt. xiii. 54-58 (= Mark vi. 1-5, Luke iv. 16-30), the record of a visit by Jesus after He had begun His public ministry. From the question of Nathanael (John i. 46) it may be inferred that it was a place of no special importance, but not necessarily that it had a bad reputation. Since the town is not mentioned in the Old Testament or Josephus, we are entirely ignorant of its early history. The New Testament writings and the Talmud only show that Jesus was popularly called, perhaps at first in contempt, 'the Nazarene,' and His followers 'Nazarenes.' (See NAZARENE.) No further mention is found until Eusebius, who says in his *Onomasticon* that it was fifteen Roman miles eastward from Legeon (the ancient Megiddo), and not far from Mount Tabor. Epiphanius, a century later, says that it had become in his day a mere village. The Christians of the first three centuries appear to have regarded it with no consideration. In later centuries it began to attract pilgrims. It naturally was reverenced by the Crusaders, who greatly embellished the place. After its final capture by the Moslems in 1291 it declined, though retaining its attraction for pilgrims. About 1620 a great Franciscan church and convent of the Annunciation was built. This has become one of the most popular pilgrim shrines in Palestine. The house in which Mary lived is said to have been miraculously transported to Loreto (q.v.), Italy. Of late years Nazareth has materially increased in population, at present containing over 10,000 souls, of whom nearly 8000 are Christians. The situation is most beautiful. In the upper reaches of a valley leading down to the Plain of Esdraelon to the south, shut in by hills, with a very fertile soil, it is isolated from the world. It is only necessary to climb the hills, however, to gain one of the finest views in Palestine. The modern town, mainly on the steep slopes of the southwest side of the valley or basin, is probably farther from the summit of the hill than was the ancient town of Jesus' day. Of all the 'holy places' in Palestine few can rival the spring near the Greek Church of Gabriel, a spot probably often visited by Mary and Jesus. Consult: Stanley, *Sinai and Palestine* (New York, 1883); George Adam Smith, *Historical Geography of the Holy Land* (New York, 1896); Baedeker-Socin, *Palestine and Syria* (Leipzig, 1898), with a plan of the town and description of the antiquities; Ritter, *Erdkunde*, vol. xvi. (Berlin, 1852); Guérin, *Galilée* (Paris, 1880); Buhl, *Geographie Palästinas* (Freiburg, 1896).

NAZARITE. See NAZIRITE.

NAZARITES (from Lat. *Nazarita*, from Gk. Ναζαρίτης, *Nazaritēs*, from Heb. *nāzar*, to separate oneself). A Christian sect found in Hungary, and particularly numerous in the Magyar districts of Eastern Hungary. They believe in the Trinity, but reject transubstantiation and infant baptism. They have no priesthood, refuse to take oaths, to perform military service, or participate in politics, and have given the Government much trouble.

NAZIRITE (Heb. *nāzīr*, from *nāzar*, to consecrate). Among the Hebrews, one who had devoted himself in a peculiar sense to Yahweh. The term is used of two classes: (a) Nazirites for life, and (b) Nazirites for a limited period. The law in the post-exilic Priestly Code (Num. vi.) refers to the latter class alone. According to this law, one who had taken the vow of Naziriteship was to abstain from wine or any intoxicating drink, not to suffer a razor to touch his head, but to let the locks of his hair grow long, and to avoid all ceremonial defilement. It is evident from these regulations—particularly the first two—that the Nazirite was to lead a life marked by the return to the simpler and rougher fashions of primitive times. The original purpose of such vows among the Hebrews, as among the Arabs, where they are also found (cf. Wellhausen, *Reste arabischen Heidenthums*. p. 143, Berlin, 1897; W. R. Smith, *Religion of the Semites*, pp. 482 sqq., London, 1894), was for war or revenge, but it was natural also to extend the customs involved to sacred seasons of the year when the deity was to be approached. So among the Arabs to this day, during the days spent by the pilgrims in Mecca (see HAJJ), it is forbidden to cut the hair, and other restrictions are imposed, most of which emphasize the return in the holy season to more primitive fashions. As for the Nazirite for life, we have only two instances in the Old Testament, Samson and Samuel. The former, in so far as he embodies popular elements, represents the hero of a rude age. It is not said of him that he was to abstain from wine, and, as a matter of fact, he frequently was involved in acts (such as contact with the carcass of a lion) which brought in their wake ceremonial defilement. The long hair in his case may have originally been the natural condition, just as the hero Eabani among the Babylonians is described as 'hairy.' In the case of Samuel, the Naziriteship involves, likewise, merely the obligation to let the hair grow, and this may have been customary among the guardians of the sanctuaries, who were in a perpetual state of 'sanctity.' The application, therefore, of the term Nazirite to Samson and Samuel in the post-exilic sense of the word is due to the projection into the past of a condition which reached its development centuries after the age of these two personages. Naziriteship in time lost its old significance and became a species of private asceticism. In this sense, John the Baptist is a 'permanent' Nazirite (Luke i. 15) and Saint Paul possibly (though not certainly) a temporary one (Acts xxi. 17-26). Consult: Dillmann, *Die Bücher Numeri, Deuteronomium und Josua* (Leipzig, 1886); Driver, "The Books of Joel and Amos," in the *Cambridge Bible for Schools and Colleges* (Cambridge, 1897); Nowack, *Hebräische Archäologie* (Freiburg, 1894); Benzinger, *Hebräische Archäologie* (ib., 1894); Smend, *Lehrbuch der alttestamentlichen Religionsgeschichte* (ib., 1893).

NEÆ'RA (Lat., from Gk. Νέαιρα, *Neaira*). The name of several nymphs in Grecian mythology, and of a maiden mentioned in the poems of Horace, Vergil, and Tibullus. It is used also in Milton's *Lycidas*, to designate an imaginary charmer.

NEAGH, nā, *Ir. pron.* nā'äG, LOUGH. The largest lake of the British Isles, in the northeastern part of Ireland, 13 miles west of Belfast (Map: Ireland, E 2). It is rectangular in shape, 17 miles long by 10 miles wide, and has a mean depth of 40 feet. It is drained northward into the Atlantic Ocean through the Bann River. Canals connect it with Belfast on the east and Lough Erne on the southwest.

NEAGLE, nā'g'l, JOHN (1796-1865). An American portrait painter. He was born in Boston, November 4, 1796, but his parents moved to Philadelphia soon after his birth. He was practically self-taught. About 1818 he began painting portraits in Lexington, Ky., and later practiced in other cities. On his return to Philadelphia, he married the daughter of Thomas Sully, the painter, from whom he received instruction and encouragement. He made rapid progress and rose in public favor, was made director of the Pennsylvania Academy (1830-31), and first president of the Artists' Fund Society of Philadelphia (1835-44). Neagle was a good draughtsman and colorist, and clever in delineation of character. Most of his important works are in Philadelphia, and include a full-length portrait of Patrick Lyon at the Forge (1826), Pennsylvania Academy; portraits of Rev. Dr. Joseph Pilmore, Saint George's Hall; Henry Clay, Union League Club; Dr. Thomas Parke, City Library; and George Washington, Independence Hall. Other works are a portrait of Gilbert Stuart, Athenæum, Boston, and several Indian portraits, New York Historical Society.

NEAL, DANIEL (1678-1743). The historian of the Puritans, born in London. He entered Oxford, but left before completing the course, to study for the dissenting ministry in England and Holland. In 1703 he returned to England, in 1706 became pastor of an independent congregation in Aldersgate Street, London, and remained at its head to the end of his life. His first work, a *History of New England* (1720), won for him the honorary degree of master of arts from Harvard in 1721. Neal's greatest work, however, was the *History of the Puritans* from the Reformation to 1689, originally undertaken by him in conjunction with Dr. John Evans. Dr. Evans died in 1730, and Neal completed the work himself (1732-38). The work was, on the whole, very favorably received by the Puritans, but Neal's studied misrepresentation and suppression of facts evoked criticism. Nevertheless, the history is for the most part a scholarly piece of work.

NEAL, David Dalhoff (1838—). An American painter. He was born at Lowell, Mass., October 20, 1838, and after studying in New Orleans, La., went to San Francisco, where he was employed in making drawings on wood. In 1862 he went to Europe, and entered the schools of the Royal Bavarian Academy, Munich. In the following year he married the daughter of Chevalier Maximilian Ainmüller, and began his first regular lessons in oil painting with his father-in-law, devoting himself to architectural subjects. From 1869 to 1876 he studied figure painting under Alexander Wagner and under Piloty. After 1879 he principally practiced portrait painting. Among the works in his early style are the "Chapel of Nonberg, Salzburg" (1864); "Chapel of the Kings, Westminster;" and "Saint Mark's." His first figure composition, "James Watt," was exhibited at the Royal Academy, London (1873). The "First Meeting of Mary Stuart and Rizzio" (1875) received the great medal from the Royal Bavarian Academy. His most noted work, "Oliver Cromwell and John Milton," is now in the Public Library, Cleveland, Ohio. His portraits owe their success to their good characterization. A fair example is that of Rev. Mark Hopkins for Williams College.

NEAL, John (1793-1876). An American poet and novelist of English-Quaker descent, born in Portland, Maine. Neal was self-educated, and studied law at Baltimore, supporting himself by literary work with an energy that characterized him throughout his long and varied life. Between 1817 and 1819 he published *Keep Cool*, a novel in two volumes, two volumes of verse, and a five-act tragedy, *Otho*. Meantime he was admitted to the Maryland bar. In 1823 he paid a visit to England. Here he was a pioneer of American letters, attracting and compelling attention, the first American to contribute to the great quarterlies and to *Blackwood*, and becoming secretary of Jeremy Bentham. Returning to America in 1827, he took up the practice of law in Portland, and in 1828 began to edit the *Yankee*, contributing much to various other magazines and newspapers, earnestly opposing capital punishment, and being an early advocate of woman's suffrage. He established a gymnasium, said to have been the first in the United States, and he was himself skilled in all the arts of exercise, and a sympathetic teacher and adviser of young men, notable among whom was E. A. Poe. While engaged energetically in journalism, he poured out a steady stream of novels, interspersed with other works. The more noteworthy of his chaotic, Byronic novels are *Randolph* (1823) and *Logan* (1823); *Rachel Dyer* (1828) and *The Downeasters* (1833) are soberer but not memorable productions. The interesting autobiography, *Wandering Recollections of a Somewhat Busy Life* (1869), was practically the last of his voluminous writings, all of which are characterized by haste, but not less by an ebullient genius and distinctive nationality.

NEAL, Joseph Clay (1807-47). An American humorist, born at Greenland, N. H. He settled in Philadelphia, where in 1831 he became editor of the *Pennsylvanian*, a Democratic journal. In 1844 he founded the *Saturday Gazette*, which had a large circulation. His best-known book, *Charcoal Sketches; or, Scenes in a Metropolis* (1837; second series 1849), enjoyed a considerable degree of popularity, and was republished in London. He wrote also *Peter Ploddy and Other Oddities* (1844).

NEALE, nēl, Edward Vansittart (1810-92). An English Christian Socialist, born at Bath and educated at Oriel College, Oxford. He became an advocate of social reform, and joined the group of Christian Socialists under F. D. Maurice. Neale founded the first coöperative stores in London. He assisted in forming several industrial societies, was a founder of the Cobden Mills in 1866, and of the Agricultural and Horticultural Association in 1867, and general secretary to the Central Coöperative Board from 1875 until 1891. He visited America in 1875. He was a director of the Coöperative Insurance Company and of the Coöperative Newspaper Society, and a Vansittart Neale scholarship at Oriel College for the sons of coöperatives was founded in his honor in 1890. His writings include: *The Characteristic Features of Some of the Principal Systems of Socialism* (1851); *The Mythical Element in Christianity* (1873); and *A Manual for Coöperators* (1879).

NEALE, John Mason (1818-66). An English author and hymnologist, born in London. He graduated at Trinity College, Cambridge, in 1840, and took holy orders in the Church of England. While chaplain and tutor at Downing College, he warmly embraced high-church views and adhered to his principles in spite of severe criticism. He was for many years warden of Sackville College, East Grinstead, and was the founder of an Anglican sisterhood of Saint Margaret. His extensive writings on theological and ecclesiastical subjects include *A History of the So-called Jansenist Church in Holland* (1858) and *Mediæval Preachers* (1857). He translated the several parts of Bernard of Cluny's *De Contemptu Mundi*, "Jerusalem the Golden." and in 1863 published *Hymns of the Eastern Church*. He also published, in addition to various collections of hymns: a *History of the Jews* (1841); *An Introduction to the History of the Holy Eastern Church* (1850); *Stories for Children from Church History* (1850); *Theodore Phranza, or the Fall of Constantinople* (1857); *History of the Council of Florence* (1861); and *Essays on Liturgiology and Church History* (1863).

NEANDER, nā-ăn′dẽr, Johann August Wilhelm (1789-1850). One of the most famous of ecclesiastical historians. He was born at Göttingen, January 17, 1789, of Jewish parentage, and received his early education at the Johanneum in Hamburg. On February 15, 1806, he publicly renounced Judaism, and was baptized in Saint Catharine's Church, Hamburg, changing his name from David Mendel to Neander (from Greek νέος, *neos*, new + ἀνήρ, *anēr*, man, in allusion to the religious change which he had experienced) and taking his Christian names from several of his friends. He now proceeded to Halle, where he studied theology under Schleiermacher, and concluded his academic course at his native town of Göttingen. In 1811 he took up his residence at Heidelberg University as a privat-docent; in 1812 he was appointed extraordinary professor of theology; and in the following year was called to the newly established University of Berlin as professor of Church history. Here he labored till his death, July 14, 1850. Neander enjoyed great celebrity as a lecturer. Students flocked to him, not only from all parts of Germany, but from the most distant Protestant countries. His works, in the order of time, are: *Ueber den Kaiser Julianus und sein Zeitalter* (1812); *Der heilige Bernhard, und sein Zeitalter* (1813); *Genetische Entwicklung der vornehmsten gnostischen Systeme* (1818); *Der heilige Johannes Chrysostomus und die Kirche, besonders des Orients, in dessen Zeitalter* (1821-22); *Denkwürdigkeiten aus der Geschichte des Christenthums und des christlichen Lebens* (1822-24); *Antignosticus, Geist des Tertullianus und Einleitung in dessen Schriften* (1826); *Allgemeine Geschichte der christlichen Religion und Kirche* (1825-52); *Kleine Gelegenheitsschriften* (1824); *Geschichte der Pflanzung und Leitung der christlichen Kirche durch die Apostel* (1832-33); *Das Leben Jesu Christi in seinem geschichtlichen Zusammenhange*, written as a reply to Strauss's work (1837); *Wissenschaftliche Abhandlungen*, published by Jacobi (1851); *Geschichte der christlichen Dogmen*, also published by Jacobi (1856); and several other posthumous works. The majority of these works have been translated into English, viz., *General History of the Christian Religion and Church* (trans. by Torrey, 12th ed. 1882); *History of the Planting and Training of the Christian Church by the Apostles* (trans. by Ryland, 1842); *Memorials of Christian Life in the Early and Middle Ages* (trans. by Ryland, 1832); *Life and Times of Saint Bernard* (trans. by Miss Matilde Wrench, 1843); *Life of Chrysostom* (trans. by Stapleton, 1845); *Life of Jesus Christ* (trans. by McClintock and Blumenthal, 1848); *Lectures on the History of Christian Dogmas* (trans. by Ryland, 1858); *The Emperor Julian* (trans. by Cox, 1850); and his commentaries on Philippians, James, and First John. Consult his *Life* by Philip Schaff (New York, 1886); by Wiegand, with bibliography (Erfurt, 1890); and by Schneider (Schleswig, 1894).

NEANDERTHAL (nā-än′dĕr-täl) **MAN.** The name applied to a dolichocephalic early Quaternary type in Western Europe, based on the upper portion of a human skull found 60 feet beneath the surface by quarrymen in a ravine called Neanderthal, near the village of Hochdal, between Düsseldorf and Elberfeld, in Rhenish Prussia. Anthropologists have varied greatly in their judgment of this relic. The preponderance of opinion is toward the view that the Neanderthal skull represents the oldest known dolichocephalic folk of Europe. Crania of the Neanderthal type were subsequently found at Brux (Bohemia), Podbaba (near Prague, Bohemia), Eguisheim (near Kolmar, Alsace), Denise (near Le Puy, Haute-Loire), Marcilly (Eure, France), Bréchamps (Eure-et-Loir), Tilbury (England, near London), Bury-Saint-Edmunds (Suffolk, England), and Victoria Cave Galley Hill, Hamilton (England). This type, in addition to its low cranial index (70-75.3), was characterized by a low forehead, prominent brow ridges, and low stature (about 1.59 meters, or 62.5 inches).

NEAP′OLIS (Lat., from Gk. Νεάπολις, 'new town'). An ancient town, the seaport of Philippi in Macedonia. The modern town of Kavalla (Map: Balkan Peninsula, E 4), with about 5000 inhabitants, is on or near its site. Paul landed here when he sailed from Troas to begin his missionary labors in Europe (Acts xvi. 9-11). The town lay on a bay, which afforded excellent anchorage, nearly opposite the island of Thasos, and was distant about nine miles from Philippi.

NEAP′OLIS. The ancient name of Naples (q.v.).

NEAP-TIDES. See TIDES.

NEARCHUS, nē-är′kŭs (Lat., from Gk. Νέαρχος, *Nearchos*). The commander of the fleet of Alexander the Great in his Indian expedition (B.C. 327-326). He was the son of Androtimus, and was born in Crete, but settled in Amphipolis in Macedonia, near the Thracian boundary. He was high in favor with Philip, but was banished on account of his adherence to Alexander. When, however, Alexander succeeded to the throne of Macedon, Nearchus was recalled, and when the conquest of the Persian Empire was begun, he was appointed Governor of Lycia and other districts in the south of Asia Minor. In B.C. 329 he accompanied Alexander to Bactria, with a body of Greek mercenaries. When his patron ordered a fleet to be built on the Hydaspes, Nearchus received the command of it. He sailed down the Indus, and then to the Persian Gulf, and arrived at Susa, in Persia, February 24, 324, shortly after Alexander himself, who had marched overland. After the death of Alexander Nearchus accepted the decision of the other generals with regard to the position of the kingdom, and retained his own provinces under Antigonus, whom he accompanied against Eumenes. In 314 Antigonus appointed him a councilor of his son, Demetrius. Fragments of his narrative of his voyage have been preserved in the *Indica* of Arrian. Consult McCrindle, *Invasion of India by Alexander the Great* (Westminster, 1896).

NEARCTIC REGION (from Gk. νέος, *neos*, new + ἀρκτικός, *arktikos*, arctic, northern). A region in zoögeography including the entire continent of North America, except the hot coastlands of Mexico. It is a part of Arctogæa, or the Holarctic Region, in the view of those who regard the Northern Hemisphere as a unit in zoögeography; but in the scheme of Sclater and Wallace it is one of the six primary regions, coordinate with the Palearctic Province. (See DISTRIBUTION OF ANIMALS, *Zoögeographical Map.*) Of further interest here are the subdivisions or local faunal areas that have been distinguished.

The earliest attempt at this set apart three regions—an 'Eastern,' from the Atlantic to the plains; a 'Central,' including the dry interior plains; and a 'Western,' the Pacific Slope. As early as 1854 Louis Agassiz stated that the eastern half of the continent contained three faunas: a northern, which he called 'Canadian;' a middle (Great Lakes to the latitude of Kentucky), which he called 'Alleghanian;' and a southern or 'Louisianian.' Later writers, especially Allen, dealing mainly with birds, made eight zones in succession from north to south—Arctic, Hudsonian, Canadian, Alleghanian, Carolinian, Louisianian, Floridian, and Antillean. Ornithologists still use this classification east of the Mississippi River. Subsequently Merriam announced the opinion that there was no reason for recognizing a 'Central Province,' and that too much stress had been laid upon the dissimilarities between Eastern and Western animals. He asserted the view that only two primary subdivisions of the Nearctic Region should be made—a 'Boreal' province and a 'Sonoran' province. The former stretches from New England and the Great Lakes northwest across Canada to Alaska, and sends down long arms along the heights of the Alleghanies and the Rocky Mountains, and along the Pacific Coast, whose fauna is a mingled one. Everything south of this is 'Sonoran,' embracing nearly all the United States, a great area of the plains of Northwestern Canada, and all of Mexico except the low tropical coast-lands. These generalizations, however, have not been universally accepted, most critics objecting that too high rank has been accorded to the 'Sonoran' region, whose boundaries are regarded as too indefinite to entitle it to be differentiated and outlined as Merriam proposed in his "Biological Survey of the San Francisco Mountain Region," in *North American Fauna, No. 3* (Washington, 1890). The question of the subdivision of the Nearctic Region therefore remains open.

NEAR-SIGHTEDNESS. See SIGHT, DEFECTS OF.

NEATH, nēth. A municipal borough and river port in Glamorganshire, South Wales, on the Neath, seven miles northeast of Swansea (Map: England, C 5). It has extensive copper and iron works. Copper, spelter, iron, tin-plates, and fine bricks are extensively exported; stone is quarried, and coal and culm are produced. The town, built on the site of the Roman station Nidum, contains the remains of an ancient castle, burned in 1231. The town received its first charter from Edward II. It owns its gas, water, slaughter-houses, markets, tramways, library, cemetery, the Victoria Gardens pleasure ground, a fair-field, and real estate worth $1.000.000. Population, in 1891, 11,157; in 1901, 13.700.

NEBENIUS, nâ-bā′nê-ụs, KARL FRIEDRICH (1785-1857). A German statesman and economist, born at Rhodt, near Landau. In 1819 he took a prominent part in working out the Baden Constitution, and for many years was the principal statesman of the Grand Duchy. In 1833 he was made Privy Councilor of State, and soon afterwards became Minister of the Interior and president of the Cabinet Council. Owing, however, to reactionary influences, he did not keep this position very long. In 1845 he again joined the Cabinet, but the Revolution of 1849 compelled him to resign, and thereafter he devoted himself entirely to literary pursuits. He published, among many treatises on political economy: *Bemerkungen über den Zustand Grossbritanniens in staatswirtschaftlicher Hinsicht* (1818); *Ueber technische Lehranstalten* (1833); and wrote a *Geschichte der Pfalz,* which appeared posthumously (1874).

NE′BO (from Bab. *nabû*, to call, name, proclaim). A deity of the Babylonians and Assyrians, mentioned in Isaiah xlvi. 1. The name also occurs in the Old Testament as a geographical term. (See NEBO, MOUNT.) In cuneiform literature the form is Nabu or Nabium. After Babylon became the centre of the Babylonian Empire, Nebo took rank immediately after Marduk (see MERODACH), the head of the pantheon. He appears originally to have been the local patron deity of Borsippa, opposite the ancient city of Babylon, and there are grounds for believing that Borsippa was older than Babylon. This may have been one reason for the prominence which Nebo retained beside the powerful Marduk. In time Borsippa became a suburb of Babylon and the union between the two was symbolized by erecting a shrine to Nebo in Marduk's temple at Babylon to which Nebo was carried in solemn procession on the New Year's Day, while the statue of Marduk was on the return trip carried part way back to E-zida ('the true house'), Nebo's temple in Borsippa. To express further the relationship to Marduk, Nebo was regarded as the son of Marduk. Originally an agricultural deity, Nebo became in time the god of wisdom, and it is in this capacity that he was chiefly worshiped by the Assyrians. To Nebo and his consort Tashmitum Assyrian rulers ascribe the art of writing on stone and tablets, and all learning is eventually traced back to him. In this respect he supplanted an earlier god of wisdom, Ea, whose cult reaches back to a still higher antiquity than that of Nebo or Marduk. Consult Jastrow, *Religion of Babylonia and Assyria* (Boston, 1898).

NEBO, MOUNT. The mountain from which, according to the Book of Deuteronomy (xxxii. 49; xxxiv. 1), Moses viewed the land of Canaan before his death. It has been identified with the mountain Neba—a ridge 2643 feet above the Mediterranean, situated five miles southwest of Heshbon. The name Nebo also occurs as that of a town in Moab (Num. xxxii. 3, and on the Moabite Stone), and a town in Judah (Ezra ii. 29). It is identical in form with the name of a well-known Babylonian god Nabu (see NEBO), whose worship appears to have spread far to the west. The tradition associating the death of Moses with Mount Nebo may have had as a starting-point the existence of a sanctuary on the top of the mount, or, at all events, the sacred character of the mountain.

NEBRAS′KA (North American Indian, shallow water). One of the north central States of the American Union, popularly known as the "Blackwater State." It lies between the parallels of latitude 40° and 43° N., and between longitudes 95° 20′ and 104° W., the latter meridian and the two parallels forming rectilinear boundaries. It is bounded on the north by South Dakota, on the east by Iowa and Missouri, on the south by Kansas and Colorado, and on the west by Wyoming and Colorado. Its shape is that of a rectangle whose eastern end is cut off diagonally by the Missouri River, and whose southwestern corner is overlapped by the northeastern corner of Colorado. Its extreme length from east to west is 420 miles, and its breadth from north to south 208 miles. Its area is 77,510 square miles, of which 670 square miles are water, and 76,840 square miles, or 49,177,600 acres, land. It ranks thirteenth in size among the States.

Topography. Nebraska lies in the region of the great plains skirting the eastern slope of the Rocky Mountains, toward whose foothills it rises in a gentle, undulating incline. The whole western half of the State lies at an elevation of more than 2500 feet above the sea. On the other hand, there are but few eminences rising much above the general level of the plain, except in the extreme west, where the foothills of the Rocky Mountains begin to appear. The highest point here is Wildcat Mountain, 5038 feet above the sea. As the rivers are deeply trenched in the soft drift material, their flood-plains in the east along the Missouri, the Platte, and their larger tributaries are lined with steep or rounded bluffs sometimes of considerable height. Nebraska is a prairie State.

Hydrography. The State is drained entirely by the Missouri River and its tributaries. Owing to the gentle and regular slope of the land, most of these rivers flow in nearly straight parallel lines east or southeastward, and they are for the most part wide and also shallow. The three principal rivers, besides the Missouri (on the boundary), are the Platte in the centre, the Niobrara in the north, these two flowing through the whole length of the State, and the Republican in the south, the latter coming from Kansas, and returning to that State to form the Kansas River.

Climate. The climate is continental, dry, and exhilarating. The mean temperature for January is 19.7° and for July 74.8°. The extremes are very great, the mercury sometimes falling to —42° and at times rising to 114°. The nights are cool. The climate of the western third of the State is, however, quite arid, and differs considerably from that of the eastern third, where agriculture is wholly successful. The annual rainfall is 23 inches, but this is very unevenly distributed. In the east it is sufficient to support agriculture, ranging from 30 inches on the average to a local maximum as high as 50 inches. In the western half it is below 20, and in the extreme west as low as 12 inches, so that here agriculture cannot be carried on successfully without irrigation. The greatest amount of rain falls in May and June, and more than three-fourths of the annual rain falls during the six months of the growing season, April to September. The prevailing winds are from the northwest, and these generally temper the summer heat, but occasionally the heat is aggravated by the hot winds from the southwest.

Soil. More than half of the State is covered with glacial drift and loess, the drift being confined to the eastern counties. The loess forms a soil of inexhaustible fertility. Its deposits range in thickness from 5 to 150 and even 200 feet, and though soft and easily excavated, it is very compact and able to withstand moisture and exposure. The bluffs along the bottom-lands are composed of this material. The alluvial lands of the river valleys also afford excellent soil, though scarcely exceeding the loess in quality, and as the State was anciently a lacustrine bed, and later a region of peat bogs, large areas are covered with a very black vegetable mold which in some places becomes true peat, and which has given the dark color to the rivers, whence the popular name of the State is derived. Considerable areas in the west, as much as 20,000 square miles, are covered with sand dunes. These are found partly in the southwestern corner, but chiefly in the large and arid area north of the Platte and west of the 100th meridian. In the extreme west the Tertiary marls, even in the Bad Lands, can be made productive by irrigation.

For Flora and Fauna, see the articles Rocky Mountains and United States.

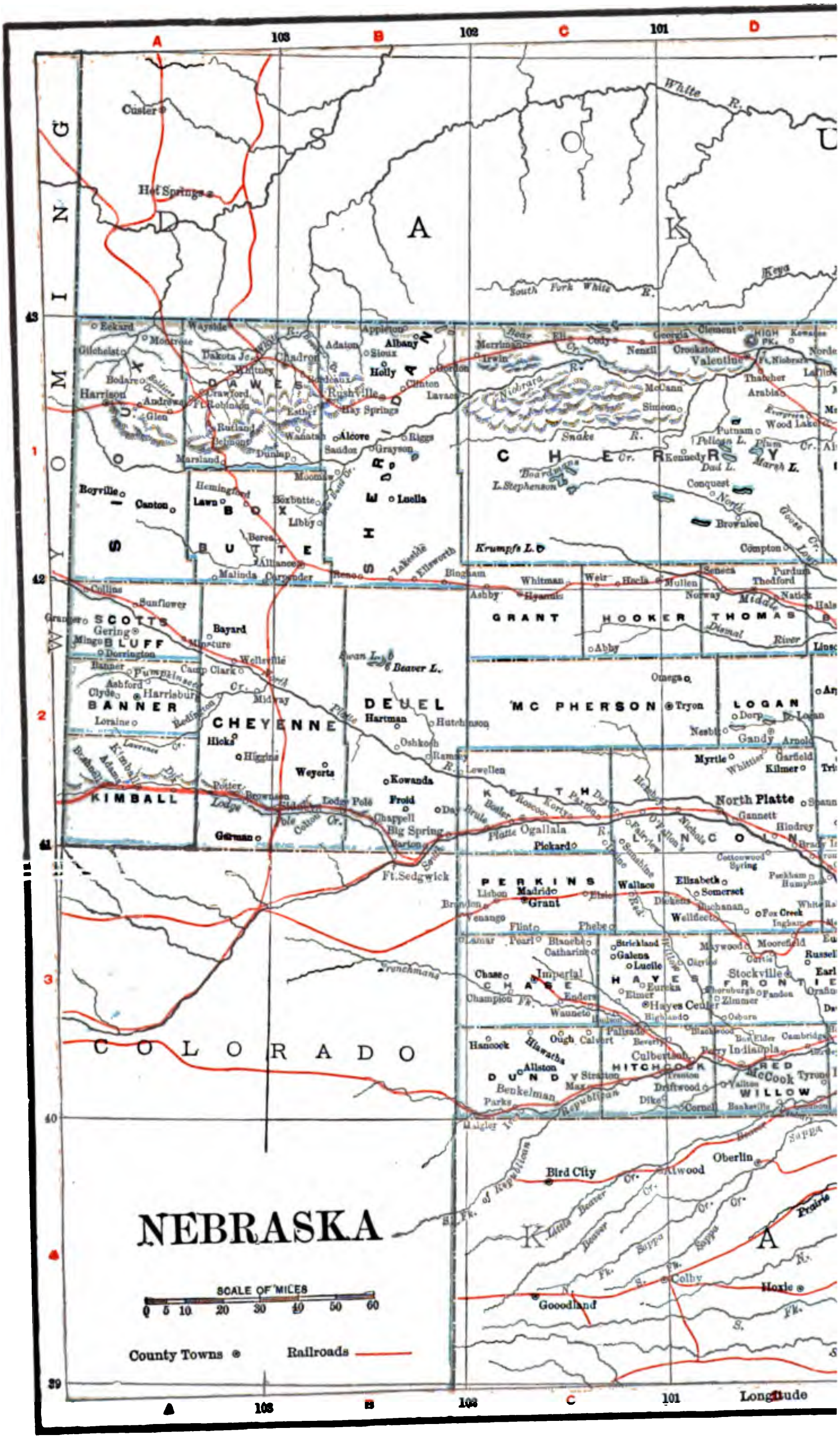
Geology and Minerals. Except in the Bad Lands of the northwest and in some other isolated localities, formations older than the Pleistocene are nowhere exposed. They are composed of nearly horizontal strata outcropping below the drift in wide bands running southwest to northeast. Four principal formations are represented, which in order from southeast to northwest are the Upper Carboniferous, Permian, Cretaceous, and the Miocene and Pliocene Tertiary. The Miocene is the one which crops out in the Bad Lands. Glacial drift covers the eastern third of the State, the remaining Pleistocene formation consisting of alluvial deposits laid down in the lakes which were formed at the close of the glacial period. Clay and a little building stone are the only important minerals. The clay deposits afford material for the production of brick and tile; the product for 1900 was valued at $683,958, three times the value of the product in 1895.

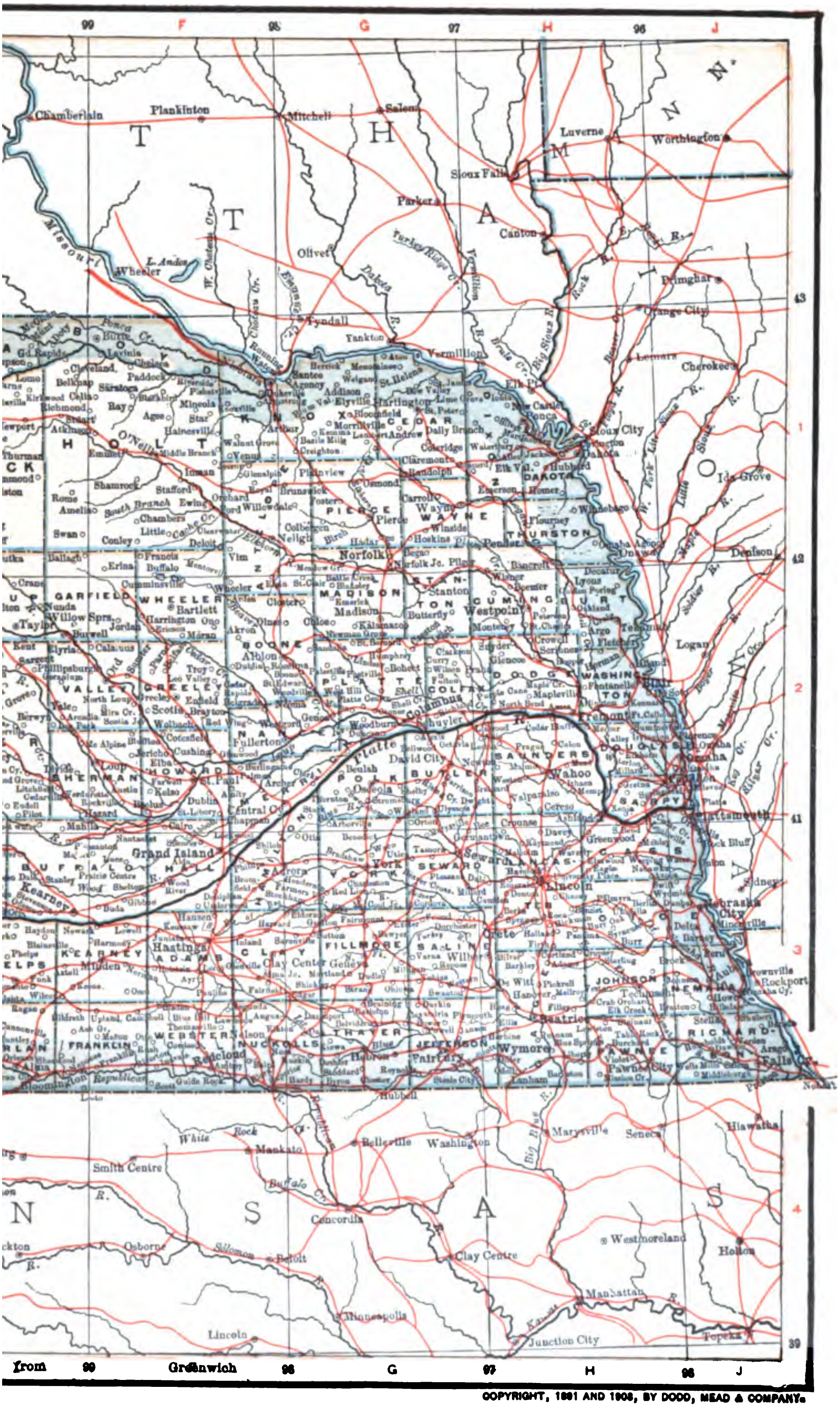
Agriculture. In agricultural development the State advanced rapidly during the last three decades of the nineteenth century, and at the end of the period ranked as one of the most important agricultural States. In 1900, 60.8 per cent. of the total land area was included in farms, and of this 61.6 per cent. was improved. Efforts at irrigation in the arid areas of the west have been attended with some success, the irrigated acreage reported in 1899 being 148,538, of which about 90 per cent. was watered from the North Platte River. In some regions there are supplies of underground water, which can be utilized by means of windmills and small reservoirs—a system which promises to be of some importance in the agricultural development of the arid regions. Since 1880 the average acreage of farms increased from 156.9 acres to 246.1 acres. This is due to the establishment of extensive live-stock ranches in the western part of the State and the cultivation of large corn-producing areas, and is in spite of the tendency to divide farm holdings which has characterized the same period in the eastern part of the State. The number of tenant-operated farms is increasing very rapidly, and amounted in 1900 to 36.9 per cent. of the total number of farms.

Corn is the leading crop, nearly one-half of the cultivated acreage of the State being devoted to it. In 1880 the acreage of wheat was only slightly less than that of corn, but in the following decade there was an actual decrease of more than two-fifths in the area devoted to it, which, how-

AREA AND POPULATION OF NEBRASKA BY COUNTIES.

County.	Map Index.	County Seat.	Area in square miles.	Population.	
				1890.	1900.
Adams	F 3	Hastings	574	24,303	18,840
Antelope	F 1	Neligh	874	10,399	11,344
Banner	A 2	Harrisburg	744	2,435	1,114
Blaine	D 2	Brewster	711	1,146	603
Boone	F 2	Albion	686	8,683	11,689
Boxbutte	A 1	Alliance	1,078	5,494	5,572
Boyd	F 1	Butte	555	695	7,332
Brown	E 1	Ainsworth	1,223	4,359	3,470
Buffalo	E 3	Kearney	985	22,162	20,254
Burt	H 2	Tekamah	476	11,069	13,040
Butler	G 2	David City	586	15,454	15.703
Cass	H 3	Plattsmouth	540	24,080	21,330
Cedar	G 1	Hartington	725	7,028	12,467
Chase	C 3	Imperial	901	4,807	2,559
Cherry	C 1	Valentine	5,891	6,428	6,541
Cheyenne	A 2	Sidney	2,601	5,698	5.570
Clay	F 3	Clay Center	586	16,310	15,735
Colfax	G 2	Schuyler	405	10,453	11,211
Cuming	H 2	Westpoint	580	12,265	14,584
Custer	D 2	Broken Row	2,595	21,677	19,758
Dakota	H 1	Dakota	264	5,386	6,286
Dawes	A 1	Chadron	1,411	9,722	6,215
Dawson	B 3	Lexington	1,002	10,129	12,214
Deuel	B 2	Chappell	2,097	2,893	2,630
Dixon	H 1	Ponca	450	8,084	10,535
Dodge	H 2	Fremont	529	19,260	22,298
Douglas	H 2	Omaha	341	158,008	140,590
Dundy	C 3	Benkelman	921	4.012	2,434
Fillmore	G 3	Geneva	568	16,022	15,087
Franklin	E 3	Bloomington	568	7,693	9,455
Frontier	D 3	Stockville	980	8,497	8,781
Furnas	D 3	Beaver City	715	9,840	12,373
Gage	H 3	Beatrice	856	36.344	30,051
Garfield	E 2	Burwell	568	1,659	2,127
Gosper	E 3	Elwood	472	4,816	5,301
Grant	C 2	Hyannis	760	458	763
Greeley	F 2	Greeley	580	4,869	5,691
Hall	F 3	Grand Island	562	16.513	17,206
Hamilton	F 3	Aurora	550	14,096	13,330
Harlan	E 3	Alma	562	8,158	9.370
Hayes	C 3	Hayes Center	725	3,953	2,708
Hitchcock	C 3	Trenton	723	5,799	4,409
Holt	F 1	O'Neill	2,410	13,672	12,224
Hooker	C 2	Mullen	725	426	432
Howard	F 2	St. Paul	574	9,430	10,343


NEBRASKA
SCALE OF MILES
0 5 10 20 30 40 50 60
County Towns
Railroads
Longitude
A
B
C
D
103
102
101
43
42
41
40
39
1
2
3
4
WYOMING
S. DAKOTA
COLORADO
KA
SIOUX
DAWES
SHERIDAN
CHERRY
BOX BUTTE
SCOTTS BLUFF
BANNER
CHEYENNE
KIMBALL
DEUEL
GRANT
HOOKER
THOMAS
MC PHERSON
LOGAN
LINCOLN
KEITH
PERKINS
CHASE
HAYES
FRONTIER
DUNDY
HITCHCOCK
RED WILLOW
Custer
Hot Springs
White R.
South Fork White R.
Keya
Niobrara R.
Snake R.
Middle Dismal River
North Platte
Ogallala
Sidney
Valentine
Chadron
Rushville
Alliance
Harrison
Gering
Harrisburg
Kimball
Chappell
Big Spring
Julesburg
Ft. Sedgwick
Grant
Imperial
Benkelman
Culbertson
Trenton
McCook
Hayes Center
Stockville
Tryon
Gandy
Republican
Frenchman
Bird City
Atwood
Oberlin
Colby
Goodland
Hoxie
Beaver Cr.
Sappa Cr.
Prairie Dog Cr.



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AREA AND POPULATION OF NEBRASKA BY COUNTIES.

(*Continued.*)

County.	Map Index.	County Seat.	Area in square miles.	Population.	
				1890.	1900.
Jefferson	G 3	Fairbury	566	14,850	15,196
Johnson	H 3	Tecumseh	382	10,333	11,197
Kearney	E 3	Minden	508	9,061	9,866
Keith	C 2	Ogallala	1,118	2,556	1,951
Keyapaha	E 1	Springview	772	3,920	3,076
Kimball	A 2	Kimball	960	959	758
Knox	F 1	Niobrara	1,125	8,582	14,343
Lancaster	H 3	Lincoln	868	76,395	64,835
Lincoln	C 2	North Platte	2,570	10,441	11,416
Logan	D 2	Gandy	576	1,378	960
Loup	E 2	Taylor	574	1,662	1,305
McPherson	C 2	Tryon	1,685	401	517
Madison	G 2	Madison	576	13,669	16,976
Merrick	F 2	Central City	460	8,758	9,255
Nance	F 2	Fullerton	456	5,773	8,222
Nemaha	J 3	Auburn	407	12,930	14,952
Nuckolls	F 3	Nelson	572	11,417	12,414
Otoe	H 3	Nebraska City	616	25,403	22,288
Pawnee	H 3	Pawnee City	437	10,340	11,770
Perkins	C 3	Grant	895	4,364	1.702
Phelps	E 3	Holdrege	564	9,869	10,772
Pierce	G 1	Pierce	568	4,864	8,445
Platte	G 2	Columbus	686	15,437	17,747
Polk	G 2	Osceola	432	10,817	10,542
Redwillow	D 3	McCook	720	8,837	9.604
Richardson	J 3	Falls City	548	17.574	19,614
Rock	E 1	Bassett	1,000	3,083	2,809
Saline	G 3	Wilber	576	20,097	18,252
Sarpy	H 2	Papillion	225	6,875	9,080
Saunders	H 2	Wahoo	764	21,577	22,085
Scotts Bluff	A 2	Gering	725	1,888	2,552
Seward	C 3	Seward	588	16,140	15,690
Sheridan	B 1	Rushville	2,179	8,687	6,033
Sherman	E 2	Loup	568	6,399	6,550
Sioux	A 1	Harrison	2,077	2,452	2,055
Stanton	G 2	Stanton	431	4,619	6,969
Thayer	G 3	Hebron	572	12,738	14,325
Thomas	D 2	Thedford	720	517	628
Thurston	H 1	Pender	396	3,176	8,756
Valley	E 2	Ord	578	7,092	7,339
Washington	H 2	Blair	392	11,869	13,086
Wayne	G 1	Wayne	441	6,169	9,862
Webster	F 3	Redcloud	578	11,210	11.619
Wheeler	F 2	Bartlett	582	1.683	1,362
York	G 3	York	588	17,279	18,205

ever, revived in the last decade of the century, amounting in 1900 to three times that of 1890. There were large increases in the area devoted to oats and rye respectively during each of the last two decades of the nineteenth century; rye, however, is of only minor importance. Grasses cut for hay are chiefly wild, salt, or prairie grasses, but millet, alfalfa, and other cultivated grasses are also grown. Potatoes and other vegetable crops are extensively grown. In the last decade of the past century a rapid increase was made in the cultivation of sugar beets, the census of 1900 reporting a total of 8662 acres devoted to them. The growing of orchard fruits is mainly confined to the southeastern part of the State. Between 1890 and 1900 the number of fruit trees increased from 1,840,704 to 6,240,118, considerably over half of this number being apple trees.

The acreage of the principal farm crops for the census years indicated is as follows:

CROP	1900	1890
Corn	7,335,187	5,480,279
Wheat	2,538,949	798,855
Oats	1,924,827	1,503,515
Rye	178,920	81,372
Barley	92,098	82,590
Hay and forage	2,823,652	2,462,245
Potatoes	79,901	106,722

STOCK-RAISING. Every decade since the settlement of the State has witnessed an increase in the number of every variety of domestic animals. In general, the increase was greatest during the ten years from 1880 to 1890. The most noteworthy gain in the last decade of the century was that made in the number of cattle other than dairy cows, amounting to 62.7 per cent. In the census year 1900, $4,137,000 was realized from the sale of dairy products, and the value of the product consumed on farms was nearly as great. In the same year only three States exceeded Nebraska in the number of swine reported.

The following table gives the number of the principal species of domestic animals for the years indicated:

	1900	1890
Dairy cows	512,544	505,045
Other cattle	2,663,699	1,637,552
Horses	795,318	626,789
Mules and asses	55,856	46,512
Sheep	335,950	209,243
Swine	4,128,000	3,815,647

MANUFACTURES. In manufacturing Nebraska is one of the least developed States. In 1900 there were 24,461 wage-earners, or only 2.3 per cent. of the total population, engaged in manufactures. The State's industries have developed almost wholly since 1880. In the two decades beginning with that year the number of wage-earners more than quintupled, and the value of products ($143,990,000 in 1900) increased over eleven fold. The lack of cheap fuel has been a serious handicap, but the development of coal fields in adjoining States is helping to overcome this obstacle. The advantages of cheap transportation are afforded by the Missouri River, and Omaha in particular has unusual railroad facilities. As yet the industries are limited mainly to those manufactures that are based upon agricultural and stock-raising products. Thus four industries—viz. slaughtering and meat-packing, and the manufacture of malt liquors, flour and grist-mill products, and cheese, butter, and condensed milk—yielded 89.6 per cent. of the total value for the nine leading industries given in the table below. The value of the products of the slaughtering industry alone was nearly equal to that of all other industries combined. The rapid growth of the industry began in 1884, and South Omaha, as a slaughtering centre, is surpassed only by Kansas City and Chicago. The factory production of butter has developed wholly since 1881. Other leading industries are printing and publishing, and car and other railroad shop construction, the manufacture of saddlery and harness, brick and tile, and lumber and planing mill products. The last two suffered a decrease during the last decade of the century. South Omaha and Omaha are the only large manufacturing centres. The following table shows the relative importance of the leading industries, and their development during the decade 1890-1900:

INDUSTRIES	Year	Number of establishments	Average number of wage-earners	Value of products, including custom work and repairing
Total for selected industries for State	1900	1,520	13,386	$92,372,460
	1890	1,045	10,467	42,260,093
Increase, 1890 to 1900	......	475	2,919	50,112,367
Per cent. of increase	......	45.5	27.9	118
Per cent. of total of all industries in the State	1900	28.1	54.7	64
	1890	34.7	51.2	45
Slaughtering and meat-packing, wholesale	1900	8	6,083	71,018,339
	1890	6	1,863	24,026,876
Cheese, butter, and condensed milk, factory product	1900	93	333	2,253,893
	1890	58	428	1,183,000
Flouring and grist-mill products	1900	305	698	8,100,794
	1890	185	690	6,365,492
Liquors, malt	1900	19	200	1,433,501
	1890	14	172	1,079,865
Brick and tile	1900	106	855	839,815
	1890	155	2,586	2,173,632
Cars and general shop-construction and repairs by steam railroad companies	1900	23	2,458	2,624,461
	1890	9	2,041	2,067,908
Lumber, planing-mill products, including sash, doors, and blinds	1900	21	293	886,333
	1890	24	497	1,112,412
Printing and publishing	1900	554	1,883	3,431,582
	1890	443	1,771	3,222,368
Saddlery and harness	1900	391	583	1,783,742
	1890	151	419	1,028,540

Transportation. The eastern part of Nebraska enjoys adequate railroad facilities, and three lines, the Burlington and Missouri River, the Union Pacific, and the Fremont, Elkhorn and Missouri Valley, cross the State from east to west. The western part of the State has no north and south lines. The principal era of construction was in the decade 1880-90, during which the mileage increased from 1953 miles to 5407 miles. There were in 1900 5695 miles in operation. There is a State Board of Railroad Commissioners. The Missouri River is not used for purposes of navigation.

Banks. The first session of the Territorial Legislature in 1855 pronounced currency banking a crime, and no banks were chartered. The necessity for currency, however, was such that insurance companies issued a disguised form of paper money. In 1856, under special charters, certain institutions did a banking business, in spite of the laws to the contrary. The general panic of 1857 swept all such institutions out of existence. For almost a decade all the banking business was performed by private banks; then national banks began to be organized.

A considerable increase in the number of banks came about in 1880, when the era of railroad building commenced. The number of State banks almost doubled in one year, and in the following decade (1880-90) increased from 83 to 513, but diminished somewhat after the panic of 1893. The national banks during the same period increased from 10 to 120. An act regulating banks was passed in 1889, establishing a State Banking Board, and providing for reports and examinations. In 1893 there were eight savings banks in Omaha, but only one existed in 1900. The following table is compiled from the official reports of 1902:

	National banks	State and private banks
Number of banks	124	458
Capital	$10,088,000	$7,521,000
Surplus	2,068,000	1,271,000
Cash, etc	4,436,000	2,437,000
Loans	44,198,000	28,527,000
Deposits	41,093,000	35,069,000

Finances. The State Constitution forbids any bonded debts of over $50,000 except in case of war, but when the disbursements have exceeded the receipts, State warrants have been issued which drew interest. In 1891 an act was passed by the Legislature relating to registration of unpaid warrants, which practically made them a bonded debt. Besides, special relief bonds were authorized and so a funded State debt created which in 1894 amounted to more than $500,000. This funded debt was paid out by 1898. On December 1, 1902, the floating indebtedness of the State was $1,989,328, but the educational trust funds held $1,457,351, so that the net indebtedness was small. The income for the preceding twenty-four months was $6,742,551, and the expenditures $6,925,315. The educational expenditures constituted almost two-thirds of the whole.

Government. The present Constitution was adopted in 1875. If three-fifths of the members of each House approve a proposed amendment, it is submitted to a vote of the people, and if approved by a majority of the electors voting, it becomes a part of the Constitution. Every male person of the age of twenty-one years and upward who is a citizen of the United States, or has declared his intention thirty days previous to an election to become a citizen, and who is neither insane, an idiot, nor an unpardoned felon, shall be entitled to vote, provided he has resided in the State six months and in the minor districts a term prescribed by law. Registration of voters is required by law in cities of over 2500 inhabitants. The State elections are held biennially on the Tuesday after the first Monday in November.

Legislative. The Constitution places a maximum limit on the Legislature of 33 Senators and 100 Representatives. It meets biennially in odd-numbered years on the first Tuesday in January. Each member is elected for two years and receives $5 a day and mileage, but salary is allowed for only sixty days at any one sitting. Unless at the request of the Governor, bills cannot be introduced after the fortieth day of the session. The power of impeachment rests with the Senate and House in joint convention; the trial of impeachment, with the judges of the State district courts.

Executive. The Governor, Lieutenant-Governor, Secretary of State, Auditor, Treasurer, Superintendent of Public Instruction, Attorney-General, and Commissioner of Public Lands and Buildings each hold office for two years. The Governor's veto extends to any item or items of appropriation bills. He has the usual pardoning power, subject to legislative regulation.

Judiciary. The judicial power is vested in a Supreme Court, district courts, county courts, justices of the peace, police magistrates, and inferior courts created by law for cities and incorporated towns. The three Supreme Court judges are elected by the State at large for six years. The State is divided into six districts, in each of which a district judge is elected for four years. The county judges are elected for two years.

Local Government. No county can be created with or reduced to a less area than 400 square miles, nor can any county be divided without the approval of a majority vote of the people. The Legislature provides by law for township organization.

Statutory Provisions. Property acquired by a wife after marriage remains separately hers. Women who own assessed property, or who have children of school age, may vote in school meetings. The liquor laws provide for high license. The legal rate of interest is seven per cent., ten being allowed by contract, and the penalty for usury is forfeiture of interest and cost.

The State has six Representatives in the National Congress. The capital is Lincoln.

Population. The population of Nebraska by decades was: 1860, 28,841; 1870, 122,993; 1880, 452,402; 1890, 1,058,910; 1900, 1,066,300. In the decade 1880-90 Texas was the only State west of the Mississippi whose absolute growth was as great as that of Nebraska, but in the following decade the population remained almost stationary, its increase being exceeded by that in every other State in the Union but one. Many of the northeastern counties of the State made large gains in the last decade of the century, but elsewhere decreases were common. Owing to its arid-ity, the western half of the State contains but few people. The foreign-born population in 1900 numbered 177,347, the Germans exceeding any other nationality. In the same year there were 6269 negroes and 3322 taxed Indians. There are 13.9 inhabitants to the square mile. Nebraska is one of the two States which suffered an actual decrease in urban population during the last decade of the past century. In 1900 there were eleven cities which exceeded 4000 inhabitants each, and together constituted 20.8 per cent. of the total population. The largest three cities in 1900 were: Omaha, 102,555; Lincoln, 40,169; South Omaha, 26,001.

CHARITABLE AND PENAL INSTITUTIONS. The Governor, Commissioner of Public Lands and Buildings, and the State Superintendent of Public Instruction constitute a Board of Charities and Correction. The State institutions are as follows: Asylums for the insane at Lincoln and at Norfolk, Asylum for Incurable Insane at Hastings, Soldiers and Sailors' Home at Grand Island, Soldiers and Sailors' Home at Milford, Home for Friendless at Lincoln, State Industrial School at Kearney, Girls' Industrial School at Geneva, Industrial Home at Milford, State Penitentiary at Lincoln, Institution for Feeble-Minded at Beatrice, Institution for Deaf and Dumb at Omaha, Institution for Blind at Nebraska City. About one-half of the counties have poor farms (1902), the inmates at these aggregating about 800, while half as many other persons receive continuous aid from the counties, and as many more receive partial aid.

EDUCATION. Nebraska bears the distinction of having the lowest proportion of illiteracy in the United States (2.3 in 1900). In 1902 the State had 6813 public schools (465 graded), with 9629 teachers, of whom 1862 were males. The school population (five to twenty-one years of age) amounted, in 1902, to 375,340, the enrollment to 289,468, and the average daily attendance to 185,755. The average length of the school term in the same year was 138 days. The average monthly salary for male teachers increased from $39.24 in 1871 to $49.15 in 1902; of female teachers, from $36.64 to $38.51. The expenditures on education in 1902 amounted to $4,435,338, or about $23.90 per pupil in average attendance. It is reported that only about 5.5 per cent. of the teachers of the State are graduates of a college or a university, about 40 per cent. have a high-school education or its equivalent, 29 per cent. are without high-school training, and less than 16 per cent. have any professional training. To improve the professional standing of the teachers, a number of union normal institutes have been organized, giving a four weeks' summer course for teachers. The normal school at Peru and the normal college at Wayne are State institutions.

In 1900 there were in the State for purposes of secondary education 250 public high schools, with 15,208 secondary scholars, and 19 private high schools and academies, with 684 students. The chief institutions for higher education are the University of Nebraska (q.v.), at Lincoln; the University of Omaha (Presbyterian), at Bellevue; Cotner University (Christian), at Bethany; Doane College (Congregational), at Crete; Nebraska Wesleyan University (Methodist Episcopal), at University Place.

RELIGION. The church members or communicants in the State form only about 20 per cent. of the total population. The principal denominations, in order of their importance, are the Methodist, comprising over one-fourth of the church members, the Roman Catholic, the Lutheran, the Presbyterian, the Baptist, and the Congregational.

MILITIA. In 1900 the State had a population of militia age amounting to 235,572. The aggregate strength of the militia in 1901 was 1595 men.

HISTORY. The territory now constituting the State was originally a part of the Louisiana Purchase, and afterwards a part of Missouri Territory. Coronado (q.v.), setting out from Mexico in search of the seven cities of Cibola and of Quivira, claimed that in 1541 he journeyed on the great plain as far as latitude 40° N., the southern boundary of the State. There are stories of other Spanish explorations, but little is known of them. In 1673 Marquette passed the mouth of the Missouri and marked the Platte from Indian stories. Pierre and August Choteau, brothers engaged in the fur trade, went beyond the forks of the Platte in 1762. Lewis and Clark, in 1804-06, skirted the boundary of the present State. The first known settlement was a trading post founded at Bellevue by Manuel Lisa in 1805. The American Fur Company placed a post here in 1810, and posts were established at Omaha in 1825 and at Nebraska City in 1826. Fort Atkinson was established in 1821, but abandoned in 1827. With the admission of Missouri as a State in 1821, the territory was left practically without government. In 1834 part of the region was attached to Arkansas, the jurisdiction of the district court of Missouri was extended over another part, and a third portion was joined to Michigan Territory. The next year Col. Henry Dodge, with a force of dragoons, encamped at what is now Fort McPherson, and commenced negotiations with the Indians looking toward their removal to reservations. Many tribes of the Eastern Indians were then being transferred to this 'Indian country.' The Mormons in 1845-46 wintered within the territory, and the next year troops destined for service in New Mexico spent the winter at old Fort Kearney. New Fort Kearney was established on the Oregon trail in 1848. Thousands of gold seekers passed through the territory in 1849-50, and some stopped on the way in defiance of the law which forbade settlement among the Indians. In 1844 Stephen A. Douglas, then a member of the House of Representatives, introduced a bill to organize a Territory, but the bill was never reported from the committee. Another unsuccessful attempt was made in April, 1848, and still another in December. The Indians, who foresaw the inevitable extension of white settlement, wished for a Territorial government in order to sell lands to better advantage. The Wyandots, led by their half and quarter bloods, in 1851-52 petitioned Congress to establish a Territory, with no success. A Territorial Delegate, Abelard Guthrie, was chosen in October, 1852. A bill to organize Nebraska Territory passed the House February 2, 1853, but did not reach a vote in the Senate. In order to force action, a Provisional Government was organized by the residents, and William Walker was elected Governor July 25, 1853. Senator Douglas reported a bill in January, 1854, providing for the erection of a Territory, based on his principle of 'squatter sovereignty.' It was amended to provide for two Territories (see KANSAS-NEBRASKA ACT), passed both Houses, and was signed by the President May 30th. By this act the boundaries of the Territory of Nebraska were defined as the 40th and 49th parallels of latitude, from the Missouri to the summit of the Rocky Mountains. In 1861 all the region north of the 43d parallel was constituted part of Dakota Territory, a small part from the southwest corner was added to Colorado, and the western boundary was extended to the 110th meridian. With the creation of Idaho Territory in 1863, the State was reduced to its present limits except for a slight addition in the northwest in 1882.

The question of Statehood came up with the organization of the Territory. In 1860 the people voted down a proposal to call a constitutional convention. Congress passed an enabling act in 1864, but not until 1866 was a constitution adopted. The act of admission passed by Congress July 18th was not signed by the President. In February, 1867, he again vetoed a similar bill, but it was passed over the veto, and on March 1st the State was admitted. The history of the Territory and State has been one of peaceful development, though during the Civil War the Indians were restless, and in August, 1864, a notable rising occurred.

Politically Nebraska has been Republican in national elections, with the exception of the year 1896, when it was carried by the Democratic candidate, William Jennings Bryan, a resident of the State. The following is a list of the Governors of the State, with their party affiliations:

TERRITORIAL

Francis Burt	1854
T. B. Cuming (acting)	1854-55
Mark W. Izard	1855-57
T. B. Cuming (acting)	1857-58
William A. Richardson	1858
J. S. Morton (acting)	1858-59
S. W. Black	1859-61
A. S. Paddock (acting)	
Alvin Saunders	1861-67

STATE

David Butler	Republican	1867-71
W. H. James (acting)		1871-73
Robert W. Furness	Republican	1873-75
Silas Garber	"	1875-79
Albinus Nance	"	1879-83
James W. Dawes	"	1883-87
John M. Thayer	"	1887-91
James E. Boyd	Democrat	1891 *
John M. Thayer	Republican	1891-92
James E. Boyd	Democrat	1892-93
Lorenzo Crounse	Republican	1893-95
Silas A. Holcombe	Dem.-Populist	1895-99
William A. Poynter	"	1899-1901
Charles H. Dietrich	Republican	1901
Ezra P. Savage	"	1901-03
John H. Mickey	"	1903 —

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* Ousted by decision of Supreme Court Nebraska, May 5, 1891; restored by decision of Supreme Court United States, Feb. 1, 1892.

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NEBRASKA. A river of Nebraska. See PLATTE.

NEBRASKA, UNIVERSITY OF. A co-educational State university at Lincoln, Neb., founded in 1869. It comprises the Graduate School; the College of Literature, Science, and Arts; the Industrial College; the College of Law; the College of Medicine; the School of Fine Arts; and the Affiliated School of Music. There is also a summer session. The regents have intrusted to its charge the United States agricultural experiment station, the State Museum, the Botanical and Geological Surveys, and the superintendency of farmers' institutes. Students are admitted on examination or on certificates from accredited schools. Military drill is compulsory for first and second year male students in the college, and physical training for all first and second year woman students. The students in 1903 numbered 2500, and the faculty consisted of 180 professors and instructors. The library contains 51,000 volumes, supplemented by eleven departmental libraries, including the departments of pure and applied sciences, law, and classical philology. The campus occupies twelve acres in the heart of Lincoln, and with the buildings is valued at $1,000,000. The endowment lands of the university were in all 136,080 acres, of which about 11,000 acres remain unsold. The principal accruing from former sales is paid into the permanent endowment funds. The income of the university for all purposes amounted in 1903 to $402,000.

NEBRASKA CITY. A city and the county-seat of Otoe County, Neb., 56 miles south of Omaha; on the Missouri River, here spanned by a fine steel railroad bridge, and on the Burlington and Missouri River (Burlington Route) and the Missouri Pacific railroads (Map: Nebraska, J 3). It has a United States Government building, the State Institute for the Blind, and a public library. The city is the centre of a noted fruit belt, also of a rich corn region. The principal industrial plants include large stock yards, grain elevators, cereal and flour mills, lumber and planing mills, foundries, press drill works, a starch factory, packing and provision house, plow works, breweries, brick works, a distillery, a cannery, and a cold storage plant. Laid out and settled in 1855 on the site of old Fort Kearney, Nebraska City was incorporated as a city of the second class in 1871. Twenty years later it received a charter of the first class, under the provisions of which it is governed by a mayor, chosen every two years, and a unicameral council, one-half of the members being elected by wards and the other half at large. Population, in 1890, 11,941; in 1900, 7380.

NEBUCHADNEZZAR, nĕb'ū-kăd-nĕz'zẽr, or, more correctly, **NEBUCHADREZZAR** (Heb., from Babylonian *Nabu-kudŭrri-uṣur*, Nabu [Nebo] protect the boundary). The great King of the Neo-Babylonian Empire, who ruled c.604-561 B.C. He was the second of the name, Nebuchadnezzar I. having been a distinguished Babylonian monarch of the second half of the twelfth century B.C. He was the son of Nabopolassar, Viceroy of Assyria in Babylonia, who upon the death of Assurbanipal (B.C. 624) gained control of the

Babylonian portion of the latter's empire. The family was Chaldean, that is, of a South Babylonian race, hence the use of this name for the dynasty and for the land in later ages. Nabopolassar entered into alliance with the other great enemy of Assyria, the Medes, marrying his son to a daughter of the Median King, Cyaxares. At this time a horde of barbarians, commonly called Scythians by historians, appeared upon the scene as assailants of the Assyrian Empire, and about B.C. 607 Nineveh fell before the combined assault. The Assyrian Empire was forthwith partitioned; the Medes took possession of the Upper Tigris Valley and the lands to the north and east of the Euphrates; Nabopolassar made firm his control of the Euphrates Valley; and from the west Necho, King of Egypt, advanced to the great river to reclaim for his land its ancient dominion in Syria. The division of spoils between Media and Babylon seems to have been prearranged, but Egypt's intrusion could not be suffered, and Nabopolassar sent Nebuchadnezzar against Necho. The latter was utterly defeated at Carchemish (B.C. 605), and Nebuchadnezzar advanced as far as Egypt to recover Syria. But he was recalled by the news of the death of his father, and accomplished the remarkable feat of leading his army by a forced march across the desert to Babylon to secure the succession. Unfortunately, we possess but scanty materials for the study of the continuation of Nebuchadnezzar's military and political career. The sources are the partial accounts found in the Bible, Josephus (quoting Berosus; *Ant.*, x. 6-11; *c. Ap.* i. 21), and Herodotus (containing obscure information concerning Egypt; ii. 151 seq.), and a fragment of Menander. The books of Kings, Jeremiah, and Ezekiel enable us to follow clearly Judah's relation to its new lord. At first King Jehoiakim submitted, but about B.C. 600 rebelled. After some delay Nebuchadnezzar sent his army against Jerusalem, which fell in 597, Jehoiakim dying during the siege. His son, Jehoiachin, suffered the Imperial chastisement of exile along with the upper classes, an uncle, Zedekiah, being appointed to the throne by the conqueror. But the new King succumbed at last to the temptations to revolt offered by his neighbors, and especially by Hophra, the ambitious King of Egypt, and drew upon himself the wrath of the Great King. Jerusalem stood a siege of sixteen months, and upon its fall (B.C. 586) was razed to the ground, while a second deportation was made, Zedekiah undergoing a cruel physical punishment. This campaign broke for good the refractory spirit of the Syrian States, Tyre alone holding out and suffering a famous siege of thirteen years, the end of which was an honorable capitulation. In B.C. 567 occurred a campaign which carried Nebuchadnezzar into the heart of Egypt, where, however, he obtained no permanent results. But it is the glory of this King that he prided himself not on the arts of war, in which he was so illustrious (he seems to have prosecuted them only at necessity), but on his works of peace. With two fragmentary exceptions, his inscriptions are devoted to his building operations, especially in Babylon, which, destroyed as it had been by Sennacherib and since then racked by civil war, he rebuilt and restored to more than its pristine glory. The excavations of the Germans under Dr. Koldewey are now uncovering the extent and grandeur of the fortifications, the palace, the temple of Marduk, and the great Procession Street, which Nebuchadnezzar reared out of patriotism and an eminent devotion to the gods. The sister city Borsippa shared in his benefactions. Nebuchadnezzar's outward successes seem to have been based upon noble kingly qualities, to which the contemporaneous Jewish prophets and even the tradition of the late Book of Daniel bear witness. According to the latter book, his life was for a time clouded by a madness (lycanthropy), for which tradition there exists some other slight testimony. His dynasty ended with his son, Evil-Merodach, whose reign of two years was terminated by assassination. The collapse of the ancient Semitic empire immediately followed. For Nebuchadnezzar's inscriptions, consult: Winckler, *Keilinschriftliche Bibliothek*, vol. iii., part 2 (Berlin, 1892), and Ball in the *Proceedings of the Society for Biblical Archæology*, vols. x.-xi. (1888-89). For excavations in Babylon, consult the current *Mittheilungen der deutschen Orient-Gesellschaft*. Also consult Rogers, *History of Babylonia and Assyria*, vol. ii. (New York, 1900).

NEBULA (in Medicine). See LEUCOMA.

NEBULÆ (Lat. nom. pl., clouds, vapors, mists). Patches of luminous matter occurring in considerable numbers in various parts of the sky, and differing from the stars in that they do not present simply small definite points of light, but rather large surfaces of widely varying brilliancy. We have acquired much exact knowledge about the nebulæ, especially in recent years, since the application of photographic processes to astronomical observation; and they have also been made the subject of extensive philosophical theories as to the origin, development, and construction of the universe, of which some are based upon too many hypothetical considerations to receive the unqualified assent of astronomers.

Only two nebulæ are visible to the naked eye: that in Andromeda and the great nebula in Orion. The former consists of an oval mass of light, about three times as long as it is broad, and surrounded with several more or less distinct disconnected oval rings. There is also a central condensation in the middle of the whole mass. The Orion nebula, on the other hand, is of quite irregular shape, contains a number of stars, and is indented with at least one very large non-luminous break known as the 'fish-mouth.' Both these large nebulæ, in the telescopic field of view, cover a space of more than one square degree on the sky's surface. When tested by long-exposure photographs, they are found to be of truly gigantic size. It is now admitted that the entire constellation of Orion is included in the outlying parts of the great nebula. Condensations appear to fasten about the stars of the constellation; and indeed the conclusion seems irresistible that we are looking upon a universe in course of formation out of plastic and gaseous material. Many of the less conspicuous nebulæ are round or oval; often have a stellar central condensation, and sometimes one of a disk-like form with uniform surface luminosity. These are the so-called 'planetary nebulæ.' Then there are 'annular' or ring-shaped nebulæ, and spiral nebulæ. These last look like great whirlpools of matter apparently rotating rapidly and trailing long streamers of light. The very latest researches in photographing nebulæ seem to indicate that the spiral form is in fact the most prevalent one. The application of the spectroscope, and especially the photographic spectroscope, to nebulæ study has proved that many nebulæ are really gaseous in constitution, and not simply aggregations of stars too small and close together to be separated even by our most powerful telescopes. It has also been possible to measure with the spectroscope the velocity with which some of the nebulæ are moving through space in the direction of our solar system; and it is found that nebular velocities are of about the same order of magnitude as those observed in the case of ordinary stars. As to the changes of the shape and form of individual nebulæ we have no decisive evidence. Indeed, the outlines of these objects are so hazy that no reliance can be placed upon ordinary drawings; and even photographs can mislead us, since what we see upon them depends in great measure upon the length of time during which the sensitive plate was exposed to the nebula's light. The number of the nebulæ at present known is not far from 10,000; and the best catalogue of them is by Dreyer, published in the *Memoirs* of the Royal Astronomical Society of London.

As to their distance our knowledge is still in the conjectural stage. No one has yet measured a nebular parallax (see PARALLAX) successfully; but it is extremely probable that their distances, like their velocities of motion, are of the same order of magnitude as the corresponding quantities for the fixed stars.

The theory of cosmic evolution known as the nebular hypothesis of Laplace intends to account for the origin and development of our solar system, beginning with a presupposed mass of formless matter. This mass, assuming a rotation under the influence of natural forces, might be expected to take upon itself the form of a flattened sphere; and if a contraction of its bulk should occur after the lapse of ages of time, certain rings of matter might be left behind, as it were, by the contracting mass. Such rings have indeed a certain analogy in the Andromeda nebula; and their possible formation once granted, there is nothing to prevent the gradual breaking up of a ring under the action of gravitational forces. Its matter might then be gathered into a single ball, and thus would be formed a planet circulating in an orbit around the central condensing mass destined in later ages to form the sun itself. It will be seen that this hypothesis, while plausible, rests upon a basis of imagined possibilities rather than ascertained facts. While, therefore, it is most interesting, it must on no account be reckoned among those astronomical theories (such as gravitation) whose foundation is as strong as that underlying any of the scientific truths coming within the range of human knowledge. See COSMOGONY.

NEBULAR HYPOTHESIS. See COSMOGONY.

NEB'ULY, or **NEBULÉ** (Fr. *nébulé*, from OF. *nebule*, cloud, from Lat. *nebula*, Gk. *νεφέλη*, *nephelē*, Skt. *nabhas*, OChurch Slav. *nebo*, cloud). One of the partition lines in heraldry (q.v.).

NECESSARIES (Lat. *necessarius*, requisite, indispensable, from *necesse*, OLat. *necessum*, indispensable, from *ne*, not + *cessus*, p.p. of *cedere*, to yield). In its technical legal sense, the term denotes such articles as are reasonably suitable or necessary to maintain a person in the station or condition in life which he occupies at the time they are furnished. The origin of the above signification of the term was in the doctrine of the common law that married women, infants, lunatics, or any incompetent persons cannot be held on their contracts; and in order to obviate the harsh effect of this rule, the courts adopted the policy of holding such persons for any articles furnished them which were actually necessary to sustain life. The courts continued the use of the word necessary, but have extended its legal meaning until to-day it is a very elastic term. It is not limited only to food and clothing sufficient to sustain life, but may include articles which might be considered luxuries by persons in some stations in life, according to the circumstances of the case. In order to determine whether an article is a necessary, the character of the article itself, the use for which it was designed, the age, social position, wealth, and previous mode of living of the person to whom it was furnished must be considered. These are questions of fact, and must, therefore, be submitted to a jury. See BANKRUPTCY; CONTRACT; INFANT; LUNATIC; HUSBAND AND WIFE; and consult authorities referred to under CONTRACT, etc.

NECHES, nĕch'ĕz. A river of eastern Texas, rising in Van Zandt County, and flowing southeast into Sabine Lake, whence its waters, with those of the Sabine River, find their way by Sabine Pass into the Gulf of Mexico (Map: Texas, G 4). It is about 350 miles long, and waters a wide and fertile portion of Texas.

NECHO, nē'kō (Egyptian *Nekau*). The second King of the twenty-sixth Egyptian dynasty, called Pharaoh-nechoh in the Bible (II. Kings xxiii. 29 et seq.), and Nechos, Nechaus, etc., by Greek writers. He succeeded Psammetichus I., and reigned from B.C. 610 to 594. On the downfall of the Assyrian Empire, Necho attempted to gain possession of Syria, and, at the outset of his campaign, defeated and slew Josiah, King of Judah, who opposed him at Megiddo. Jehoahaz, the son of Josiah, after a brief reign of three months, was deposed by the Egyptians. Eliakim, who changed his name to Jehoiakim, was made King by Necho in place of Jehoahaz, and Judah was subjected to a tribute of 100 talents of silver and one of gold. Necho conquered Syria as far as the Euphrates, but was completely defeated at Carchemish by the Babylonian Crown Prince, Nebuchadnezzar (B.C. 605), and lost all his conquests. Although unable to cope with the Babylonian Empire, Necho was an active and energetic ruler. He constructed the first canal from the Nile to the Red Sea, a precursor of the modern Suez Canal. The statement of Herodotus that he left it unfinished is incorrect. Necho also built a fleet and sent it, manned by Phœnician sailors, on an exploring expedition around Africa. Consult: Wiedemann, *Geschichte Aegyptens von Psammetich I. bis auf Alexander den Grossen* (Leipzig, 1880); Budge, *A History of Egypt* (New York, 1902).

NECK (AS. *hnecca*, OHG. *hnac*, *nac*, Ger. *Nacken*, neck; probably connected with OIr. *cnocc*, OBret. *cnoch*, hill, elevation). The portion of the anatomy between the head and the shoulders. In the human being there are several muscles that pass from the skull to the thorax, which, together with the œsophagus and the trachea, form the principal bulk of the neck. Through the neck run very important blood-vessels between the brain and the thorax, among these being the carotid arteries and the jugular veins, an incision into either of which usually causes death very promptly. Through the œsophagus the food passes into the stomach, and through the trachea the air passes into the bronchi and thence into the lungs. The principal muscles of the neck are the platysma myoides, the sterno-cleido-mastoid, the infra-hyoid and supra-hyoid, the muscles of the tongue, the muscles of the palate and of the pharynx, and the prevertebral muscles, as well as certain of the muscles of the back which are inserted into the skull; as the trachelo-mastoid, complexus, transversalis cervicis, the rectus group, the longus colli, the three scaleni, and the cervicalis ascendens. Several of these muscles form important triangles, with the aid of the ramus of the jaw, the clavicle, the hyoid bone, and the imaginary centre line of the body. These triangles are of use to the surgeon in locating and describing important structures. For instance, the digastric triangle is bounded by the jaw, above, and on either side by a belly of the digastric muscle, attached (at the apex of the triangle) to the hyoid bone below. Within this triangle are to be found a portion of the facial artery and of the lingual artery; and it is the site chosen for ligating the last-named artery.

In man there is present at the back of the neck a rudiment of an important elastic ligament, which in some of the lower animals serves to sustain the weight of the head. It is called the *ligamentum nuchæ*, and is a yellow elastic ligament, which represents in the neck the supraspinous and inter-spinous ligaments of the vertebræ of the lower part of the spine. It extends from the external occipital protuberance to the spinous process of the seventh cervical vertebra.

NECK'AM, ALEXANDER (1157-1217). An English Latinist, born at Saint Albans, Hertfordshire, foster brother of King Richard I. Neckam studied in Paris, returned to England, and entered an Augustinian monastery at Saint Albans, where he did most of his writing. He wrote, on natural science, a prose essay, *De Naturis Rerum*, and *De Laudibus Divinæ Sapientiæ*, a treatment of the same subject in elegiac verse (both edited by Wright in the "Rolls Series of Chronicles and Memorials," 1863); also forty-two fables. The fables are edited and Neckam's life sketched by Hervieux, *Les fabulistes latins* (3 vols., Paris, 1883-93).

NECKAR, nĕk'kär. One of the principal right affluents of the Rhine. It rises in the Swabian Jura in the southwestern part of Württemberg, near the source of the Danube, flows northward through Württemberg, then west through Baden, and enters the Rhine at Mannheim, 30 miles south of the mouth of the Main (Map: Germany, C 4). It is 247 miles long, and flows for the greater part of its course through a series of lake basins surrounded by vine-clad hills. It is navigable for steamers to Heilbronn, 71 miles, and for smaller vessels to Cannstatt, 116 miles. Heidelberg lies on its banks near its mouth, where the river is flanked by picturesque hills crowned by ruined castles.

NECKER, nâ'kâr', JACQUES (1732-1804). A French statesman and financier. He was born September 30, 1732, at Geneva, where his father was professor of public law. In 1747 Necker went to Paris and entered a banking house, where he served his apprenticeship in finance. In 1762 he established a banking business of his own in Paris and acquired a large fortune during the Seven Years' War. After retiring from business he became the representative of Geneva at the French Court and also a syndic of the French East India Company. He likewise began his career as a writer, and in 1773 gained the prize at the French Academy by his *éloge* on Colbert. He acquired a further reputation by his publications on political economy and finance, particularly his *Essai sur la législation et le commerce des grains* (Paris, 1775). On the removal of Turgot from office in June, 1776, Necker was called to assist in financial affairs, and after the brief administration of Clugny he was made Director-General of Finances in June, 1777. Necker succeeded in restoring to some degree of order the general financial affairs of the country, though mainly by the perilous expedient of borrowing, which he was enabled to do to an almost unlimited extent, owing to the confidence reposed in his financial dexterity. He reformed and systematized the financial administration, made taxation more equitable, and restored public confidence in the Government. This was the most brilliant period of his life, and the *salon* of Madame Necker was the rendezvous for all the brilliant literary and political lights of the day. Necker's Protestantism, however, his extraordinary vanity, and some retrenchments which he had made in the royal household, together with his publication on the financial affairs of France, *Compte rendu au roi* (1781), made him an object of great dislike to both Queen and Court, and on May 12, 1781, he was suddenly dismissed. He retired to Geneva, and while living in retirement on his estate of Coppet he wrote his famous *Administration des finances*, published in 1784. He returned to Paris in 1787, but was soon banished on account of an attack which he published on the financial policy and management of Calonne. In the financial crises which followed upon the administration of Loménie de Brienne, Louis XVI. found himself under the necessity of calling Necker to the office of Director-General of Finances and Minister of State. This was in the summer of 1788, and Necker recommended the calling of the States-General, and thereby acquired his great popularity. When the Court, on June 23, 1789, determined upon nullifying the resolutions of the Third Estate, Necker seemingly objected and the King dismissed him on July 11th, and required him to leave the French dominions. He obeyed, but the disturbances of July 12th, 13th, and 14th, culminating in the storming of the Bastille, were the result of his dismissal, and the King was under the necessity of recalling him. On the rejection by the Constituent Assembly of his scheme of a loan, and the adoption instead of it of Mirabeau's scheme of assignats, he resigned his office in September, 1790, and again retired to Coppet, where he died, April 9, 1804. Necker was able and honest, but he was a business man rather than a statesman. His daughter was the celebrated Madame de Staël (q.v.). A complete edition of Necker's writings, edited by his grandson, August de Staël-Holstein, was published in 15 volumes (1820-21). Consult also: Mme. de Staël, *La vie privée de M. Necker* (Paris, 1804); Nourrisson, *Trois révolutionnaires: Turgot, Necker et Bailly* (2d ed., ib., 1886); Gomel, *Les causes financières de la révolution française: les ministères de Turgot et de Necker* (ib., 1892); Hermann, *Zur Geschichte der Familie Necker* (Berlin, 1886).

NECKER, SUZANNE (CURCHOD) (1739-94). The wife of Jacques Necker (q.v.), born at Crassier in the Swiss Canton of Vaud. Her father, a Protestant minister, gave her an excellent education. She was at one time engaged to Gibbon, the historian, but after her father's death she went to Paris, and there met Necker, then a wealthy banker, who married her in 1764. Under her influence, Necker entered public life, and became the Finance Minister of Louis XVI. She herself founded a hospital in Paris, which still bears her name, and she wrote a number of books, including: *Réflexions sur le divorce* (1794); *Des inhumations précipitées* (1790); and five volumes of miscellanies, which appeared after her death (1798 and 1802). Consult: D'Arvor, *Madame Necker, 1737-94* (Paris, 1897); and D'Haussonville, *Le salon de Madame Necker* (Paris, 1882).

NECKER DE SAUSSURE, de sō'sụr', ADRIENNE ALBERTINE (1766-1841). A French author, born in Geneva. She was the daughter of the naturalist Saussure, and married Jacques Necker the botanist, and nephew of the French statesman of the same name. Her cousin, Mme. de Staël, was credited with the translation (1814) of Schlegel's *Vorlesungen über dramatische Kunst und Litteratur* (1809-11), now known to have been written by Mme. Necker herself. The book on which her reputation rests is *L'éducation progressive, ou étude sur le cours de la vie* (1828-32), for which the Academy gave her the Montyon Prize in 1832. It is a pedagogical work, treating of the importance of child-training, in the preparation for after life.

NECK-MOLDING. A molding at the junction of the capital and shaft of a column. It is also called *neck* or *necking*, as in the case of the plain space between the astragal of the shaft and the moldings of the cap of the Doric order.

NEC'ROMAN'CY (Lat. *necromantia*, from Gk. **νεκρομαντεία**, *nekromanteia*, from **νεκρός**, *nekros*, corpse + **μαντεία**, *manteia*, divination). A method of divination by which the dead were supposed to be conjured up and to answer questions concerning the future. Its practice was certainly extremely ancient. It was condemned in the Old Testament, and among the Greeks it was familiar in Homer's day. In historical days necromancy was practiced by priests or consecrated persons at many shrines in Greece. It was also current among the Romans, although banned by the Church under Constantine. It was also employed by the northern peoples, and in the mediæval and later period passed over into sorcery. See SPIRITUALISM.

NECROP'OLIS (Neo-Lat., from Gk. **νεκρόπολις**, *nekropolis*, cemetery, from **νεκρός**, *nekros*, corpse + **πόλις**, *polis*, city). A term originally applied to the cemeteries in the vicinity of ancient cities, and in particular to a suburb of Alexandria largely devoted to the reception and embalming of the dead. The term necropolis is now, however, used in a much more extended sense, and applied to any extensive burial-region of ancient date. The most remarkable of these are in Egypt, where they extend for miles along the left bank of the Nile. The Pyramids are the most conspicuous features of the Ghizeh necropolis; the 'Valley of the Kings,' near Thebes, the necropolis of El-Kab, and those of Beni Hassan and Abydos are other examples. In Africa the extensive necropolis of Cyrene; in Italy the ancient Etruscan tomb-groups of Vulci, Tarquinii, and Capua, distinguished for their painted tombs; the remarkable necropolises of Myra and Antiphellus in Lycia, and that of Petra in Syria are among the important examples belonging to classical antiquity. The extraordinary collection of domed and minareted tombs and sepulchral mosques in Cairo, known as the Karafah (tombs of the Khalifs), and dating from the twelth to the fifteenth century, is often and justly called a necropolis; but the term is seldom applied to either mediæval or modern cemeteries. The burial places of antiquity have been especially important sources of archæological discovery, owing to the universal custom in early ages of burying, with the deceased, utensils, arms, money, and jewelry, for his use in the nether world.

NECRO'SIS (Lat., from Gk. **νέκρωσις**, *nekrōsis*, a killing, deadness, from **νεκροῦν**, *nekroun*, to kill, from **νεκρός**, *nekros*, corpse). A term employed to denote the absolute death of a circumscribed portion of any tissue. Specifically, in surgery, it is applied to the death of a bone, wholly or in part. The dead portion separates from the surrounding healthy tissue by an inflammatory process, the cast-off part being known as the *sequestrum*, and the boundary between the living and dead tissue as the *line of demarcation*. Bony necrosis is due usually to direct injuries, inflammations, and infections, which attack either the periosteum (the membrane covering the bone) or the marrow, the immediate cause being interference with the circulation and nutrition. Necrosis of the soft parts is termed gangrene, and the dead portion, known as the *slough* or *sphacelus*, separates in the same way as in bone, by a line of demarcation. See GANGRENE.

NECTAN'EBO, or **NECTAN'EBUS.** The name of two kings of Egypt. NECTANEBO I. (Egyptian *Nakht-Hor-hebt*), the Νεκτανέβης (*Nektanebēs*) of Manetho, was the first King of the Thirtieth Dynasty, and reigned from B.C. 382 to 364. The native monuments give little historical information in regard to his reign, but the accounts of Greek writers, especially Diodorus, show that he was a capable and energetic monarch. In the earlier part of his reign he supported Evagoras, King of Cyprus, against the Persians, and when the latter invaded Egypt, succeeded in repelling them, aided by an inundation of the Nile. Nectanebo endeavored to restore the old sanctuaries of the land, and he built or restored temples in many parts of Egypt. His stone sarcophagus, inscribed with religious texts, is in the British Museum. He was succeeded by TEHER or TACHUS, after whom NECTAN-

EBO II. (Egyptian *Nakht-nebof*), the Νεκτανεβῶς (*Nectanebos*) of Manetho, reigned from B.C. 361 to 343. He was a great builder. For a long time he repulsed the attempts of the Persians to conquer Egypt, but they finally made themselves masters of the Delta, and Nectanebo fled to Ethiopia. He was the last native King of Egypt. After his flight, Egypt was subject to Persian rule until B.C. 332, when it came into the possession of Alexander the Great. Consult: Wiedemann, *Geschichte Aegyptens von Psammetich I. bis auf Alexander den Grossen* (Leipzig, 1880); Budge, *A History of Egypt* (New York, 1902).

NECTAR (Lat., from Gk. *νέκταρ, nektar*). In Greek mythology, the drink of the gods, as ambrosia is their food. In the *Iliad* only nectar is mentioned as the nourishment of the gods, and originally both words seem to have been used without distinction. Consult Roscher, *Nektar und Ambrosia* (Leipzig, 1883), though his identification of them with honey is open to grave doubts.

NECTAR. The sweet secretion formed by glands located on various parts of a plant, but especially in the flower. Sometimes it is called honey, but honey is nectar after partial digestion in the crop of insects, such as bees or wasps. See NECTARY; GLAND.

NECTARINE. A smooth-skinned stone fruit. See PEACH and Colored Plate of DRUPES.

NECTARY. A surface gland which secretes nectar (q.v.). The name is also applied to abortive floral organs (see below). Nectaries are most common in the flowers of seed plants, but are found also in regions remote from the flower (Fig. 1). Extra-floral nectaries are found on the leafstalks and at the base of the leaf-blade, upon stipules and other portions of the leaf-base, and more rarely upon the blade itself.

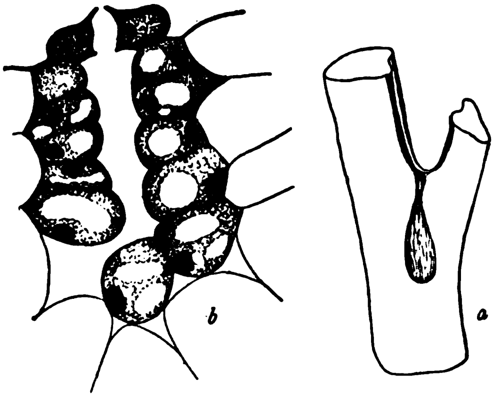


FIG. 1. EXTRA-FLORAL NECTARY OF THE BRACKEN FERN.
a, diagram showing location of gland in the axil of a leaflet; *b*, section showing the secreting cells beneath a stoma. (After Lloyd.)

The forms of nectaries are very various. The secreting surface frequently covers a more or less pronounced swelling or cushion of tissue, which may develop on the base of the flower leaves, or on the axis of the flower between them. Sometimes a nectary stands in the place where in other related flowers well-formed and functional floral organs stand. This fact has led to the application of the term nectary to abortive floral organs even when they do not secrete nectar. Sometimes the nectar gland forms a continuous ring about the base of the pistil. In other cases the nectar gland lines the concave surface of depressions in the floral organs or the floral axis. When these pits deepen they constitute efficient receptacles for the secreted nectar. Thus, spurred petals and sepals are often furnished with nectar glands on the inner side or at the base of the spur, and the whole cavity may become filled with their secretion. Nectar glands sometimes line deep and narrow pits of small capacity, opening at the surface by a pore or cleft from which the nectar oozes. These passages may be branched, so that a complex gland is formed, such as is found in the pistils of some lilies (Fig. 2).

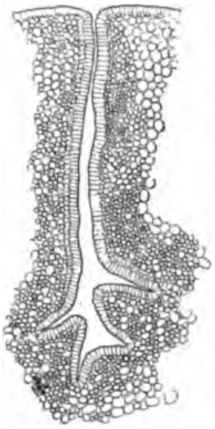


FIG. 2. SEPTAL NECTARY FROM FRUIT OF DAY-LILY.
The columnar cells lining the tube are the secreting cells.

Nectar varies greatly in composition in different plants. The greater part of it is water, which is withdrawn from the gland cells by the osmotic action of the sugar. (See SECRETION.) In addition to sugars (glucose and saccharose) small amounts of proteids and various other carbon compounds give the peculiar odor and flavor to the nectar. Nectar is eaten by bees, wasps, butterflies, and other insects, which in their search for it are utilized as unconscious carriers of pollen. See POLLINATION.

NEDJED, nĕj″d, or **NEJD.** A region of Arabia, lying between latitudes 24° and 27° N., and bounded by El-Hasa on the east and Hedjaz on the west (Map: Asia, D 6). It has a hilly surface, intersected by many streams, which dry up during the summer. The climate is healthful. Politically Nedjed is a dependency of Jebel-Shammar. The inhabitants are Wahabis.

NEEDFIRE. In folk-custom, a fire kindled by the friction of two sticks of wood or of a rope on a wooden stake to ward off demons of disease. Among the many customs and beliefs connected with fire one of the most important is that of ritual purification. This idea arose at an early stage of man's acquaintance with fire from a simple observation of the effects of flame, the most mysterious phenomenon which he knew. Later, fire was differentiated into a number of varieties partly good and partly evil with regard to position and use, thus implying that all flame was not equal in efficacy. Still further it was thought that by age or contamination fire became ineffective and must be renewed, hence the kindling of new fire, which was an accompaniment of widely diffused cults, as that of Thor in Scandinavia and of nature gods in ancient Mexico. The new fire is supposed to regenerate, as fire sacrifice is designed to sustain, the invisible beings. Needfire is a practice usually of shepherd peoples to ward off disease attacking the flocks. In historic times the sparks for kindling the needfire were sometimes obtained by twirling a wooden peg around in a wooden post. As in the case of new fire, the needfire was almost always accompanied with the extinguishing of the fires of the locality and the neighbors also rekindled their fires from it as in the new fire ceremony. In practice the people passed or the herds were driven through or between the flames of the needfire for purification. The needfire custom survived well into the nineteenth century, and it is probable that traces of it still exist in parts of Europe.

NEED'HAM, John Turberville (1713-81). An English naturalist, born in London. He studied at Douai, and was ordained to the priesthood in 1738. In 1769 he became director of the Academy of Sciences of Brussels. Needham was a friend of Buffon, and in his time well known as a scientist. His great 'discovery' was that all life proceeds from vegetation; it is contained in his *Observations upon the General Composition and Decomposition of Animal and Vegetable Substances* (1749), and *Nouvelles observations microscopiques* (1750).

NEEDHAM, or **NEDHAM,** Marchamont (1620-78). An English journalist and pamphleteer, born at Burford, Oxfordshire. He was educated at All Souls' College, Oxford, and after studying medicine and law turned to journalism, and founded in 1643 the *Mercurius Britannicus* (*sic*), to which he was frequently the sole contributor. The boldness of his scurrilous attacks upon Charles I. led to his incarceration in the Fleet Prison in 1645 and in 1646, but the following year he became a Royalist himself and began the publication of *Mercurius Pragmaticus*, wherein he defended the King and turned his venomous pen against the Scots and Oliver Cromwell. Afterwards he rejoined the popular party, and signalized his conversion by the publication of *The Case of the Commonwealth of England Stated* (1650). After the Protector's death he went to Holland and continued the publication of his abusive pamphlets, such as *A Short History of the English Rebellion, Completed in Verse* (1661), and *Christianissimus Christianandus; or, Reasons for the Reduction of France to a More Christian State in Europe* (1678).

NEEDLE (AS. *nædl*, Goth. *nēala*, OHG. *nādela*, *nādla*, Ger. *Nadel*, from OHG. *nājan*, Ger. *nähen*, to sew; ultimately connected with OIr. *snāthad*, thread, AS. *snear*, Eng. *snare*, Lat. *nere*. Gk. *νεῖν neein*, to sew). An instrument of metal, or other material, used to carry the thread in sewing, embroidering, knitting, netting, and other similar operations. Needles are generally made of metal, but bone, ivory, and wood are also used; for ordinary needlework, called sewing, they are made of fine steel, and are too well known to need description; for other kinds of work they are often much larger and differently formed. The earliest needles were not pierced, but were like awls, and were used for making holes in skins, through which the long roots of plants or leather thongs were passed. Later, a hole was bored in one end of the stone or bronze needle through which the root or thong was passed and this was dragged through the leather as it was punched. Stone needles, with a hole in the end opposite the point, are found in the remains of the Stone Age. Bone needles with eyes are found in the reindeer caves of France and lake dwellings of Central Europe. The needles that have come down to us from ancient Egypt are very coarse, but finer needles must have been made to execute the delicate embroidery that was produced by that people. The ancient Greeks must have been skilled in needlework, judging from the descriptions of embroidery in Homer. Ordinary needles and surgeons' needles have been found in the ruins of Pompeii.

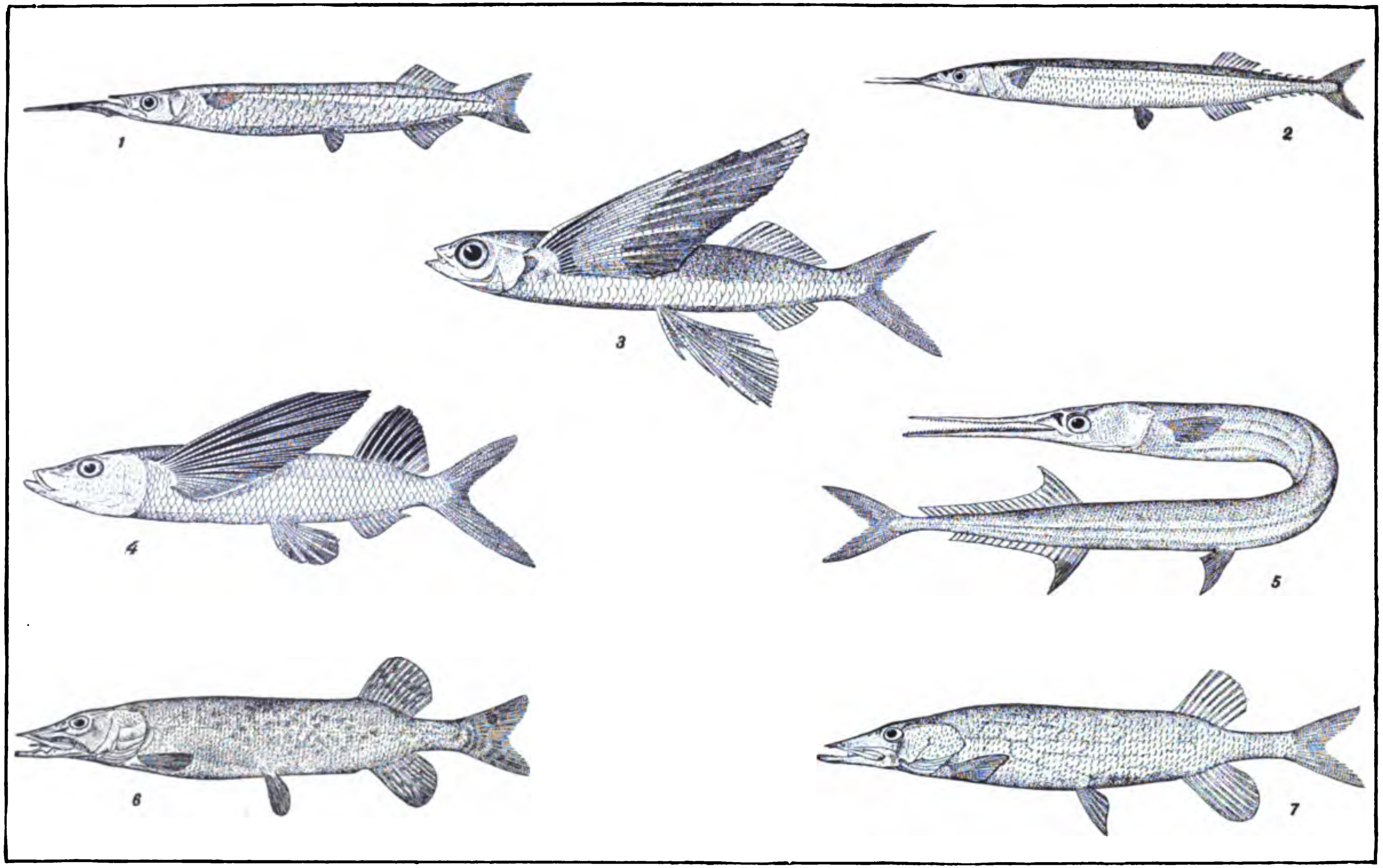
The Chinese are believed to have been the first to use needles of steel, and these implements gradually found their way westward until they were brought into Europe by the Moors. By 1370 the needle-making industry was established in Nuremberg. In England it was not until the reign of Queen Elizabeth that their manufacture was taken up on any considerable scale in small shops, and after 1650 it gradually developed until the greater part of the hand-sewing needles are now made in England. Subsequent developments included the introduction of the needle with the eye and the gradual development of machines for their manufacture. The first drill-eyed needles were made in 1826.

Needle-making is an important industrial art, and it has attained to extraordinary perfection. The first operation, after the wire has been selected and its thickness accurately gauged, is to cut it into eight-foot lengths; this is done by winding it in a coil of sixteen feet circumference, and then cutting this coil into exact halves with powerful cutting shears. The coiling of the wire is so managed that there are 100 pieces in each half when cut; the bundles of 100 wires are again cut into the necessary lengths for two needles. The pieces cut from a coil, although now reduced to the length of two small needles, are nevertheless somewhat curved; they are therefore collected into bundles and placed in two iron rings, which hold them loosely together; they are then slightly softened by firing, and are laid on an iron plate or bench, and are pressed with a small curved bar in two or three positions, by which the operator manages to make them all perfectly straight. The blanks after being removed from a hopper in regular succession are next pointed at both ends by a grindstone to whose face they are held by a rubber band.

The eyes are next punched by means of dies. (See Dies and Die-Sinking.) The blanks or double needles are now placed on two wires and the two sets broken apart to form separate needles. The roughly formed needles still have to be polished, tempered, and have the heads ground into shape, operations which are mechanically performed.

Besides the ordinary sewing needle already described and other hand needles—such as those used in sail-making, leather work, upholstery, and surgery—many forms of sewing-machine needles are manufactured. The most familiar of these is the needle used in the domestic sewing machine, with the point in the eye and grooves on each side to protect the thread from being worn or cut in passing through the fabric. The latched needles used in stocking machinery are very delicate pieces of mechanism, as the latch is held by a rivet about $\frac{1}{100}$ inch in diameter between walls which are no thicker. For leather-sewing machines the needles must be adapted for use with waxed thread, and often are made with a hook at the end, instead of a hole; while the welting-machine needle, for sewing welts in boots and shoes, is the shape of a segment of a circle.

NEEDLE-FISH, PIKES, ETC.



1. HALFBEAK (Hyporhamphus unifasciatus).
2. SAURY (Scomberesox saurus).
3. FLYING FISH (Exocœtus volitans).
4. SHARP-NOSED FLYING FISH (Fodiator acutus).
5. NEEDLE-FISH or HOUNDFISH (Tylosurus acus).
6. PIKE (Esox lucius).
7. POND PICKEREL (Esox reticulatus).

Hand needles are largely made in Germany and England. Aix-la-Chapelle is the centre of the industry in Germany, and it is said that the factories of that city alone produce 50,000,000 weekly.

Needles for use in various machines are made in the United States, especially those for the ordinary domestic sewing machine. At first these needles were made by processes similar to those employed for making ordinary hand-sewing needles, but gradually special machinery has been invented for their manufacture. The process is essentially as follows: The wire is cut into a blank, which is then reduced and pointed, grooved, has its eye punched, is hardened and tempered, hard burr dressed, brass brushed, has its eye polished, undergoes a first inspection, is hard straightened, and then receives the final pointing. In one method of making sewing-machine needles by machinery the crucible steel wire from which the needle is formed is first straightened and then fed into a machine which makes the large end of the needle and cuts off the blanks of the lengths required. These blanks after being ground and polished with emery wheels and an emery belt pass from a hopper on to a grooved endless traveling carrier, where the shank of the needle is formed by the grinding action of an emery wheel. By successive wheels the needles are ground and pointed and then grooves are cut by steel saws and the eyes punched. They are then heated and hardened and cleaned first by emery and then by wire brushes and burnishing powder applied from a bristle brush. The final pointing is done on a fine emery wheel and the last polishing is accomplished with crocus and alcohol. A second method differs from that just described in that the steel wire is cut into blanks of about one-third the length of the finished needle. After a thorough cleaning these blanks are fed from a hopper into a machine where they are acted upon by steel dies which compress and extend the blank. This process is known as swaging and produces needles which vary slightly in length. This defect, however, is remedied by the action of a clipping and straightening machine which reduces the needles to a uniform size.

Statistics. According to the *United States Statistical Abstract* for 1900 the value of the needles imported into the United States is as follows: 1891, $314,033; 1892, $337,272; 1893, $369,465; 1894, $278,101; 1895, $291,026; 1896, $312,298; 1897, $309,754; 1898, $362,606; 1899, $407,746; 1900, $367,568. According to the Twelfth United States Census, 1,120,532 gross of needles were manufactured in the United States in 1900. The total value of this product is given as $1,027,949, which is distributed as follows: Latch knitting-machine needles, 276,141 gross, valued at $414,504; common household sewing-machine needles, 324,476 gross, valued at $399,252; wax-thread sewing-machine needles, 212,649 gross, at $99,533; knitting spring needles, 307,266 gross, at $114,660. In addition, about 277,000 gross of needles, valued at $327,000, are annually produced incidentally in factories not specially engaged in their manufacture in connection with other industries. It will be noticed that this list does not include common hand sewing and darning needles, crochet, tape, and hand-knitting needles, and it appears that none of these varieties were included in the 1900 census returns of manufactures in the United States. Consult article on "Needles and Pins," in *Twelfth Census of U. S.*, vol. x., Manufactures, part iv. (Washington, 1902).

NEEDLEFISH (so called from the shape of the snout). A gar-like fish of the synentognathous family Esocidæ, and especially of the genus Tylosurus. They are slim, long-jawed, voracious, carnivorous fishes found in all warm seas, and sometimes entering rivers. Their habits are ordinarily much like those of a pike. (See Plate of Needlefish, Pikes, etc.) Their flesh is good. Some species are numerous on the South Atlantic and Gulf coasts, where they are confounded with the true gars, under the names 'garfish' and 'billfish' (especially *Tylosurus marinus*), and are also called 'aguja' (q.v.), 'long-jaws,' 'houndfish,' and 'guardfish.' Consult Jordan and Fordice, *Proceedings of the United States National Museum* for 1886.

NEEDLE GUN. See Small Arms.

NEEF, nāf, or **NEEFS**, nāfs, Pieter, the Elder (c.1580-c.1661). A Dutch architectural painter. He was born at Antwerp, and was there a pupil of Hendrick van Steenwyck. His numerous architectural paintings usually represent church interiors illuminated with the glow of torches or of candles. His treatment was delicate, refined, and extraordinarily clear; he understood the harmonious modulation of colors and the power of chiaroscuro, but he generally intrusted the painting of the figures introduced into his pictures to Teniers, Franks, Breughel, and Van Thulden. His works are to be found in the galleries of Dresden, Vienna, Paris, and Gotha.

NEELE, nēl, Henry (1798-1828). An English writer, born in London. He was admitted to the bar, and practiced as a solicitor. From the successful appearance of his *Odes and Other Poems* (1817), printed during his clerkship, he was a busy contributor to various journals and the annuals. In 1827 he gave first at the Russell Institution, and later at the Western Literary Institution, his *Lectures on English Poetry*, extending from Chaucer to Cowper. His most important publication was the *Romance of English History* (3 vols., 1827), a collection of stories based on occurrences in each reign from the Conquest to the Reformation, marred by a stilted style and historical inaccuracies. In the same year his poems were gathered in a two-volume edition. His verse has no higher qualities than spontaneity and ease. His stories, at their best, are marked by considerable imaginative skill. His *Literary Remains*, including the *Lectures*, appeared posthumously (1829), with a memoir. The *Winter Nights* (London, 1820) of Nathan Drake contains (No. xiii., vol. ii.) "Critical Observations" on the *Odes and Other Poems*, associating Neele with Chatterton and Kirke White.

NEENAH, nē′nȧ. A city in Winnebago County, Wis., 14 miles north of Oshkosh, the county-seat; on the Fox River, at the outlet of Lake Winnebago, and on the Chicago and Northwestern, the Chicago, Milwaukee and Saint Paul, and the Wisconsin Central railroads (Map: Wisconsin, E 4). It is an attractive summer resort, well known for its fishing, and has a public library, a handsome opera house, and several public parks, the most notable being Riverside Park. The river, which affords fine water power, divides, as it leaves the lake, into two streams, inclosing a large island, half of which belongs to Neenah and half to Menasha, the two cities forming practically one industrial community. Manufacturing enterprises are well developed and include paper, lumber, and flour mills, stove works, foundries and machine shops, brick works, a boot and shoe factory, etc. Settled in 1846, Neenah was incorporated in 1850 as a village, and in 1873 was chartered as a city. The government, under a charter of 1883, is administered by a mayor, chosen every two years, and a unicameral council. The municipality owns and operates the water-works. Population, in 1890, 5083; in 1900, 5954.

NEER, nār, Aart van der (1603-77). A Dutch landscape painter, born at Amsterdam. He was a friend of Albert Cuyp, who occasionally supplied the figures and animals in his pictures, which were for the most part moonlight scenes, depicted with a prevailing warm tone. At times he represented the same scenes, usually towns or groups of cottages on the banks of a canal or river, under the effect of sunlight. Fine specimens of this kind are in the National Gallery, London, in the Louvre, and in the Metropolitan Museum, New York. Three remarkable examples of his conflagration effects, which he depicted with great truth, are in the Berlin Museum, which, besides four other examples of his work, contains one of his most effective moonlight pieces. Among the best of the latter variety are two in the Dresden Gallery and one in the Vienna Museum. The warmth and glow of his coloring extend even to his winter landscapes, which may be seen to best advantage in the museums of Amsterdam and Brunswick. He died at Amsterdam, November 9, 1677.

His son, Eglon Hendrik van der Neer (1643-1703), a genre and landscape painter, was born at Amsterdam. He was at first instructed by his father, who, on his showing preference for figure painting, placed him under Jakob van Loo. From 1663 on he spent about three years in France, then lived successively in Rotterdam, Amsterdam, and Brussels, and in 1687 became Court painter to the Elector Palatine at Düsseldorf, where he died on May 3, 1703. His favorite subjects were single figures, especially ladies in elegant attire, engaged in domestic occupations, in the manner of Terborch and Netscher, with whom the fine taste shown in his compositions, and pervading all details, entitles him to be ranked. A harmonious example of this kind is a "Lady Tuning Her Lute" (1678), in the Pinakothek at Munich. Similar pictures are in the Rotterdam Museum (dated 1669), and in the galleries at Karlsruhe (1677) and Dresden. Occasionally he painted, but less successfully, biblical subjects, such as "Tobias with the Angel" (1690), in the Amsterdam Museum, and later also landscapes, taking Elsheimer for his model. Two examples of these (dated 1697) are in the Uffizi Gallery at Florence, which also contains the artist's portrait (1696).

NEERWINDEN, nâr'vĭn'den. A village of Belgium, in the Province of Liège, five miles southeast of Tirlemont, celebrated in history for the great victory gained by the French under the Duke of Luxembourg over the English and Dutch under William III. (July 29, 1693). It was also the scene of the defeat of the French under Dumouriez by the Allies under the Prince of Coburg (March 18, 1793).

NEESIMA, nĕ'shĭ-mȧ, Joseph Hardy (1845-90). A Japanese educator, born in Yedo, of a good *samurai* family. He received an excellent education and went to Boston, where he found a patron in Alpheus Hardy. He graduated at Amherst College and at Andover Theological Seminary. Returning home in 1874, with funds obtained from friends of the American Board of Foreign Missions, he succeeded in carrying out his educational plans. His college in Kioto, the Doshisha, became the largest and best equipped Christian institution in the Empire.

NEES VON ESENBECK, nās fôn ā'zen-bĕk, Christian Gottfried (1776-1858). A German botanist and naturalist. He was born at Erbach in the Odenwald; studied medicine at Jena, and in 1818 became professor of botany at the University of Erlangen. He subsequently was professor of botany at Bonn, and in 1830 accepted the posts of professor of botany and director of the botanic garden at Breslau. In 1848 he went to Berlin and took an active interest in the agitations of that and the following year. His deposition from the chair of botany in 1852 was the consequence of his political activity. In his *Handbook of Botany* (1821), he developed the theory advanced by Goethe in his *Metamorphose der Pflanzen*, that all the parts of the flower are only variations of the leaf. This work had been preceded by *Die Algen des süssen Wassers* (1814); by *Das System der Pilze und Schwämme* (1816); and by *Substanz der Pflanzen* (1819), in which he was assisted by Rothe and Bischof. He published, in 1833, *Genera et Species Asterearum;* in 1836, *Systema Laurinarum;* and in 1841, *Floræ Africæ Australiaris Illustrationes Monographicæ*. In 1852 appeared the first volume of *Die allgemeine Formenlehre der Natur*. He was a specialist on cryptogamous plants, and in this branch of botany his chief work is *Naturgeschichte der europäischen Lebermoose* (1833-38).

NE EXEAT (Lat., let him not go out). A writ or order issued by a court of equity, directed to a sheriff and commanding him to arrest the defendant in an action and detain him until he furnishes a certain bail, on condition that he will not leave the jurisdiction without permission of the court. About the time of Queen Elizabeth, this writ came to be employed by the Court of Chancery to restrain a person who was under some equitable obligation to another from leaving the country. This practice became common in England, and was adopted into equity or chancery practice in the United States, where it still obtains in many States.

This equitable remedy of *ne exeat* corresponds in its purposes to the legal process of arrest and bail in civil cases, and has been abolished by some modern codes of procedure, as in New York, and the legal remedy substituted in its stead. See Arrest; Bail; Equity. Consult the authorities referred to under Equity; Procedure; Writ.

NEF, John Ulric (1862—). An American chemist, born at Herisau (Appenzell), Switzerland. He graduated at Harvard University in 1884, held a fellowship there in 1884-87, studied also at Munich (Ph.D., 1886), and in 1887-89 was professor of chemistry in Purdue University (Lafayette, Ind.). In 1889-92 he was assistant professor of chemistry and acting director of the chemical laboratory in Clark University (Worcester, Mass.), in 1892-96 was professor of chemistry in the University of Chicago, and in 1896 became head of the department of chemistry in that institution.

NEGAPATAM, nĕg′*a*-p*a*-tăm′. A seaport city on the Coromandel coast, in the district of Tanjore, Madras, British India, and the terminus of a branch line from Tanjore, 48 miles to the west (Map: India, D 6). It has regular steamer communication with Ceylon, Burma, and the Straits Settlements, and carries on an active trade exporting rice and paddy, and importing cotton goods and betel nuts. The extraction of oil from cocoanuts and oil seeds is an important industry. The extensive building and repairing plant of the Great Southern Railway of India is located here. Negapatam was one of the earliest Portuguese settlements on the Coromandel coast; it was taken by the Dutch in 1660, and was the capital of their Indian possessions until captured by the English in 1781. Population, in 1891, 59,221; in 1901, 57,190.

NEGATIVE (from Lat. *negativus*, negative, from *negare*, to deny, from *nec*, not + *aiere*, Skt. *ah*, to say, Gk. ἠμί, *ēmi*, I say). A photographic picture in which the lights and shades of the object are reversed. A negative is usually produced in a camera by the action of light upon the sensitized surface of a glass plate, celluloid film, or paper. (See PHOTOGRAPHY.) When the plate is developed, the portions most affected by the light receive the densest deposits, and are rendered nearly if not quite opaque, while the portions corresponding to the shadows appear transparent. A good negative should show the gradations of light and shade, and should be distinct in all its detail. The presence of as many tones, or values of light and shade, as possible, is desired, while at the same time the high lights and shadows must be marked. The production of a good negative, outside of questions of the preparation of the plate or film, depends chiefly upon a proper length of exposure and successful development. A negative is used for making positives by contact printing or with an enlarging or copying camera. For contact printing the negative is placed film side upward in a printing frame, and on it is laid a sheet of sensitized paper with its coating next to the film. The printing frame is then exposed to the light and the rays passing through the clear or transparent portions of the negative affect the paper beneath, while those portions beneath the dark or opaque parts of the negative are protected and remain white. In this way a large number of positives or correct reproductions can be obtained from one negative.

NEGATIVE QUANTITY. The inverse operations of mathematics, such as subtraction, division, and evolution, often lead to results which cannot be expressed in terms of the same unit as the numbers entering the operation. The interpretation of these results leads to the so-called artificial numbers, and in the particular case of subtraction to the notion of negative number. For example, \$2 — \$3 is impossible if the result is to be expressed in terms of the positive unit \$1, but, since the result of subtraction is the number which added to the subtrahend will produce the minuend, it is easy to see that the number which added to \$3 will make \$2 must be equivalent to the number which subtracted from \$3 will make \$2. In other words, instead of subtracting \$1 from \$3 to reduce it to \$2, a number must be added which will produce the same result. Such a number is called a negative number and is designated by the sign — placed before it. Hence \$2 — \$3 = — \$1. This notion of negative number as the opposite of positive number, and apparently growing out of an arbitrary interpretation of a mathematical process, has its counterpart in concrete magnitudes opposed in function or extent. For example, in the above case, if a man's assets are \$2 and his debts \$3, the number expressing his financial status is \$1 of indebtedness, which may be expressed by — \$1. Similarly, time A.D. is often expressed by positive numbers, and time B.C. by negative numbers. In astronomy north latitude is expressed by positive numbers and south latitude by negative numbers; west longitude is designated as positive and east longitude as negative. Such extensions of the meaning of signs and modes of operation are the natural outgrowths of a constantly progressive science. The introduction of the negative number doubles the number space of arithmetic by adding an infinite series of numbers opposite in meaning and having a 1 to 1 correspondence (see CORRESPONDENCE) with the series of positive numbers.

The negative quantity enters geometry through the phases of motion and direction. For example, the segments AB, BC, and CD, of a horizontal straight line AD thought of as extending to the right are considered positive, but the segments DC, CB, and BA thought of as extending to the left are considered negative. Similarly, many writers regard all angles generated by a line revolving counter-clockwise about a point as positive and those generated by a clockwise motion as negative. The introduction of negative quantities into geometry, especially in connection with the theory of continuity (see CONTINUITY), has greatly increased the power and scope of the subject.

The meaning of negative quantities as employed in the physical sciences may be illustrated from elementary mechanics. A material point confined to a horizontal straight line may move to the right, remain stationary, or move to the left. The first condition may be expressed by a positive velocity toward the right, the second by a zero velocity, and the third by a negative velocity.

By analogy to mathematical usage, the positive and negative notation is sometimes applied to quantities measured by scales like those of the ordinary thermometers, on which an arbitrary point is denoted as the zero-point and all degrees below zero are denoted by negative numbers. Such conventional notations are convenient, but not always well founded. Thus, the temperature — 1° C. is not the physical opposite of + 1° C.; the two temperatures would be the physical opposites of each other only if 0° C. represented a state in which bodies would have no heat at all, and if it were possible that a body should have less than no heat. On the other hand, in the case of physical magnitudes whose character, like that of electricity, may be dual, the positive and negative notation has again a definite natural meaning.

Negative quantities have been thoroughly understood only within recent times. Although Hero of Alexandria in his *Stereometrica* considered the expression $\sqrt{81-144}$ as possible, the result is recorded as $8-1/16$, which shows that negative quantities were not understood by the Greeks. The Hindus were more successful, for Aryabhatta, c.530, distinguished between *dhana* (assets), positive quantities, and *kshaya* (liabilities), negative numbers. Bhaskara, c.1150, was aware that a square root can be both positive and negative, and that $\sqrt{-a}$ does not exist for the ordinary number-system. Al-Khuwarizmi, c.830, a celebrated mathematician under the Arab supremacy, obtained two roots for the quadratic equation, but the negative roots were rejected as not valid. Among the early European mathematicians, Fibonacci (1202) went no further than the Arabs. Paccioli (1494) definitely stated the rule, *minus times minus always gives plus;* but this fact was known to the Arabs and Hindus, Bhaskara, for example, having stated that the square of a negative number is always positive. Cardan (1545) recognized negative roots, but called them *æstimationes falsæ* or *fictæ.* Stifel (1544) called negative numbers *numeri absurdi,* and Harriot (1631) was the first to consider such a number capable of forming a member of an equation. Vieta (1591) distinguished between positive and negative numbers, and Descartes (1637) in his geometry used the same letter for both positive and negative quantities.

NEGAUNEE, nē-gạ'nē. A city in Marquette County, Mich., three miles east of Ishpeming; on the Chicago and Northwestern and the Duluth, South Shore and Atlantic railroads (Map: Michigan, F 2). It is in the great iron region of the State, on a ridge called the 'iron mountain,' at an elevation of about 1400 feet, and has several productive iron mines within the municipal limits. Settled about 1870, Negaunee was incorporated in 1873, the charter of that year, as revised, now operating to provide for a mayor, annually elected, and a unicameral council. The water-works and electric light plant are owned and operated by the city. Population, in 1890, 6078; in 1900, 6935.

NEGLIGENCE (Lat. *negligentia,* from *negligens,* pres. part. of *negligere, neglegere,* to neglect, from *nec,* not + *legere,* to gather). The omission to do something which a reasonable man guided by those considerations which ordinarily regulate the conduct of human affairs would do, or doing something which such a prudent and reasonable man would not do. Such is a judicial definition of the term, which is quoted by legal writers and judges more frequently than any other. It assumes, what is often expressly stated in other definitions, that the thing omitted or done was in violation of a legal duty, and resulted in legal damage to the one to whom the duty was owed. The three elements to be considered, then, are: (1) proper care; (2) legal duty; (3) legal harm.

PROPER CARE. It will be observed that the standard of care recognized by the definition is that which a reasonable man would exercise in a given situation. Whether such care has been taken or not is generally a question of fact for the jury. It is true that if the evidence is not conflicting—if the story of the plaintiff is the same as that of the defendant, and if, in the opinion of the court, reasonable men would draw but one inference from the evidence—the question of negligence will be decided by the court. Hence a court often nonsuits a plaintiff on the ground that his own evidence shows that the harm of which he complains was not caused by any negligent act or omission of the defendant. As a rule, however, the jury are to determine whether the defendant's conduct was reasonably prudent or not. At the same time, the court is bound to explain to the jury the legal rules bearing upon the subject, of which the most important are these:

When a person undertakes the performance of a task which requires special skill, the failure to do all that any skillful person could reasonably be expected to do in such a case, considering all the circumstances, will amount to actionable negligence. If an ordinary mechanic undertakes to clean or repair a watch, he is bound to do the work with the skill and care of the ordinary watch cleaner or repairer.

The law does not presume negligence on the part of any one, and throws upon him who alleges that another has been negligent the burden of proving it. Accordingly, a person who has been injured by a runaway horse, or whose property has been destroyed by a fire which started on his neighbor's land, must show, not only that the horse ran away or the fire started, but that it was through the owner's fault. At times, however, the situation of the parties when the injury occurs is such as to overcome the ordinary presumption of care on the part of the defendant. To such a situation the maxim is applied, *res ipsa loquitur*—"the thing speaks for itself." A railroad train jumps the tracks; a case of goods falls out of a warehouse window; or a peck of live cinders is thrown out of a railroad engine of an elevated road upon a traveler in the street below; in each case we have a situation which would not exist, ordinarily, had the railroad company or the warehouseman exercised ordinary care. Hence the presumption of due care on his part is overcome, and judgment will pass against him unless he can show that, notwithstanding these appearances, he was really without fault.

Another important rule is that the amount of care required varies with the apparent risk. One sets fire to brush or rubbish upon his premises and the fire spreads to his neighbor's land, doing damage and hurting another. Whether he acted negligently will depend upon various circumstances, such as these: Was the weather dry or damp? From what direction and with what velocity was the wind blowing? What vigilance and effort did he exercise in trying to keep the fire on his own land? Again, without warning, one throws an article from a scaffold to the ground, hitting and hurting another. Whether he acted negligently will depend upon the apparent risk incident to the act. If the scaffold was adjoining a city street and the article was thrown into the thoroughfare, the act would be clearly negligent. On the other hand, if the scaffold overhung private premises, and there was no reason to believe that other persons were present, the act would be careful.

In some cases the courts are disposed to hold persons liable for harm caused by their acts or omissions, whether these are negligent or not. The doctrine was laid down by an eminent English judge as follows: "The person who for his own purpose brings on his land, and collects and keeps there, anything liable to do mischief if it escapes, must keep it at his peril, and, if he does not do so, is *prima facie* answerable for all the damage which is the natural consequence of its escape. He can excuse himself by showing that the escape was owing to the plaintiff's default, or was the consequence of the act of God." This view has not been adopted to any extent in the United States, the courts preferring the rule that one who brings dangerous agencies upon his land or under his control is not an insurer of the safety of others, but that he is bound to exercise a care over them commensurate with the apparent risk in each case.

The terms gross negligence, ordinary negligence, and slight negligence are often used, although the modern tendency is to discard them. When employed, the first represents the extreme of negligence—a want of care amounting almost to recklessness; the second is the absence of such care as an ordinarily prudent man exercises; and the third stands for the lack of care required of one who is doing a favor to the injured party, such as keeping his property gratuitously.

LEGAL DUTY. Passing now to the legal duty of exercising care, it should be borne in mind that this is relative, not absolute; and consequently, when it has no existence between particular parties, there can be no such thing as negligence in the legal sense of the term. In other words, a man may be very careless without being negligent. To illustrate: the owner of a sugar orchard left a bucket of hot maple syrup uncovered in his woods. A neighbor's unruly cow jumped the fence, wandered into the woods, and died from drinking the syrup. Leaving the syrup thus was careless so far as protecting it from harm was concerned; but it was not negligence toward the owner of the cow, for the owner of the syrup was under no legal duty to exercise ordinary care toward trespassers, and the act of the cow was a trespass (q.v.). Toward trespassers the duty of a landowner, a common carrier, or the like, is simply to refrain from inflicting willful or wanton injury. Toward a licensee, that is, one whom a person barely permits to be upon his premises or in his vehicle, the licensor owes some duty of care; but the amount of care is slight. As a rule the licensee takes the risk of the situation. There must be something like fraud on the part of the licensor before he can be held answerable for injuries sustained by the licensee in falling into unguarded excavations, or breaking through defective floors, staircases, pavements, or the like, or getting caught by unfenced machinery or being thrown from a collapsing carriage. The licensor is bound, however, not to open new excavations in or near a path which he knows licensees are accustomed to traverse, or to subject them to anything like man-traps or new and serious dangers without giving them warning. An ordinary guest is generally looked upon by the law as a mere licensee. Toward persons expressly or impliedly invited upon one's property in a matter of common interest, the inviter is under a well-defined duty—the duty of making the property reasonably safe. He is not under an absolute duty to prevent harm, but only a duty to make the place as little dangerous as such a place would reasonably be, having regard to the ordinary exigencies of the business there carried on.

LEGAL HARM. Even when it is shown that the defendant has been guilty of negligence toward the plaintiff, the latter may fail in his action because he cannot show that he has sustained legal harm by such negligence. A striking illustration of this rule is afforded where one is made sick by a nervous shock due to another's negligence. Through the fault of a railroad company, for example, a car takes fire, and several passengers are so badly frightened that they faint and for weeks are confined to their beds by consequent sickness. According to the prevailing doctrine in England and in the United States, they have no cause of action against the company. Various reasons are assigned in its support. One is that such sickness is not the natural and probable consequence of the negligence; that it occurs only when there is an accidental or unusual combination of circumstances which could not have been reasonably anticipated by the defendant, and over which he had no control. Another reason urged is that to hold a defendant liable for mental anguish, or fright, or nervous shock, would cause an alarming increase in the volume of sham litigations. Every passenger in case of a railroad collision could allege fright or nervous shock and thus maintain an action against the company. In a few jurisdictions, however, mental anguish, even without consequent or attendant physical injury, is deemed legal damage. It is generally held that if the defendant's negligence causes injury to one's body, recovery may be had for the pain and suffering which are incident thereto.

Not only must the harm sustained by the plaintiff be of a character which the law deems it wise to recompense, but it must be, in contemplation of law, the natural and probable consequence of defendant's negligence. When negligence is to be deemed the proximate cause, and when the remote cause, is often a question of great difficulty. Ordinarily it is a mixed question of law and fact, to be submitted to the jury under proper instructions from the court, although, if the evidence is not conflicting, and the court thinks that but one inference can be drawn from it by reasonable men, it will decide the question itself. When the inquiry is sent to a jury, they are generally instructed that the proper test to be applied by them is: Was there an unbroken connection between the negligence and the injury? Did the facts constitute a continuous succession of events so linked together as to make a natural whole, or was there some new and independent cause intervening between the wrong and the injury? Applying this test, the plaintiff was beaten in the following case: Defendant, a railroad company, received a quantity of wool for transportation from Buffalo to Albany, N. Y., and for delivery there to another company for transportation to Boston, Mass. It was negligent in starting the wool on its journey, so that it reached Albany ten days later than it would but for such negligence. While in defendant's warehouse awaiting the call of the second carrier the wool was injured by an extraordinary flood. It was held that the immediate and proximate cause of plaintiff's loss was the flood, and that defendant's negligence was too remote to render it liable. The latter had ceased to operate as an active or efficient cause before the flood came.

Contributory Negligence. It is really on this ground (that defendant's negligence is not the proximate and efficient cause of one's injury) that the injured party is denied a recovery when he is shown to have been guilty of contributory negligence. A single example will suffice here: A workman is warned by his employer not to work upon a scaffold at a certain point because it has no railing there. He does work on that part, and, forgetting the absence of a rail, steps backward, falls, and is injured. Clearly, it is the workman's negligence, not the employer's, that is the decisive cause of his harm. But suppose, being there with knowledge of defendant's negligent omission of a railing, he had been knocked from the scaffold by the fall of an object from the roof, which fall was due to defendant's negligence. The servant's presence at the point in question would have furnished an opportunity for defendant's negligence to operate, but would not have been the cause of his injury, and he would recover.

It should be noted that contributory negligence on the part of a plaintiff is not an absolute bar to recovery in admiralty (q.v.) as it is at common law. It only diminishes his damages. Hence, whenever one has an option to sue at common law or in admiralty for the defendant's negligence, he should choose the latter jurisdiction.

Criminal Negligence. Negligence which is the proximate and efficient cause of the death of a human being may subject one to a criminal prosecution for manslaughter (q.v.), but at common law it does not render one liable in tort. The latter rule has been changed by statute both in England and in many of our States. While this legislation varies in different jurisdictions, its principal object is to grant a cause of action on behalf of those who were dependent upon or financially interested in the life of the deceased, against the one wrongfully causing his death. Consult: Beven, *Negligence in Law* (London, 1895); Shearman and Redfield, *Treatise on the Law of Negligence* (New York, 1898); Pollock, *The Law of Torts* (London and New York, 1901).

NEGOTIABLE INSTRUMENTS (ML. *negotiabilis*, from Lat. *negotiari*, to negotiate, from *negotium*, business, from *nec*, not + *otium*, leisure). Contracts in writing which are transferable by indorsement or delivery, and which are enforceable by the transferee in his own name, without previous notice to the promisor, as well as without the risk of being met by defenses that would have been good against the transferrer. Such contracts were unknown to the early common law of England. By that law a contract, whether written or oral, could not be transferred so as to enable the transferee to sue upon it in his own name. He was obliged to sue in the name of the transferrer. Equity modified this rule to the extent of allowing an assignee of a contract to sue in his own name. But, even in equity, the assignment would not bind the promisor until he received notice of it, and after notice he could set up all defenses against the assignee which were available to him against the assignor at the time of notice. In other words, the assignee could get no better title than the assignor had. Modern statutes have made nearly all contracts and rights of action assignable; that is, they permit the assignee to sue upon them in his own name, but he takes them and sues upon them subject to the defenses available against his assignor.

The negotiability of certain contracts is a characteristic impressed upon them by the usages of merchants. This quality was first recognized and made effective by the law merchant (q.v.), whose rules upon this were later adopted and enforced by the common law. Thus it has come about that for more than three centuries certain contracts in writing have been treated by all English judicial tribunals as negotiable, and have been contrasted with others which are only assignable. The earliest form of negotiable instrument recognized by English law was the foreign bill of exchange (q.v.). Next in order came the domestic or inland bill of exchange, differing from the foreign bill only in the fact that it was drawn and payable within the same State or political jurisdiction. Following this came the promissory note (q.v.), but its negotiable character was not established without a struggle. It is true that the negotiability of this novel mercantile instrument passed unchallenged for a time in England, but after Lord Holt became Chief Justice he set his face against the recognition of new forms of negotiable instruments and decided that promissory notes were not negotiable. Immediately the merchants of London appealed to Parliament, and that august body enacted a statute without delay, upholding the mercantile view and declaring promissory notes negotiable like bills of exchange (3 and 4 Anne, c. 9, 1704). About this time another species of negotiable instruments was devised and came into general use—the goldsmiths' or bankers' notes. These were the promissory notes of bankers, payable to bearer on demand, and originally given for money actually deposited with the maker by the one to whom they were issued. Lord Mansfield had no hesitation in treating them as negotiable by delivery. A little later the use of checks (q.v.) became general. For some time the legal status of this instrument was doubtful, but it has long been recognized as a species of bill of exchange, and is now authoritatively defined as a bill drawn on a bank and payable on demand.

The foregoing are the most common forms of negotiable paper, but several other forms have been found useful in mercantile transactions, and have received judicial approval, such as the bonds of business and municipal corporations, exchequer bills, and scrip for Government bonds. In order that a written contract may possess negotiability, it must be payable to order or to bearer and must be treated in the money market as a security for and representative of money. Accordingly, bills of lading (q.v.), warehouse receipts (q.v.), and like documents of title are not negotiable instruments, even in jurisdictions where they are declared by statute to be negotiable. They are not representatives of money and cannot perform the functions of currency. They are symbols of goods, and their transferee gets no better title to the goods which they symbolize than he would secure by the actual delivery of the goods themselves. Hence the thief or the finder of a bill of lading cannot pass a perfect title to a bona fide purchaser thereof, as he can do in case of a bill of exchange or promissory note, which is payable to bearer or indorsed in blank.

The right to enforce negotiable paper free from defenses available against the transferrer or prior parties is confined to the bona fide holder, that is, to one who has become the owner of the paper before it is due, for value, and without notice of any defect in the transferrer's title. Such a holder, however, can pass his perfect title even after the paper is due, and to one who has notice of defects in the title of one back of such holder.

The law of negotiable instruments has been codified in Great Britain (Bills of Exchange Act, 1882, 45 and 46 Vict., c. 61) and in a number of our jurisdictions (Colorado, Connecticut, District of Columbia, Florida, Maryland, Massachusetts, North Carolina, North Dakota, Oregon, Pennsylvania, Rhode Island, Tennessee, Utah, Washington, Wisconsin). Consult: Chalmers, *Bills of Exchange Act* (London, 1902); Crawford, *The Negotiable Instruments Law, Annotated* (New York, 1902); Daniels, *Treatise on the Law of Negotiable Instruments* (New York, 1903); Bigelow, *The Laws of Bills, Notes, and Cheques* (Boston, 1900).

NEGOTIABLE PAPER. In its strict legal sense, this term is used interchangeably with the term 'negotiable instruments,' to denote any written securities for the payment of money, the legal and equitable title to which may be transferred by indorsement and delivery, or if payable to bearer, by delivery merely, and which if so transferred before maturity give the transferee complete title, and an absolute right to demand the amount named on the face thereof, free from any defenses which might have been available against the transferrer. However, the term is popularly employed to designate such instruments in writing, as promissory notes and bills of exchange, which alone had the above qualities by the 'law merchant,' or common law, and as distinguished from the term 'negotiable instruments,' which, in some jurisdictions, include municipal and corporate bonds, certificates of deposit, warehouse receipts, bills of lading, and other instruments. Therefore, the popular usage would exclude any instrument which was not negotiable by the common law, and which has only been given the peculiar qualities of negotiability by statute. Consult Story, *The Law of Bills of Exchange;* Parsons, *The Law of Promissory Notes and Bills of Exchange.* See Negotiable Instruments.

NEGRI, nā′grê, Ada (1870—). An Italian poet, born at Lodi of a family of artisans. As a teacher in a village school, she wrote her first verses, which passed almost unnoticed in the columns of a periodical, but they attracted attention to her when published as the volume of lyrics entitled *Fatalità* (1893). A second volume, the *Tempeste,* appeared in 1896. Soon after the publication of the *Fatalità* she received a good post in the normal school at Milan. In Ada Negri's verse the note of protest against the abuses in the social order rings out loudly.. She has noble ideals as to universal brotherhood, and depicts in vivid colors the abject misery of those engaged in a constant struggle to gain the means of a livelihood. Spontaneousness and sincerity are undeniable qualities of her verse, but she may be said to idealize too much the figure of the peasant and artisan. Consult: Jean Dornis, *La poésie italienne contemporaine* (Paris, 1898); Mazzoni, in the *Nuova antologia* (Rome, June 17, 1893).

NEGRI, Cristoforo (1809-96). An Italian politician, historian, and geographer, born at Milan. He became professor at Padua in 1843, was the first member of the faculty to side with the Italian cause in 1848, and after Custozza and the success of Austria he was forced to resign his chair. He was almost immediately elected president of the University of Turin, and held a place in Gioberti's Ministry until the battle of Novara. He then became chief of the consular service and held this position under Azeglio, Rattazzi, and Cavour. Negri founded in 1867 the Italian Geographical Society, and was its president for five years. He wrote: *La grandezza italiana* (1864); *La storia politica dell' antichità paragonata alla moderna* (1867); and *I passati viaggi antartici e l'ideata spedizione italiana* (1880).

NEGRI, Paolo (1853—). An Italian gynecologist. He was born in Verona, studied medicine at Padua, and, after teaching at Milan and at Novara, where he became director of the Obstetrical School, in 1886, was appointed director of the School of Obstetrics of the University of Padua, situated at Venice. He wrote: *Studii e ricerche di ostetricia* (1885); *Sulla idrocefalia ripetuta del feto* (1890); and *Cinquanta laparotomie* (1892).

NEGRITOS, nȧ-grē′tōz (Sp., little negro). The term applied by most modern ethnologists to one of the great ethnic groups into which the population of the East Indies is divided. Some anthropologists recognize a 'Negritic stock' consisting of three groups, Negrito, Papuan, and Melanesian, while others regard the 'Indo-Oceanic Negritos' as a separate branch of the *Homo Æthiopicus,* distinct from the 'Indo-Oceanic Negros' from whom they believe that the Papuans and Melanesians have sprung. It seems best, however, to count the Malays, Indonesians, Negritos, and Papuans as the four ethnic stocks of Malaysia. The term should be used in the restricted sense implied in the principal recent classifications of mankind in this area. The physical characteristics of the Negritos are: Small stature (great majority under five feet), a brachycephalic or subbrachycephalic head-form, a dark brown or black skin sometimes somewhat yellowish, the hair woolly (scanty on face and body), a flat nose, thickish lips, and other features of physiognomy and body of a negroid character. Many ethnologists assume that the earliest inhabitants of extreme Southeastern Asia, the Malay Archipelago, and neighboring regions were of this stock, but evidence for such a view is lacking. No real proof of their presence in Sumatra, Java, Borneo, Celebes, or Formosa has been produced. It is held by some, however, that the Negritos once inhabited Timor, Flores, and the islands near, while it has been reported that the Karons of the Arfak Hills in Northwestern New Guinea were Negritos, although this is not certain. The only centres of undoubted Negrito population existing at present are in the Andaman Islands, the Malay Peninsula, and certain of the Philippine Islands, the pure Negritos being certainly represented only by the Mincopies, Sakai, and Aëtas. The Mincopies of the Andaman Islands, who average four feet ten inches in height, are taller than the other Negritos, except some of the Malaccans, who are probably crossed with Malays. The Semangs and Mantras, in the peninsula of Malacca, may be regarded as Negritos, while the Mintra and the Jakhuns of Johore are Sakai-Malay half-breeds, with lighter skin and taller stature. Some authorities, however, regard them as Negritos. The Semangs (whose own name is Mendi or Menik) of Northern Perak, Kedah, Rahman, Ranga, and Kelantan are described by Martin, who visited the Malay Peninsula in 1897, as representing a dark-brown ulotrichous variety of man, while the Sakai (whose own name is Senoi) of Southeastern Perak and Northwestern Pahang are a brown cymotrichous variety. Both are distinct alike from the Malayan and the Mongoloid peoples. The Blandas, Ma-meri (or Besesi) of Southern Selangor, the Mantra of the territory of Malacca and Rembau, and the Jakhuns of Johore he styles mixed peoples. As to head-form the Semangs are mesocephalic (tending to dolichocephalic), the purest Sakai are dolichocephalic, and the Besesi brachycephalic. The hair of the Semangs is frizzy or thick woolly, while that of the Sakai and of the mixed tribes is for the most part wavy. The Sakai may perhaps be the descendants of the Neolithic population of this portion of Farther India. The Aëtas of the Philippines, who number altogether some 10,000, are found in certain parts of the interior of Luzon, Mindoro, Panay, and Negros, and Northeastern Mindanao. The culture-status of the Negritos is very primitive, though the arts and industries of the Andaman Islanders, the best studied members of the stock, give more evidence of talent and ingenious adaptation to environment than is commonly attributed to them. The strict monogamy of the Sakai and their rather high morality ought also to be noted. The bow and arrow (often poisoned) is a characteristic Negrito weapon.

Consult: Quatrefages, *Les pygmées* (Paris, 1887); Man, *The Aborigines of the Andaman Islands* (London, 1885); Clifford, *In Court and Kampong* (London, 1897); Stevens, *Materialien zur Kenntniss der wilden Stämme auf der Halbinsel Malakka* (Berlin, 1892); Giglioli, *Nuove notizie sui popoli negroidi dell' Asia e specialmente sui Negriti* (Florence, 1879); Meyer, *Album von Philippinen-Typen* (Dresden, 1885); Blumentritt, *Ethnographie der Philippinen* (Gotha, 1892); Meyer, *Die Negritos* (Dresden, 1899).

NEGRO (Sp., Port., It. *negro*, black, from Lat. *niger*, black). The name properly applied to a subspecies of mankind of whom the chief characteristics are a dark skin, woolly or frizzly hair, and a dolichocephalic skull. The negroid type presents many modifications and has obtained a fairly wide dispersion, but is found in its purest state and in greatest numbers in Africa, and that continent must be considered its centre of distribution.

It is commonly held that the type is best represented by the Sudanese tribes of Africa, who are regarded as true negroes. They are distinguished by a very dark brown or chocolate-colored skin, black crisp hair which is flat on section, a relatively long head, with flat, broad nose and projecting jaws with thick, everted lips. In stature they are tall, with long arms and slender legs.

The most important modification of this type is found in the Bantu group of tribes, which stretches southward in Africa from the Sudan to the Cape of Good Hope. This division is one based largely on linguistic grounds, and, presenting as it does many variations of slight extent, it is impossible to name any single physical character which distinguishes the Bantu negro from the Sudanese. In general, however, the Bantu face is less coarse than the Sudanese, the jaws less projecting, and the lips not so thick. In color of skin the Bantu shows all shades of dark brown, and in stature corresponds to the Sudanese.

A marked variation, and one difficult to account for, is seen in the dwarf races who are found in scattered groups across Central Africa surrounded by Bantu neighbors and extending far to the south, where they are represented by the well-known tribe of Bushmen. The Bushmen, with their somewhat taller neighbors, the Hottentots, are usually regarded as forming an independent stock not to be classed with the pygmies of the equatorial region. This problem is at present impossible to settle.

The dwarfs offer striking physical traits which differentiate them from the other negroid peoples of Africa. In stature the northern pygmies do not average much over four feet, the Bushmen seldom range over five feet, while the Hottentots are somewhat taller. In color the skin is a light yellowish brown, and, in the true dwarf groups, said to be covered with a sort of down. The hair is crisp and in the central dwarfs of a rusty brown color, while in the Bushmen-Hottentot group it is black and tufted.

Of the true negroes of the Sudan the most important tribes are, in the west, the Wolof, Mandingan, Felup, Timni, Kru, Sierra Leonese, Liberian, Tshi, Ewe, Yoruba, Ibo, Efik, Borgu, and Mossi. In the Central Sudan, the Sonrhay, Hausa, Mosgu, Kanembu, Kanuri, Baghirmi, and Yedina; and in the east, the Maba, Fur, Nuba, Shilluk, Dinka, Bari, Abaka, Bongo, Mangbattu, Zandeh, Momfu, and Bari.

Of the Bantu tribes traced southward along the east coast and northward along the west, following their probable course of migration, the most important divisions are the Bonjo, Baya, Waganda, Wanyoro, Wapokomo, Wagiryama, Waswhahili, Zulu, Mashona, Bechuana, Ova-Herrero, Eshi-Kongo, Bashilange, Balolo, Manyuema, Bakalai, Fan, Mpongwe, Dwala, and Batanga.

The dwarf races of Central Africa are little known, but the most familiar are the Akka, Wochua, Obongo, and Batwa. In the south are the Bushmen and the Hottentots, the chief tribes of the latter being the Namaqua, Griqua, and Damara.

These peoples include the bulk of the African negroids. The dark-skinned natives of the north, viz. in Abyssinia and in neighboring regions, and along the Mediterranean, exhibit such differences and are so allied in other respects with Semitic and Hamitic peoples that they are usually classed with them.

The extra-African distribution of negroid stocks immediately presents difficulties. We can disregard the negroes of the two Americas, who are almost invariably of West African descent and differ from their parent stocks only in the modifications due to mixture with Europeans and Indians.

The Australians, who are regarded as negroes by some authorities, must be considered an independent race presenting physical characteristics which differentiate them from the true negro, notwithstanding their dark skins.

There are, however, in the East Indian Archipelago, in New Guinea and Melanesia, and in Madagascar negroid tribes whose classification and relationships present difficulties at present insurmountable. Of these stocks the Papuans of New Guinea and the Melanesians are the most numerous and important. They are a dark-skinned, tall, dolichocephalic race, and differ physically from the African negro chiefly in the hair, which is longer and mop-like, and in facial features, which latter, however, are variable. There are no safe grounds for considering them as a branch of the true negro stock other than the striking resemblance in skin color.

At different points in the northern portion of this region are found scattered groups of an undersized negroid stock commonly called Negritos. They are usually compared with the dwarf races of Africa and undoubtedly do offer striking similarities in physical characters, but in other respects seem to correspond rather to the Australian and Papuan.

The parentage of the negroids of Madagascar is also in dispute. The proximity of Africa would indicate an origin from that continent, and there are both physical and cultural facts to support the view, but there are also unmistakable signs of Melanesian traits which suggest immigration from both regions.

Much has been written as to the mental capacity of the negro, but trustworthy information is scanty. Such few careful observations as have been made upon negro brains indicate a slightly lower type than that of Europeans; but the variability is so high as to forbid drawing any conclusions regarding the accompanying intellectual powers—a statement which holds true of the natives of Melanesia as well as of Africa.

In culture the negro presents almost as many degrees and varieties as there are stocks. A relatively low grade represented by certain of the Sudanese, Bantu, and dwarf tribes is found side by side with a relatively high civilization, as, for example, that of the Hausa; but it must be admitted that the sporadic examples of marked cultural progress in Africa can almost invariably be traced to Arabic or other foreign influence. Environment has, of course, produced specific types of culture in different parts of the continent, such as the cattle-breeding, pastoral life of the south and west, and the strictly hunting life of the dwarfs of the equatorial forests, and this diversity makes general statements dangerous or impossible.

With regard to religion, we find an extensive animism which has developed remarkably at different points. For example, the ancestor worship of the Zulus has been carried to a logical extreme, which is unique among savages, and the complex fetishism of West Africa is everywhere regarded as the type of that phase of belief.

Political organization is equally diverse, ranging from hereditary kingship to such loose tribal systems that no chieftainship is ascertainable.

In comparison with other great groups of mankind, the negro seems to possess certain temperamental qualities which are more or less characteristic, being lively, excitable, and fond of social life and discussion; and this trait has undoubtedly played an important rôle in the development of certain phases of African culture. Our knowledge of the majority of the negro tribes of Africa is still lamentably slight, but, with the extension of European interests in that continent, much valuable information is coming to light. See NEGRO EDUCATION.

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NEGRO, nā′grō, RIO. A tributary of the Amazon. See RIO NEGRO.

NEGRO BUG. A plant-bug of the family Corimelænidæ. These bugs are usually of very small size and are intensely black in color, sometimes having a bluish or greenish tinge. They are convex in form, the scutellum covering nearly the whole upper side of the body, and are often mistaken for small beetles. They are fond of laying their eggs on small fruits, like blackberry and raspberry, giving them a very disagreeable taste. A common species in the United States, the flea-like negro bug (*Corimelæna puticaria*), is frequently mistaken for the chinch bug.

NEGRO EDUCATION. Much of the negro advancement in the United States since the Civil War is to be credited to the regular habits of industry, and to the knowledge of the white man's religion, language, and ways of life gained in slavery days. To one connected with negro schools nothing is clearer than the value of the influence of good Southern white families upon their slaves. Some of the plantations were really large trade schools where habits of industry were formed. Carpenters, coopers, sawyers, blacksmiths, tanners, curriers, shoemakers, spinners, weavers, knitters, and distillers were all to be found among plantation slaves; and the negro mechanic was an important man in the community. Thus the race was being gradually trained in the ways of civilization, was contracting the habit of labor, acquiring a superior language and religion, and developing a character capable of further advancement.

Credit should also be given to the training which the colored man received during the Civil War. In the Northern armies there were thousands of colored troops who received discipline of the most valuable sort. In the South, the homes and farms of the white Confederate soldiers were largely in the hands of negro men and women. Most valuable to the slaves was the gain in power and executive ability that came out of that experience. While their masters were fighting to keep them in slavery, they were receiving in the absence of those masters the education which was to fit them to be freemen.

The sudden emancipation of the blacks brought about a condition bordering upon chaos. The Southern white man knew little of the treatment due a negro freeman, and the negro knew as little what his relation to his former master should be. The white man was unable to look upon the black in any other light than as his servant, and the black man looked upon all service as degrading, considering that freedom and education ought to exempt him from labor, especially from the labor of the hands.

Upon the heels of the Northern armies came an army of devoted women, eager to teach the freedmen. In September, 1861, the American Missionary Association opened its first school for contrabands at Hampton, Va., the outcome of which is the Hampton Normal and Agricultural Institute (q.v.). In the following January schools were started at Hilton Head and Beaufort, S. C., and in 1862 and 1863 teachers were sent to Tennessee. The Rev. John Eaton, an army chaplain from Ohio, afterwards United States Commissioner of Education, was placed by General Grant in charge of the instruction of the colored people, of whom it is estimated that more than a million learned to read and write; of the 80,000 colored troops in the Northern army, 20,000 learned to read and write. The churches of the North vied with one another in their endeavors to bring education to the black man. In 1865 the Freedmen's Bureau (q.v.) was established, and, in addition to other work, it superintended the education given to the freedmen by the Government and the churches of the North. Between 1865 and 1870 more than five million dollars was expended by this organization for educational purposes. In some cases Government buildings and land were granted.

The proved capacity of the negroes for education suggested the wisdom and economy of providing their schools with teachers of their own race, and during the years from 1868 to 1878 there were founded twenty-five normal and collegiate institutions under the control of different religious denominations, the Congregationalists and Baptists leading in the number and size of their schools. They extended from Hampton in Virginia to Tillotson in Texas. At Atlanta, Nashville, Chattanooga, and other centres institutions were built costing from $200,000 to $500,000, and having a yearly attendance of from 300 to 500 students. They have trained many of the teachers of the negro race.

The work of these schools has often been criticised, and sometimes, perhaps, justly. But it is nevertheless true that they have had much to do with the uplifting of the negro race. From them have gone forth many of the best teachers of the negro public schools. Most of these institutions had as their model the New England high school or college. Latin and Greek had often a prominent place. The practical side of education, which was largely provided for in the New England home, was not supplied in the one-room cabin of the South. Too great emphasis was sometimes placed upon the literary and academic side of education, and too little upon the gaining of a knowledge of the common things of life and of the forming of habits of intelligent industry. It was natural that the colored man, after years of forced labor, should revolt against any education that gave prominence to the work of the hand. It was natural that his teacher, who heard it continually said that negroes were fit only to be hewers of wood and drawers of water, should wish to prove that they could become successful lawyers, physicians, and clergymen. The wisdom of raising up leaders of a people is unquestioned, but where ninety per cent. of a race live on the land, as is the case with the blacks of the South, and where a large majority live, as the masses of the negro race still do, in one-room cabins under the lien system of crops, it would seem that there ought to be a close relation between education and vocation, and that their teachers and clergymen should be taught how to build their own houses, and how to cultivate their land properly. Each year is giving to these higher institutions for negroes in the South, as to the colleges of the North, curricula which have a more vital connection with life.

What is called race prejudice has caused a separation between the white and black races which, though attended with evil, has been productive of much good. The unwillingness of the Southern whites to allow white and black children to be taught in the same schools has resulted in the founding of the schools just described, which are in some respects superior to most of those that are open to the white children of the South. It has also resulted in a system of public schools taught by colored teachers which, while it has its disadvantages, has resulted in good to the race.

Before the year 1870 there were practically no negro public schools, with the exception of those in Memphis, New Orleans, and Nashville. There were, however, in the District of Columbia 10,494 colored children in public and private schools. In 1870, while for the most part there was opposition, certain far-seeing Southerners declared in favor of the education of the blacks. In 1871 a little improvement was made. In 1872 Delaware and Kentucky were the only States that had not made provision for negro education. In 1873 and 1874 State normal schools began to be established for the training of negro teachers. In 1877 the total number of negro children reported of school age was 1,513,065, and the number enrolled in the schools 571,506. There were twenty-seven normal schools with 3785 pupils, and twenty-three institutions for secondary instruction, with 2087 pupils. In 1882-83 the colored school population in the District of Columbia and the former slave States was 1,944,572, and the enrollment 802,982. Thus, less than twenty years after the war there was built up in the South a public school system for both whites and blacks, with normal schools for the training of teachers, which, considering the extreme poverty of the Southern States, was admirable. In 1897-98 the United States Commissioner of Education stated that there was an enrollment in the schools of 1,506,742 colored children, or 52.97 per cent. of the colored school population, while his report for 1900-01 shows an enrollment of 57.22 per cent. of the negro children. The average daily attendance in the colored schools is 62.46 per cent. of their enrollment.

No account of negro education in America would be complete which did not include an account of the work of General S. C. Armstrong at Hampton Institute. Believing in the moral value of self-help, General Armstrong built up a school in which greater prominence was given to doing than to mere learning, where there was not only the schoolroom, but also the workshop; not only the church, but also the farm; not only the training of the mind, but also that of the heart and hand. An effort was made in this school to fit men and women for definite conditions, to develop a love for intelligent work, and to inspire in its pupils a strong desire to go out and help to uplift their people. The school at Tuskegee, founded by Booker T. Washington, Hampton's most distinguished graduate, was established with similar views. While receiving help from the North, both of these schools have put themselves in the closest touch with the South and its public school system. Their influence on this system has been marked. As a result of the kind of training given at Hampton and Tuskegee, hundreds of young people have been sent out who, by the establishment of homes, the cultivation of land, and the carrying on of business enterprises, have reconstructed whole communities. There is reason to believe that this type of school is meeting the pressing need, on the part of the negro people, of knowledge of the common duties of life, while, at the same time, it is providing a kind of training which results in the stability of character so lacking in the masses of this people.

In the establishment and conduct of negro schools, two wisely administered funds have had a large share. (See PEABODY EDUCATIONAL FUND; SLATER FUND.) Mention should also be made of the Southern and General Education Boards, which are composed of prominent Northern and Southern men. Both these agencies represent a union of wealth, business sagacity, and educational statesmanship that augurs well for the cause of universal education. The Southern Education Board conducts a campaign of education for the purpose of stimulating public sentiment in favor of more liberal provision for the common schools for both races. Its work is supplemented by that of the General Education Board, which, in addition to collecting information in regard to existing educational conditions among both races, is empowered to disburse certain funds where they are most needed for the strengthening of the agencies tending to promote the education of all the people.

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NEGRO EXODUS. The name applied to a movement of freedmen from the Southern to the Western and Northern States in 1879 and 1880. The movement began in the early spring of 1879, and before the close of 1880 fully 40,000 negroes had removed to Kansas alone, while a large number had settled in Missouri and Indiana also. Many arrived at their destination poorly clad, generally destitute, and without promise of employment, and for a time there was much want and suffering among them. Large sums of money, however, were contributed for their relief throughout the North, especially in Kansas, where, soon after the arrival of the first band of immigrants, an efficient Freedmen's Relief Association was organized. The only Southern States from which the blacks emigrated in any considerable numbers seem to have been Mississippi, Louisiana, and Texas. The chief reasons given by the negroes for the abandonment of their homes were that they were forced to pay excessive rents, that the system of land tenure in the South was unjust, that exorbitant prices were charged by 'credit' merchants, and that the freedmen were wholly denied political recognition and were kept down in every way by 'bulldozing' methods. Opponents of the movement asserted that the negroes had been misled by the representations of land speculators, by misguided philanthropists, and by politicians who, in view of the approaching Presidential election, wished to import numbers of Republican voters into various parts of the North, where the Republican majority was doubtful. The movement seems to have been considerably furthered by the 'Nashville Colored Convention,' which met in Nashville, Tenn., May 7, 1879, adopted a report setting forth the grievances of the blacks and the many disadvantages, social, economic, and political, under which they labored in the South, and recommending that the negroes should emigrate to those States where their rights were not denied them. For an account of the causes of the movement, consult an article by Runnion, "The Negro Exodus," in the *Atlantic Monthly*, vol. xliv. (Boston, 1879); and for arguments justifying and condemning the movement, consult articles by R. T. Greener and Frederick Douglass, respectively, in the *Journal of Social Science*, vol. xi. (Boston, 1888).

NEGRO IN AMERICA. The first appearance of the negro in the English colonies in America was in 1619, when a cargo of negro slaves was landed at Jamestown. The scarcity of labor, especially in the Southern colonies, created an increasing demand for negro slaves; and by 1714 the number had increased to 58,850 (estimated). The greater part of these were brought direct from Africa, although considerable importations from the West Indies took place, and natural increase contributed an appreciable number. Importation was carried on more extensively in the following half century, the aggregate of negroes in the colonies reaching about 300,000 in 1754. In 1790 the first census found 757,208 in the United States. In the next hundred years this number was multiplied tenfold. This extraordinary growth in numbers has been due chiefly to natural increase; although importations were considerable up to 1808, when they were prohibited by the Constitution. The smuggling in of Africans continued, however, up to the Civil War. Since that time there has been some immigration of negroes from the West Indies, not sufficient, however, to affect the truth of the proposition that recent growth in negro population practically represents a natural increase.

It is a matter of great importance whether or not the negro population is increasing more rapidly than the white. Table I. from the *Twelfth Census* shows the number of negroes in the United States for each decade, from 1790 to 1900, together with the percentage of the total population which the negroes represent:

TABLE I.

	Negroes	Percentage of total population of United States
1790	757,208	19.3
1800	1,002,037	18.9
1810	1,377,808	19.0
1820	1,771,656	18.4
1830	2,328,642	18.1
1840	2,873,648	16.8
1850	3,638,808	15.7
1860	4,441,830	14.1
1870	4,880,009	12.7
1880	6,580,793	13.1
1890	7,488,788	11.9
1900	8,840,789	11.6

It will be seen that the proportion of negroes to the general population has declined for every decade since 1810 except 1870-80; and it is now generally understood that the apparent increase for that decade was the result of faulty enumeration. It is true that much of the relative increase in white population is to be ascribed to immigration (q.v.). Nevertheless, it appears that the native white population is increasing faster than the negro population. Thus, for the decade 1890-1900, the native whites of native parentage increased 18.9 per cent., while the negroes increased 18.1 per cent.

DISTRIBUTION OF NEGRO POPULATION. In the colonial period negroes were found in every colony, but were most numerous in the South, where their services were in greater demand. The abolition of slavery in the North led to greater concentration in the South; and by 1860, out of 4,441,830 in the United States, only 226,216 lived in the Northern States. Since the war a considerable diffusion has taken place. At times it has been feared that a large proportion of the negroes would flock to the North; but adverse climatic conditions and the difficulty of competing with white labor have forced most of the negroes to remain in the South. See Table II. for the distribution of negroes.

TABLE II.

DISTRIBUTION OF NEGROES.

	1880	1890	1900
North Atlantic division	229,417	269,906	385,020
South Atlantic division	2,941,202	3,262,690	3,729,017
North Central division	385,621	431,112	495,751
South Central division	3,012,701	3,497,887	4,193,952
Western division	11,852	27,081	30,254

It will be seen that in absolute numbers the negroes have increased in each of the greater census divisions. Relatively to the general population, their numbers have increased in the last decade in the North Atlantic division only. See Table III.

TABLE III.

PERCENTAGE OF NEGROES IN GENERAL POPULATION.

	1890	1900
North Atlantic division	1.6	1.8
South Atlantic division	36.8	35.7
North Central division	1.9	1.9
South Central division	31.3	29.8
Western division	0.9	0.7

Georgia had a negro population in 1900 of 1,034,813, Mississippi 907,630, Alabama 827,307, South Carolina 782,321. Virginia, North Carolina, Louisiana, and Texas exceeded 600,000. In Alabama the negroes are 45.1 per cent. of the total population; South Carolina, 58.4; Louisiana, 47.2; Georgia, 46.7; Florida, 43.7. A more detailed statistical study would show a tendency of the negroes to concentrate in limited areas in some of the Southern States. Thus, in five counties of the Yazoo-Mississippi delta, in Mississippi, the negroes form 87.6 per cent. of the total population.

ECONOMIC CONDITION OF THE NEGRO. As a laborer, the negro is capable of the hardest physical toil, and works without difficulty where the humidity and heat render labor intolerable for the white. He is lacking in stability, and is inclined to roam from one district to another without any satisfactory reason; he is wasteful and careless, requiring constant supervision. These characteristics have largely determined his economic position. As an agricultural laborer the negro is indispensable in the South, more especially in the low, swampy districts, where the white laborer readily succumbs to disease. As a domestic servant the negro has proved his usefulness. In manufactures, on the other hand, negro labor is unsatisfactory, since the negro will not remain in a position long enough to develop a high degree of skill. The same deficiency is driving him out of the handicrafts. Under slavery a large number of negroes were trained in handicrafts, and proved to be valuable workmen after emancipation; but the generation which has risen since slavery has manifested an unwillingness to enter upon the long period of training necessary for the exercise of the trades. The tendency toward agricultural labor and personal service is illustrated by the statistics of occupations of the *Eleventh Census*. In 1890, of all negroes in gainful occupations, 57.2 per cent. were engaged in agriculture, 31.4 per cent. in personal service, 5.6 per cent. in manufactures, 4.7 per cent. in trade and transportation, and 1.1 per cent. in the professions. In the Southern States the proportion engaged in agriculture was greater—64 and 71 per cent. for the South Atlantic and South Central divisions respectively.

The wages of the negro agricultural laborer in the South usually range from six to ten dollars a month, with substantial additions in the shape of food, house room, etc. In the busy season of the year the day laborer usually receives a far higher wage. A good cotton-picker in the Yazoo-Mississippi delta often earns a dollar and a half a day. Whether wages are high or low, the negro laborer is likely at any time to leave his employment, with resulting embarrassment to the employer. Hence, it is a common practice to let small holdings to negroes, in order that interest in the crop may diminish their migratory tendencies. According to the census of 1890, 549,642 'farms' were occupied by negroes, of which only 22 per cent. were owned by their occupants. The tenant farmers sometimes pay a cash rental, but more frequently farm 'on shares.' The landowner furnishes machinery and draught animals, receiving one-half the crop. Frequently he advances food and other supplies to the tenant, recouping himself out of the tenant's share in the crop.

Whether as tenant or as independent landowner, the negro farmer has not as yet attained a high degree of prosperity. Negligence in the care of his stock and machinery and lack of foresight in the expenditure of his income prevent him from attaining economic independence. Recent educational movements (see NEGRO EDUCATION) aim to encourage the negro tenant to become a landowner, and to teach him how to utilize his land to the best advantage. The great mass of the negro farmers have not yet been affected by such influences.

In the North the negro manifests a tendency to concentrate in the cities, where his economic activities are chiefly confined to personal service and unskilled labor.

SOCIAL AND MORAL CONDITIONS. When account is taken of the fact that the ancestors of the American negro were taken from a state of barbarism in which moral standards were quite wanting, and were subjected only to comparatively weak moral restraint under slavery, it does not appear surprising that the social and moral condition of the negro is unsatisfactory. The great mass of the negro children receive an inadequate home training, and are therefore left to pursue their own inclinations, with the result that they readily lapse into their ancestral vices. The rules of monogamic marriage are but loosely obeyed—the exchanging of wives, for example, being not uncommon on Southern plantations. Illegitimacy is common. The percentage of illegitimate births among negroes in the city of Washington increased from 17.6 per cent. in 1879 to 26.5 per cent. in 1894. Sexual promiscuity is common wherever large negro colonies exist. Whether conditions are improving or deteriorating in this respect it is impossible to prove. It is, however, the testimony of a large number of observers that wherever the negro withdraws from the presence of the white population, moral conditions deteriorate; hence the tendency toward segregation noted above is generally viewed with anxiety by those who are most deeply interested in the improvement of the negro race. Wherever the economic conditions of the negro are improving, on the other hand, family life and morals also show a tendency toward improvement. The poverty of the masses of the negroes at present results in the overcrowding of cabins and tenements, which is destructive of family life and morality. For this reason students of the race problem look to the technical education of the negro as the best method of elevating him morally.

Statistics of crime present another serious problem connected with the presence of the negro in the United States. In 1890 there were in the Southern States six white prisoners to every ten thousand whites, and twenty-nine negro prisoners to every ten thousand negroes. In the Northern States there were twelve white prisoners to every ten thousand whites, sixty-nine negro prisoners to every ten thousand negroes. In the South negro prisoners increased 29 per cent. per ten thousand between 1880 and 1890, while white prisoners increased 8 per cent. per ten thousand. While it is no doubt true that a larger percentage of crimes against property committed by negroes is detected and punished, and hence the relative amount of negro criminality may be exaggerated, it is also true that a large number of negro crimes committed against members of their own race are not punished at all, and so do not appear in the statistics of criminality. Crimes of violence appear to be increasingly frequent where the negroes are least in contact with the whites.

The greatest improvement in the position of the negro appears in the statistics of education. At the close of the Civil War it is doubtful whether more than 5 per cent. could read and write. In 1900 the percentage of illiteracy had been reduced to 44.5 per cent. But it does not appear that such education as the mass of the negroes have received has perceptibly affected their material or moral conditions.

POLITICAL CONDITION. After the close of the Civil War, the negroes, under the leadership of a certain class of whites, practically controlled the government of many of the Southern States. (See RECONSTRUCTION.) Their ignorance and lack of political training rendered them incapable of exercising political power wisely, and they were gradually excluded from power by the whites, at first by wholly illegal means, later by State laws and constitutional amendments. In 1890 the Constitution of Mississippi was amended so as to exclude from the suffrage any person unable to read any section of the Constitution, or understand it when read to him and give a reasonable interpretation of it. Payment of a poll tax was also required. The effect of this amendment was the exclusion of the greater part of the negro vote. In 1895 South Carolina amended its Constitution so as to exclude the votes of those unable to read or write any section of the Constitution, or to show that he owned and paid taxes on property assessed at $300 or more. In 1898 Louisiana passed a similar amendment, with the addition of the so-called 'grandfather clause,' excusing from the limitations of the amendment all descendants of men who voted previous to the war, thus admitting to the suffrage illiterate, propertyless whites. North Carolina took similar action in 1900, though no property qualification was required. In 1901 constitutional amendments were adopted in Virginia and Alabama practically disfranchising the negro.

For the solution of the various 'negro problems,' social, economic, and political, several plans have been brought to public attention. Repatriation of the negro in Africa was widely advocated, especially in the first two decades after the Civil War; but the plan has been generally abandoned as impracticable, since the negro manifests no desire to return to Africa, and could not be forced to emigrate against his will. From a moral point of view, the plan has been condemned on the ground that it would mean a reversion to barbarism of the greater part of the race. Economically its effects would be grave, since the Southern States must for a long time rely upon the negro for unskilled labor.

The plan which finds greatest favor at present is the industrial education of the negro, the encouragement of land-ownership by those who are now tenants, and the general extension of education. (See NEGRO EDUCATION.) The plan has already produced valuable results. Graduates of institutions like Tuskegee (q.v.) and Hampton Institute have proved that under the leadership of members of their own race negro communities are capable of rapid improvement, economically and morally. See NEGRO; NEGRO EDUCATION; SLAVERY.

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NEGRO MELODIES. The music of the American negroes is essentially vocal. Their few musical instruments are of importance only for furnishing accompaniments to songs or for accenting the rhythm of the dance. During the last twenty years negro music has been steadily losing its distinctive features, owing to the tendency among the younger generation to discard everything which harks back to the days of slavery. The old plaintive melodies have been replaced largely by more modern comic and erotic songs which are cast in a nondescript Afric-European mode.

Negro songs may be divided into two general groups: those which show evidences of foreign origin, but which have been added to and changed until they are undeniably negro in character; and those which are the spontaneous expression of the negro's own feelings. The first group may be subdivided into (a) those derived from European songs and dances, and (b) those adapted from Baptist and Methodist hymns. The *original* negro songs, whose most typical element is a weird recitative, have undoubtedly an affinity with the musical forms used in Africa, but they have been greatly expanded both rhythmically and melodically. Though it is possible to make some such analysis of negro melodies, the most important feature, their interpretation, cannot be adequately described. Impromptu chords, notes, and accents are introduced, the whole blending into unusual forms with strikingly original melodies and motives. Strange to say, the time structure is excellent, and the *tempo* is universally exact. The tunes have as a rule a range of few notes, and, as in Africa, the major key predominates. In some songs both the major and minor keys are used. The weird effect produced by many of their cadences is not as a rule due to the use of the minor key so much as to the employment of the pentatonic scale, and the major scale with the flat seventh. A distinctive character of negro melodies is the 'rhythmical snap' which became such an overworked feature in 'ragtime.' See FOLK-MUSIC; RAGTIME. Consult: Ritter, *Music in America* (New ed., New York, 1900); Edwards, *Bahama Songs and Stories* (New York, 1895); Marsh, *The Story of the Jubilee Singers and Their Songs* (Boston, 1880): and Trotter, *Music, and Some Highly Musical People* (ib., 1878).

NEGRO MONKEY. (1) A sooty black langur (*Semnopithecus maurus*), about 24 inches long, plus a still longer tail. The animal is well known in Sumatra and the Malay Peninsula. Its young are reddish in color and grow black with advancing age. (2) A marmoset (*Midas ursulus*) of Brazil, also called 'negro tamarin,' and often tamed. It is black with a reddish dorsal stripe.

NEGROS, nā′grōs. One of the Philippine Islands, belonging to the Visayas group. It lies between the islands of Panay and Cebú. It is separated from Panay and the small island of Guimarás on the northwest by the Strait of Guimarás, eight miles wide at the narrowest, and from Cebú on the east by the Strait of Tañón, from 6 to 22 miles wide (Map: Philippine Islands, G 10). On the north the island borders on the Visayan Sea, and on the southwest and south it is washed by the Sulu Sea, which to the southeast separates Negros by a distance of 30 miles from Mindanao. The island is roughly rectangular, but very elongated in shape. Its length is 134 miles, and its average breadth 26 miles, increased near the southern end to 34 miles by a broad, rounded peninsula, extending from the western coast. Its area is given as 4839 square miles. Including a number of small dependent islets, the area is 4854 square miles. It ranks fourth in size among the Philippine Islands.

The coasts are clear and steep, but very little indented, and afford no harbors except a few anchorages sheltered by the small adjacent islands. The whole interior consists of a mountainous plateau with a central ridge running the entire length of the island and dividing it into two distinct halves, forming its two political divisions. The active volcano of Canlaón or Malaspina, situated in the north central part of the island, is 8192 feet high. The range terminates at the north in the remarkable isolated peak Solitario. The two slopes are eroded into numerous lateral valleys watered by short and generally simple streams, the largest being on the western slope. In the southern part are two remarkable mountain lakes, the larger six miles long. The mountains of the interior are covered with vast forests of valuable timber, among which the teak is prominent. The soil is everywhere fertile and well watered, and agriculture is the principal occupation. The chief products are cacao of an excellent quality, hemp, sugar-cane, coffee, rice, tobacco, cotton, and cereals. The fisheries are next in importance to agriculture, and cattle-raising also receives considerable attention, large numbers of horses, carabaos, and hogs being raised.

The chief manufactures are abaca, cabo negro, sugar sacks, and sugar, the last-named manufacture employing hydraulic and steam machinery. Means of communication are very poor. Coasting vessels are almost the only means of communication between the towns. These are nearly all situated on the coast, the interior being a wilderness. The population of the island in 1901 was estimated at 372,000. The prevailing race is the Visayan, and the Visayan is the language most spoken. The forests of the interior are inhabited by roaming savages. Politically the island is divided into the two provinces of Negros Occidental and Negros Oriental, whose areas, respectively, are 3112 and 1742 square miles, and whose populations are 231,000 and 141,000. The capital of the former is Bacólod, and of the latter Dumaguete. The two old provinces were continued under civil government by the Philippine Commission Act of February 6, 1901. Some resistance was offered to the authority of the United States by bands of natives, who kept American troops actively engaged on the island during the campaigns of 1899 and 1900. Consult *Apuntes de la Isla de Negros* (Manila, 1894).

NEGRUZZI, nâ-grōōt′sê, KONSTANTIN (1808-68). A Rumanian poet, born at Jassy, the disciple and translator of the poet Pushkin. He also translated some of Hugo's works, and wrote an epic poem, *Aprodul Purice*, and a volume of verse and prose, *The Sins of Youth*. His complete works were published in 1873. His son, JACOB (1843—), was born at Jassy, and became professor of commercial law at the university there, and afterwards at Bucharest (1885). In 1867 he founded and became the editor of the literary journal, *Convorbiri Literare*. His writings include: *Poesiĭ* (1872); *Mirónasi Florica*, an idyl; *Mihiau Vereanu*, a novel; and the short stories in *Copiĭ după natura*.

NEGUN′DO (Neo-Lat., from the North American Indian name). A group of trees sometimes separated from Acer as a genus of the natural order Aceraceæ (see MAPLE), differing from the maples chiefly in the apetalous diœcious flowers, and in the pinnated ash-like leaves. The common negundo, ash-leaved maple, or box-elder (q.v.), is a native of North America often planted for ornament and extensively cultivated in the Western United States.

NEHAN′TIC. See NIANTIC.

NE′HEMI′AH (Heb. *ʽNĕḥemyah*, Yahweh is consolation). A Hebrew leader of the fifth century B.C., whose memoirs are embodied in the Book of Nehemiah of the Old Testament. It is there stated that he was a son of Hachaliah, and cup-bearer to Artaxerxes (i.e. Artaxerxes I., Longimanus, B.C. 465-425) in the palace of Shushan. Having learned the sad condition of the returned colonists in Jerusalem, he prevailed upon the King to send him to his brethren there with full powers 'to seek their welfare.' He received an appointment as 'governor,' and worked for the safety of the city and its inhabitants. He rebuilt the city walls, notwithstanding many hindrances and dangers; he induced people from the country—priests and laymen—to take up their abode in the city, thus promoting its prosperity; above all he rekindled the flame of ancient piety and enthusiasm for the observance of the law in the hearts of the rough immigrants. He then returned to Persia, trusting to the new vitality which his reforms had, as he thought, infused into the Jewish commonwealth. But not long afterwards he had again to obtain leave from the King to return for the purpose of abolishing many abuses that had crept in during his brief absence. He enforced the rigorous observance of feast and Sabbath, and rearranged the temple service, procuring at the same time the means for its proper support by inducing the people to offer the tithes as of old.

Owing to the changes in the memoirs of Nehemiah which have been made in the course of the different editings to which they have been subjected (see NEHEMIAH, BOOK OF), it is difficult to separate the actual course of events from the traditional view concerning Nehemiah's activity. This much, however, seems certain: that Nehemiah paid two visits to Jerusalem, the one in B.C. 445, the other probably in 433. He came the first time on a special mission to protect Jerusalem from attack by rebuilding the walls, and for this work he was intrusted with full powers by the Persian King. He completed the restoration of the walls in the short space of fifty-two days, and provided for the proper guarding of the gates; afterwards he returned to the Persians. In this visit he appears as the 'governor.' In the second, however, he holds no such office; his purpose is to insure the enforcement of the provisions of the 'Priestly Code,' particularly those forbidding marriages between Jews and non-Jews. By his influence he succeeded in aiding the pious Ezra in his efforts. See EZRA.

NEHEMIAH, BOOK OF. One of the historical books of the Old Testament. In some Greek and Latin versions it is called the Second Book of Ezra, and in the Jewish canon the books of Ezra and Nehemiah originally constituted one book. It is the opinion of modern scholars that both books were put into their present form by one and the same editor. (See EZRA, BOOK OF.) The period covered by the Book of Nehemiah is the years B.C. 445-432. It is based upon the genuine memoirs of Nehemiah, but also, according to the critical view, contains much extraneous material, the memoirs having been freely used by compilers whose aim it was to prove that the work of restoration of the temple, the cult, and the general reorganization was performed by Babylonian Jews who returned from the Exile; whereas, as a matter of fact, much of the work was due to the section of the Jewish community of Jerusalem which had remained in the country. The contents of the book may be summarized as follows: Nehemiah's sorrow over the desolation of Jerusalem is depicted, and he prays to God for opportunity to rebuild the city (ch. i.). Permission is granted him by the King to undertake the work; he arrives at Jerusalem, surveys the ruins, and begins to rebuild the walls (chs. ii.-iii.). The opposition of enemies is related and the plans by which their schemes were defeated (ch. iv.). The people complain against the oppression of the nobles and the evil is redressed (ch. v.). Enemies form a plot to interrupt the work, which is frustrated by Nehemiah's boldness (ch. vi.). A record of the families that returned first from Babylon is given, followed by an account of the offerings made by rich and poor for the work (ch. vii.). The law is read by Ezra the Scribe, accompanied with a joyful celebration of the feast of tabernacles (ch. viii.). The people mourn, fast, and repent, a full confession of sin is made and a solemn covenant sealed by princes, priests, and Levites, and confirmed with an oath by the whole multitude to observe the law, sanctify the Sabbath, sustain the services of the temple, and bring in all the tithes (chs. ix.-x.). A tenth of the people are selected by lot to dwell in Jerusalem and the rest are distributed through the other cities of the land (ch. xi.). A list of priests and Levites is given, and the joyous dedication of the wall, accompanied with sacrifices, is described (ch. xii.). During Nehemiah's absence in Persia heathen strangers were admitted into the temple; they are expelled after his return, and the broken covenant to pay the tithes, to sanctify the Sabbath, and to refrain from mixed marriages is enforced (ch. xiii.).

The chronological questions involved in the Book of Nehemiah will be found discussed in the articles EZRA, BOOK OF; and NEHEMIAH. As to how much of the book represents Nehemiah's memoirs, scholars are not agreed. The genuine historical basis of the work is probably the account of Nehemiah's first visit, his activity in the rebuilding of the walls, his return to Persia, and his subsequent second visit to Jerusalem to enforce the regulations of the 'Priestly Code,' which had been adopted by the people in B.C. 444 on the occasion of the first visit. For literature, consult the works mentioned under EZRA, BOOK OF.

NEHER, nā'ĕr, BERNHARD VON (1806-86). A German historical painter, born at Biberach, Württemberg. He studied in Stuttgart under Hetsch and Dannecker, and in 1823 proceeded to Munich, where he studied at the Academy under Cornelius. During his sojourn in Rome, from 1828 to 1832, he produced "The Raising of the Youth at Nain" (1831, Stuttgart Gallery), and "Abraham Visited by the Angels" (1832, Basel Museum), and on his return to Munich was commissioned to execute the fresco painting "Entry of Emperor Louis the Bavarian" (1832-35), on the recently restored Isar gate. Appointed director of the Leipzig Academy in 1841, he thence went to Stuttgart in 1846, as professor at the School of Art, and became its director in 1854. His most important works there were a dozen great cartoons for stained-glass windows to be placed in churches in Stuttgart. Among several larger and smaller canvases, dating from that period, should be mentioned: "Descent from the Cross" (1855, Stuttgart Gallery), and "Spring" (1858, Royal Palace, Stuttgart).

NEHER, MICHAEL (1798-1876). A German architectural painter, brother of the preceding, born in Munich. On his way to Italy, in 1819, he spent some time at Trent painting portraits, but in Rome he took up genre subjects, and gradually gave more and more prominence to architectural surroundings. His "Roman Poultry Vender" (1825, New Pinakothek, Munich) is an exquisite specimen of that phase of his work. He returned to Munich in 1825, and painted many landscapes and architectural and costume pieces. After 1837 he confined his brush to those subjects with which his name was thenceforth associated, namely, views of city squares, enlivened with scenes from German life of the past. The New Pinakothek at Munich has "Interior of Chapel at Castle Traussnitz" (1838); "Views in Old Munich" (1842-43); "Magdeburg Cathedral" (1855); "Saint Vitus's Church in Prague."

NEHLIG, nā'lĕg', VICTOR (1830—). A French historical painter, born in Paris. He was a pupil of Cogniet and Abel de Pujol, and came to the United States in 1856. He opened a studio in New York, and in 1870 was made a member of the National Academy of Design. In 1872 he returned to Paris, where he still resides. Among his best works are: the "Bravo" (1870); "Armorer of the Olden Time," "Gertrude of Wyoming," the "Artist's Dream," the "Cavalry Charge of Lieutenant Hidden," New York Historical Society; "Battle at Antietam," in possession of William Astor, New York; the "Captive Huguenot," "Pocahontas," "Hiawatha," the "Serenade," and "Waiting for My Enemy." Nehlig is successful in depicting historical scenes.

NEHRING, nā'rĭng, WLADISLAW (1830—). A German Slavic scholar, born at Kletzko, near Gnesen. He was educated at the University of Breslau, where he was appointed professor of Slavic languages and literature in 1868, Among his publications are: *Kurs literatury polskiéj* (1866); *Study a literacki* (1884); and *Altpolnische Sprachdenkmäler* (1887).

NEIDE, nī'de, EMIL (1843—). A German painter, born at Königsberg. First a pupil of the Academy there, he continued his studies at Düsseldorf and Munich, especially under Dietz, and subsequently traveled in Belgium, Holland, France, and Italy. Previous to this journey he had executed the fresco painting "Ptolemy Observing the Constellations," in the Aula of the Gymnasium at Königsberg, where, after his return, he painted numerous portraits and several mythological subjects, of which "Psyche Conveyed Across the Styx by Charon" (1873, Königsberg Museum), "Orpheus and Eurydice" (1876, Halsey Collection, New York City), and the "Scenes from the Odyssey," in fresco for the Gymnasium at Insterburg, are the most prominent. In 1880 he was appointed instructor, and in 1884 professor at the Königsberg Academy. Two years afterwards he created a startling impression by his revolutionary change in the choice of subjects and their coloristic treatment, as exemplified by such sensational genre scenes as "On the Scene of the Deed" (the discovery of a murdered man's body), "Tired of Life," and similar incidents.

NEIDHART VON REUENTHAL, nīt'härt fōn roi'en-tȧl (c.1180-c.1250). A German poet, born in Bavaria. He participated in the crusade against Damietta, Egypt (1218-19), and later resided at the Court of Frederick the Quarrelsome in Vienna. From Frederick he received a fief near Melk and other valuable gifts. He was the originator of a new form of the mediæval lyric—the peasant lyric written under the influence of the Court. In this he satirizes the wealthy but vulgar peasantry of Bavaria and Austria, with its display of finery, its brawls, and its insolence to betters. For this ridicule he was bitterly disliked by the rustic versifiers, and, by the name Neidhart Fuchs, was known as the enemy of the peasants as late as the sixteenth century. Neidhart's work was an important one in the development of the Volkslied, upon which it continued for two centuries to leave a distinct impression. A manuscript collection of his poems, dating from the thirteenth century, was edited by Benecke, in vol. ii. of the *Beiträge zur Kenntnis der altdeutschen Sprache* (Göttingen, 1832). The critical edition by Haupt (Leipzig, 1858) is excellent. Neidhart is co-hero with the Pfaff Amis of Anastasius Grün's (Count Auersperg's) *Pfaff vom Kahlenberg* (Leipzig, 1850; 3d ed. 1877). Consult also, Bielschowsky, *Leben und Dichten Neidharts von Reuenthal* (Berlin, 1891).

NEILGHERRY (nêl-gĕ'rĭ) **HILLS.** Mountains in India. See Nilgiri Hills.

NEILGHERRY (or **NILGIRI**) **NETTLE** (*Girardinia palmata*). A plant of the natural order Urticaceæ, nearly allied to the true nettles, and possessing the stinging power common in them. It is frequent on all the higher ranges of the Nilgiri hills. The natives obtain the fibre by first boiling the plant, to destroy its stinging properties, and then peeling the stalks. There are said to be two or three distinct forms or varieties of Neilgherry nettle fibre, and different specific names have been given the plants producing them. Its bark yields a long, soft, and silky fibre, which is said to be one of the best fibres produced in India.

NEILL, nēl, Edward Duffield (1823-93). An American author and educator, born at Philadelphia. He attended the University of Pennsylvania for a time, but was graduated at Amherst in 1842, and afterwards studied theology at Andover. After ordination as a Presbyterian minister he removed to Saint Paul, Minn., in 1848, and became pastor of the first Protestant church. In 1851-53 he was superintendent of public instruction for the Territory, and from 1858 to 1861 chancellor of the State University. In 1861-64 he was an army and hospital chaplain. From that time until 1869 he was one of the secretaries of Presidents Lincoln and Johnson. President Grant appointed him consul to Dublin in 1869, but he returned the next year. In 1873-84 he was president of Manchester College in Saint Paul, and from that time until his death professor of history and literature. He published many historical works, chiefly concerning the colonial period. They are drawn entirely from original documents, and contain much valuable material, arranged, however, with little sense of proportion. The most important are: *History of Minnesota* (1858, 5th ed. 1883); *Minnesota Explorers and Pioneers* (1881); *Terra Mariæ*, a history of early Maryland (1867); *History of the Virginia Company of London* (1869); *English Colonization of America During the Seventeenth Century* (1871); *Virginia Vetusta* (1885); *Virginia Carolorum* (1886).

NEILLS'VILLE. A city and the county-seat of Clark County, Wis., 66 miles northeast of La Crosse, at the junction of the O'Neil and Black rivers, and on the Chicago, Saint Paul, Minneapolis and Omaha Railroad (Map: Wisconsin, C 4). The city has a public library of 2000 volumes. It is the centre of a prosperous farming and cattle-raising community; there are manufactures of flour, furniture, and lumber in various products. Population, in 1890, 1936; in 1900, 2104.

NEILSON, nēl'son, James Beaumont (1792-1865). A Scotch inventor, born at Shettleston, near Glasgow. He had little education in school, and at fourteen was set to work. He was employed by his brother, then as engineer of a colliery near Irvine, and in 1817 as foreman of the Glasgow gas works, where he made many improvements in the method of gas manufacture, and founded an institute for the education of employees. His great invention, that of the hot blast in manufacturing iron, was directly opposed to the belief of contemporary foundrymen that the colder the blast the better the quality and the greater the quantity; and his experiments were long blocked by the impossibility of a fair test. Neilson's patent, taken out in 1828, was very successful. With equal fuel his method produced three times the iron of the cold blast. But the validity of the patent was attacked with some success, and many firms refused to pay the license for the blast. Neilson won the great suit against the Bairds of Gartsherrie in 1843, and four years afterwards retired to the Isle of Bute. His last years were spent at Queenshill, Kirkcudbright, where he established a workingman's institute.

NEILSON, Lilian Adelaide (1848-80). The assumed name of an English actress named Elizabeth Ann Brown. She was born March 3, 1848, in Leeds, and her childhood at Guiseley was of the humblest. When fourteen years old she ran away from home, and going to London, was educated for the stage through the kindness of a chance acquaintance, making her début in 1865 in the part of Juliet. She played for a few years in various theatres of London and the provinces, till 1870-71, when she met great success as Amy Robsart in an adaptation of *Kenilworth*, and as Rebecca in *Ivanhoe*. At once she became one of the favorites of the English stage, and was equally popular in America, where she appeared neary every year from 1872 to her death. Her great characters, besides those mentioned, were the Shakespearean Rosalind, Beatrice, and Imogen, and also Julia in *The Hunchback*. Early in her career she was married to Philip Lee, from whom she was divorced in 1877. She died suddenly in the prime of her beauty, in Paris, August 15, 1880. Consult: Scott, *The Drama of Yesterday and To-Day* (London, 1899); Marston, *Our Recent Actors* (ib., 1890).

NEILSON, Samuel (1761-1803). An Irish politician, founder of the United Irish Society. He was born at Ballyroney, County Down, the son of a Presbyterian clergyman, and established himself in Belfast as a woolen merchant, but his interest in politics soon forced him out of business. In 1792 he founded the *Northern Star*, an organ of the United Irishmen. The formation of this society had been suggested by Neilson in the previous year and was carried out by Wolf Tone. The *Star* was suppressed in 1797 after the editor, who aimed at complete separation from England, had several times suffered arrest and imprisonment. Rearrested in 1798, Neilson either bargained with the Government in behalf of all political prisoners that they were to be exiled to some country friendly to Great Britain, and in return would disclose the secrets of the United Irish Society, or in some other way managed to escape trial. In 1802 he was set free at Cuxhaven, soon afterwards came to the United States, and died at Poughkeepsie, N. Y.

NEIRA (nā'ē-rȧ) **BANDA.** One of the Banda Islands (q.v.).

NEISSE, nī'*se*. The capital of a circle, and a fortified town in the Province of Silesia, Prussia, on the Glatzer Neisse, 46 miles south-southeast of Breslau (Map: Prussia, G 3). The town proper on the left bank of the river is well built, and has a number of interesting features, of which the most prominent are the Gothic Church of Saint Jacob, dating from the twelfth century, the Jesuit Church, completed in 1688, the Rathaus with its high tower, the bishop's residence, now used as municipal offices, and the Catholic Gymnasium, formerly a Jesuit college. The town has manufactures of furniture, machinery, blankets, lace, and wire screens, and carries on a trade in sugar, wood, marble, and vegetables. Population, in 1890, 22,444; in 1900, 24,271. Neisse was formerly the capital of the Principality of Neisse, which belonged to the Bishopric of Breslau.

NEITH, nē'ĭth. An Egyptian goddess worshiped especially at Sais in the Delta. She is mentioned in some of the most ancient inscriptions, but did not attain any special prominence until the time of Dynasty 26, which originated in Sais. Neith is represented as a woman wearing the crown of Lower Egypt, and holding in her hand a bow and arrows together with the sceptre of a goddess. It is probable that she was originally a Libyan divinity. Consult: Wiedemann, *Religion of the Ancient Egyptians* (New York, 1897); Mallet, *Le culte de Neit à Sais* (Paris, 1889); Petrie, *Nagada and Ballas* (London, 1896).

NEIVA, nā'ē-vȧ. A town of the Department of Tolima, Colombia, on the right bank of the River Magdalena, at the head of navigation for light craft, and 112 miles southwest of Bogotá (Map: Colombia, C 3). It is the chief centre for commerce for Southern Colombia, is celebrated for its cacao, and has an export trade in cattle. There are minor industries in silk-weaving and in the manufacture of hats. Its former trade in cinchona has largely disappeared through the destruction of the trees. Neiva was founded in 1550, and nineteen years later destroyed by the Indians. It was rebuilt in 1612 on its present site. It remained the capital of the department until 1888. Its population, in 1892, was about 5000; of the municipal district, 16,000.

NEJD, nĕj''d. A region of Arabia. See NEDJED.

NEKHBET, nĕk'bĕt. An Egyptian deity, the local divinity of the city of Eileithyia (q.v.).

NEKRASOFF, nyĕ-krä'sôf, NIKOLAI ALEXEYEVITCH (1821-78). A Russian poet, born in the Government of Podolia. At sixteen he left the Yaroslav Gymnasium, and was sent to Saint Petersburg to enter the Regiment of Nobles. He matriculated at the university in 1839, whereupon his father cast him off. For three years he suffered fearful privations, and amid his bitter surroundings his poetic genius turned into a 'muse of vengeance and dolor.' A tutorship in a preparatory school and some hack-work for periodicals improved his material circumstances. While writing for the *Annals of the Fatherland* he chanced to show Byelinski a poem, "On the Road." The warm praise of that great critic turned Nekrasoff to his true vocation. He bought the *Contemporary* (1847), which soon became the most popular monthly in Russia. The years between 1856 and 1866 were the most brilliant period in his literary activity. Until then despondent and doubting, he now shared the roseate hopes aroused by the great reform movement. Though mainly the singer of the people's sufferings, he did not confine himself within that narrow circle. His works depict the 'downtrodden and oppressed' of all classes of Russian society. His *Fatherland*, *Peasants' Children*, and *Last Songs* are among the most touching of his poems. The peasant groaning under the heavy hands of the master, the workman hauling the barges on the Volga, the heroic devotion of the wives of the Decembrists as they follow their husbands to the Siberian dungeons straight from the glamor of the Court (*Russian Women*), bear witness to the range of his sympathies. The meeting of husbands and wives in the dark mines of Siberia (*Russian Women*) is probably the most moving and powerful episode in all Russian literature, and his *Hero for an Hour* would alone give him an international reputation. The long poem (5000 verses) *Who Lives Happily in Russia?* written in an unusual metre, is sometimes diffuse in the treatment of the whole life of the whole nation, but the greater part of it is admirable. He died January 8, 1878. The *Last Songs*, written with a dying hand, are overpowering in their intensity of feeling.

NÉLATON, nȧ'lȧ-tôɴ', AUGUSTE (1807-73). A French surgeon, born in Paris. He received his doctor's degree in 1836, from 1839 until 1851 was adjunct professor in the Faculty of Paris, and from the latter year until 1867 was professor of clinical surgery. He became a Senator in 1868, and a member of the Institute in 1869. He was one of the most skillful operators of his time, and made several important improvements in surgery, one of which, a probe, having an unpolished porcelain knob at its end, much used in military surgery in searching for bullets, is called Nélaton's probe. His principal work is *Eléments de pathologie chirurgicale* (2d ed. 1868-85).

NE'LEUS (Lat., from Gk. Νηλεύς). A son of Poseidon and brother of Pelias. Having been exposed by their mother, the brothers were found and brought up by a herdsman, and when grown up were recognized by their mother, Tyro, who had married Cretheus of Iolcus. After Cretheus's death they quarreled over the possession of Iolcus, and Neleus withdrew to Pylos in Messenia. Because Neleus refused to purify Heracles after the murder of Iphitus, Heracles killed all Neleus's sons except Nestor. According to one account Neleus perished with his sons. He is also said to have reëstablished the Olympic Games and to have died at Corinth.

NELIGH, nē'lĭg. A city and the county-seat of Antelope County, Neb., 152 miles northwest of Omaha; on the Elkhorn River, and on the Fremont, Elkhorn and Missouri Valley Railroad (Map: Nebraska, G 1). Gates Academy (Congregational), with a library of 5000 volumes, is located here. The city is the commercial centre of a large agricultural and stock-raising region. Alfalfa is extensively cultivated in this vicinity. Population, in 1890, 1209; in 1900, 1135.

NELLORE, nĕl-lōr', or **NELLUR**, nĕl-lōōr'. The capital of a district, Madras, British India, situated on an elevation on the right bank of the Pennair River, eight miles from its mouth, and 96 miles northwest of Madras by rail (Map: India, D 6). It is irregularly built and has densely populated sections; but there are also some good streets. It is the seat of several European missions. One of the features of the vicinity is the anicut, 677 yards long, the chief irrigation work on the Pennair. The town has a good water supply. The ancient Sinhapur, "lion city," was formerly an important fortress. The discovery in the ruins of a Hindu temple, at the end of the eighteenth century, of a pot filled with second century Roman gold coins and medals, chiefly of Trajan, Adrian, and Faustina, would point to a remote origin. Population, in 1891, 29,336; in 1901, 32,040.

NEL'SON. A municipal borough and manufacturing town in Lancashire, England, 3½ miles northeast of Burnley (Map: England, D 3). Besides coal-mining, it has considerable manufactures of cotton, worsted, and silk. It contains a handsome market-hall, and a technical school. In 1850 it was a small village named after a roadside inn; its manufactures inaugurated its prosperity, and it was incorporated in 1890. It owns its water, gas, and electric lighting plants, market, free library, cemetery, and provides technical instruction. Population, in 1871, 5600; in 1891, 22,754; in 1901, 32,816.

NELSON. The capital of a province of the same name, in New Zealand, situated at the north end of South Island (Map: New Zealand, D 4). The harbor has a depth on bar of from 15 to 19 feet. The railway wharf can be reached only by vessels drawing 18 feet and under. Steamers periodically ply to Sydney and Melbourne. The manufactures of the town comprise cloth and leather goods. The centre of the town is a hill rising 40 feet above the surrounding streets, and laid out as a square with an Episcopal cathedral in its centre. The city was founded in 1841. Population, in 1901, 7000; of electoral district, 11,100.

NEL'SON. A town in the southeastern part of British Columbia, situated on the Kootenay River, 20 miles west of Kootenay Lake (Map: British Columbia, F 5). It is the chief mining centre of the Kootenay silver-mining region, and has a large smelting plant, saw mill, foundry, and machine shops. Population, in 1901, 5273.

NELSON, Horatio, Viscount (1758-1805). The most famous of English admirals. He was born at Burnham-Thorpe, Norfolk, England, on September 29, 1758. His father was the rector of his native place, while his mother was a grand-niece of Sir Robert Walpole. Nelson received only a slender education, and at the age of twelve he entered the navy under the care of his maternal uncle, Captain Maurice Suckling. To this uncle he owed his early rapid promotion, and the advice which led to his careful training in seamanship. During his first period of service he made voyages to the Arctic regions and the East Indies, and suffered considerably from ill health, for throughout life Nelson was very weak physically, and often was maintained only by sheer force of will. In 1777 Nelson was made second lieutenant, and again went to the West Indies. In 1779 he became captain, and henceforth promotion came to him only in due order, since the regulations did not allow any promotion other than according to seniority after the rank of captain.

In 1783, after the war with France and the American colonies had closed, Nelson was for a short time put on half pay, but after a few months, part of which time was spent in France, he was appointed to the *Boreas*, on which he served in the West Indies until 1787. Here he performed his first notable service, which, however, brought him into conflict with his commander, Sir Richard Hughes, a well-meaning, but timid man. Contrary to the latter's orders and in opposition to powerful interests in the West Indies, Nelson insisted upon enforcing the Navigation Acts against the United States and other foreign nations. He was ultimately upheld by the British Government, but for the time it involved him in vexatious law-suits and caused him much anxiety. While on this station Nelson first met at Nevis the widow of Dr. Josiah Nisbet, by birth a Miss Frances Woolward, whom he ultimately married on March 11, 1787, Prince William, afterwards William IV., giving the bride away.

Soon after his marriage Nelson started for home, and on November 30, 1787, he was relieved from active service. For some obscure reasons a coolness had sprung up between Nelson and the Admiralty, with the result that he remained in retirement until the threatened outbreak of the war with France in 1792 caused all officers to be recalled into active service. On January 30, 1793, Nelson received command of the sixty-four-gun ship *Agamemnon*, which, together with his last ship, the *Victory*, is most closely associated with his career. He served on it for over three years. He was assigned to the Mediterranean fleet, serving first under Admiral Hood, then under Hotham, and finally under Sir John Jervis (later the Earl of Saint Vincent). Several times he was sent on diplomatic missions, and on the occasion of one to Naples in September, 1793, Nelson for the first time met Sir William Hamilton and his wife Emma, the Lady Hamilton who was to have later so great an influence over him. Nelson took an active part in Hood's conquest of Corsica, commanding the marines at Bastia and Calvi, where he lost the sight of his right eye. This period of his life Nelson always considered the happiest part of his career, and it prepared him for the great events to come. In 1796 he was made a commodore, and received a new ship.

At this time Napoleon was winning his great victories over the Austrians in Italy. The position of the British fleet in the Mediterranean was becoming precarious, as Spain was about to join France, in which case the English fleet would be greatly outnumbered. The hold of the British on Corsica was loosening, since, under the influence of the great French victories, the Republicans were becoming very active on the island. Taking all these things into consideration, the British Government ordered Sir John Jervis to abandon Corsica, to withdraw from the Mediterranean, and return to England. These orders were received on September 25, 1796, and Nelson had to superintend the work, though he considered it best for Great Britain to retain everything, since he believed the British fleet sufficiently powerful to cope with the enemy.

In December, 1796, Jervis sent Nelson back to the Mediterranean to aid in the removal of the naval stores from the island of Elba, which the British had retained at the time they had abandoned the other posts in that sea. As he was returning he had to pass through the whole Spanish fleet, and on February 13, 1797, he had rejoined Jervis. The following day took place the great battle off Cape Saint Vincent (q.v.). Here by his rapid and independent manœuvres Nelson did much to carry the day, and Jervis was magnanimous enough to give him due credit. The Spanish fleet of twenty-seven ships was totally defeated by fifteen vessels, and one of the chief naval resources of France had disappeared. As a reward for his share in this great event Nelson received a knighthood of the Bath, and before this he had become in due order of promotion a rear-admiral of the blue. His next duty was to bring the troops away from Elba, a task which he promptly accomplished. It is interesting to note that though at this time the serious mutinies in the fleet at Spithead and the Nore took place, Nelson had no difficulty with his men, who assured him of their loyalty. For a few weeks Nelson served off Cadiz, and then, at his own suggestion, he was detached to make an attack on the town of Santa Cruz, on the island of Teneriffe, believing that large Mexican treasure ships had taken refuge there, whose capture would deal a severe blow to Spain. The expedition arrived at its destination on July 20, 1797, and the following day an attack was made. This assault and some later ones were all repulsed. The plan had never anything to recommend it but its boldness and a belief that the place was not strongly defended. Nelson himself fought with great heroism and lost his right arm, and, as the wound did not heal well, he was compelled to return to England, where he arrived on September 3, 1797. On September 27 he was invested with the Order of the Bath by George III. in person, and at the same time a pension of £1000 a year was awarded him. At this time, on account of his ill health and a fear that he would never again be able to enter active service, his spirits were greatly depressed, but he revived at once when on March 29, 1798, his flag was again hoisted over a ship. On April 30th he rejoined the Earl of Saint Vincent off Cadiz.

From this time a new period in Nelson's life begins. He soon becomes the great man of his service, instead of merely one of many distinguished naval officers. It is the period which opens with Abukir Bay and closes with Trafalgar. It is necessary to consider now the state of Europe at the time when Nelson rejoined the fleet. Austria had been compelled by Napoleon's victories in Italy to sign the Preliminaries of Leoben on April 18, 1797, which were ratified soon after by the Treaty of Campo-Formio (q.v.). This left England with only one weak ally, Portugal, while it set Napoleon free to attack England itself. He thought the best place to injure England would be in the East, and for this purpose prepared his great Egyptian expedition. (See NAPOLEON I.) The news of Napoleon's intentions soon reached Saint Vincent, and in spite of the jealousy of some older officers, he detached Nelson to watch the French fleet and to check it. Nelson was unable to prevent it from getting to Egypt, and for months there was a weary hunt to find the French ships and compel them to fight. Finally, on August 1, 1798, Nelson discovered them in the Bay of Abukir, and in the battle that ensued the French fleet was completely defeated, and only two vessels escaped. Nelson received a wound on the head from which he suffered forever after. The brilliant victory at Abukir practically insured the failure of Napoleon's expedition, since it cut him off from his base of supplies. Nelson was created Baron Nelson of the Nile, and received a pension of £2000 a year, besides other numerous gifts and compliments both from England and abroad. On August 19th he sailed from Alexandria and on September 22d he finally arrived at Naples.

The Neapolitan period of Nelson's life, which covered the ensuing two years, was the one blemish on his otherwise glorious career. Here began his criminal relations with the wife of the English Minister at Naples, Sir William Hamilton, which led to a complete separation of Nelson and his wife early in 1801. Moreover, Lady Hamilton influenced Nelson's public acts, so that for a time he behaved rather as commander-in-chief of the Neapolitan navy than as an English admiral. He induced Naples, however, to make war upon France, but the Neapolitan army was soon decisively defeated, and the royal family was compelled in December, 1798, to leave Naples, where the French proclaimed the Parthenopean Republic. After residing for a while with the Hamiltons at Palermo, and vexed for a time on account of the appointment of a junior officer, Sir Sidney Smith, to an important command in the Levant, Nelson was finally roused again to action on May 12, 1799, by the news that Admiral Bruix with the French Brest fleet had escaped from that harbor and was about to enter the Mediterranean. The danger was imminent that the French would recover the naval supremacy in the Mediterranean, which had been destroyed by the victory at Abukir Bay. Nelson prepared for the emergency with his usual ability, when, to his disgust, Jervis resigned his command and was succeeded by Keith, an honest but by no means brilliant officer. Friction between him and Nelson existed from the start. On June 24, 1799, Nelson appeared before Naples intent upon securing that city before the French fleet should appear. He found that the Republicans had complete control and were aided by a Neapolitan squadron under Commodore Caraccioli. The Neapolitan admiral was captured on June 29th, and Nelson, as commander-in-chief of the Neapolitan navy, immediately ordered a court-martial, which sentenced the Commodore to death, and he was executed at once. Nelson has often been blamed unjustly for this action, the only fault which can possibly be imputed to him being that possibly he might have proceeded with more deliberation. The forts of the city had surrendered on June 26th. At this time Nelson was created Duke of Bronte by the despicable Ferdinand IV. of Naples. To the influence of Lady Hamilton, who was the intimate of the Queen of Naples, must be charged the serious disobedience of orders by Nelson shortly after. He had been ordered to join Lord Keith and to assist him to meet a large French fleet, but he preferred to remain at Naples. The danger, it is true, was averted; for on August 13, 1799, the French fleet reëntered Brest, but had Nelson come up in time it is just possible that another great victory might have been won. For a short time Nelson was commander in the Mediterranean, but he displayed no enthusiasm for his work. On January 20, 1800, he united his command with that of Keith, and after several quarrels Nelson was finally recalled by orders which reached him in June. He traveled overland with the Hamiltons, and, though he was received everywhere with great enthusiasm, his conduct gave great cause of scandal to all his friends. On November 6, 1800, the party arrived in England, and soon after Nelson's final breach with his wife took place.

On January 1, 1801, Nelson was promoted to be vice-admiral, and he was assigned to the command of Sir Hyde Parker, who was to coerce the Northern Confederation. This league, composed of the States on the Baltic, had been maintaining an armed neutrality, which in truth was only a veiled attempt to aid Napoleon. Nelson advised an attack on the strongest member of the confederacy, Russia; but his daring plan was not followed, and instead the whole fleet sailed for Denmark. In a bold assault on the Danish fleet at Copenhagen, Nelson was victorious (April 2, 1801), and the Danes were compelled on April 9th to sign an armistice, which tied their hands, but left the English free. It was during the engagement of April 2d that Nelson, having received an order early in the day to cease action, placed his telescope to his blind eye and said, "I really do not see the signal." On May 5, 1801, Nelson was appointed commander-in-chief in place of Parker. He immediately proceeded to carry out his plan of attacking Russia, but found, when he arrived at Revel, that the Czar Paul had been murdered on March 24th, and his son and successor, Alexander I., was preparing to follow another policy. For his services in this campaign Nelson was created a viscount. He returned to England and lived with the Hamiltons. After some slight service in the Channel, the Peace of Amiens closed the war, and on October 22, 1801, Nelson left his ship.

Peace, however, proved of short duration, and on May 18, 1803, Nelson raised his flag on the *Victory* as commander-in-chief of the Mediterranean fleet. For two years he blockaded Toulon and kept a watchful eye on affairs, but Villeneuve escaped from Toulon with the French fleet on March 30, 1805. Napoleon was preparing at Boulogne to invade England, and for this purpose the different French fleets were to unite and cover the expedition. A most exciting chase followed, in which Nelson pursued Villeneuve to the West Indies and back to the coast of Spain, but the French admiral was unable to elude Nelson and the other English admirals long enough to give Napoleon any opportunity of crossing the Channel. Villeneuve finally put in at Cadiz and Napoleon marched against Austria, which had declared war against him. Thus England was saved.

Nelson now blockaded Villeneuve at Cadiz, but Napoleon was threatening to disgrace his admiral for not fighting, and consequently, when Nelson had to send six vessels to Gibraltar for water, Villeneuve seized the opportunity and started to leave his shelter on October 19, 1805, and on October 21st took place the famous battle off Cape Trafalgar (q.v.). Before beginning battle Nelson gave his now famous signal, "England expects that every man will do his duty." The victory was complete, but Nelson was mortally wounded, and died on the afternoon of October 21, 1805, with the words "Thank God, I have done my duty." By his final great victory he had destroyed the combined French and Spanish fleets, and Napoleon's hope of creating a naval power vanished forever. Nelson thus contributed immensely to the final destruction of the Napoleonic ambitions, for without the control of the sea England would have been unable to wage her long contest. Nelson was buried at Saint Paul's Cathedral, London, on January 9, 1806, amid extraordinary public demonstrations.

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NELSON, SAMUEL (1792-1873). An American jurist, born at Hebron, Washington County, N. Y. He graduated at Middlebury College, Vermont, in 1813. He then read law, removed to New York State, where in 1817 he was admitted to the bar, and began practice at Cortland. In 1820 he was a Presidential elector on the Democratic ticket. His long judicial career of half a century began in 1823, when he was appointed by Governor Yates a judge of the State circuit court. In 1831 he was promoted to be an associate justice of the New York State Supreme Court, and in 1837, by appointment of Governor Marcy, he became Chief Justice of the court in succession to Judge Savage. In 1845 he was nominated by President Tyler as an associate justice of the Supreme Court of the United States. Although he concurred with Chief Justice Taney in the "Dred Scott" decision in 1857, and disapproved of the President's exercise of "war powers" during the Civil War, his loyalty was never questioned, and he was frequently consulted by Lincoln in judicial matters. He ranks as one of the greatest American authorities on admiralty and maritime law, and his prize-court decisions during the Civil War are of the utmost importance. In 1871 he was appointed by President Grant as one of the Joint High Commission for the settlement of the Alabama claims (q.v.).

NELSON, THOMAS (1738-89). An American patriot, one of the signers of the Declaration of Independence. He was born at Yorktown, Va., and was the son of William Nelson, Governor of Virginia in 1770-71. He went to England in 1753, was educated at Eton and at Trinity College, Cambridge, and returned to his home at Yorktown in 1761. He was a delegate for several terms to the House of Burgesses, and served in the Provincial Conventions of 1774, 1775, and 1776, introducing in the last the resolution by which Virginia's delegates to Congress were instructed (May 15th) to propose a declaration of independence. From August, 1775, until May, 1777, when he was forced by ill health to resign, he was a delegate to the Continental Congress, and signed the Declaration of Independence. In 1775 he was for a time colonel of the Second Virginia Regiment, and from August, 1777, until late in 1782, he commanded the Virginia State forces, rendering valuable service at the siege of Yorktown (1781), where he showed his patriotism by ordering the gunners to fire upon his own mansion, supposed to be the headquarters of Cornwallis. In 1779 he again sat for a time in Congress, and was again forced by ill health to resign; in 1780 he raised a large sum of money, on his own security, for the State, and paid out of his own pocket the arrearages of two Virginia regiments ordered South; and in the spring of

1781 he succeeded Jefferson as Governor of Virginia, though he resigned in November. Impoverished by his liberal advances to the State during the war, he passed his last years in very straitened circumstances, and much of his property was sold to pay public debts, for which he was security.

NELSON, William (1825-62). An American naval officer and soldier, born in Maysville, Ky. He entered the United States Navy in 1840, and in 1847 commanded a battery at the siege of Vera Cruz. He subsequently served in the Mediterranean and South Pacific, was promoted to the rank of master in 1854 and to that of lieutenant in 1855, and in 1858, as commander of the *Niagara*, transported to Africa the negroes who had been rescued from the slave-ship *Echo*. In 1861 he was on ordnance duty at Washington, and at the outbreak of the Civil War he was placed in command of the gunboats on the Ohio, with the rank of lieutenant-commander. He left the navy soon afterwards, entered the military service, was ordered to Kentucky, and there established recruiting stations, and organized camp 'Dick Robinson,' near Danville, and a similar rendezvous at Washington, in Mason County. In September, 1861, he became a brigadier-general of volunteers, and at the battle of Shiloh (April 6-7, 1862) he commanded the second division under General Buell. (See Shiloh, Battle of.) He was wounded in the engagement at Richmond, Ky.; was in command at Louisville, Ky., in 1862, when the Confederate general Bragg threatened that city, and in July of this year was commissioned major-general of volunteers. On September 29th he was fatally shot at the Galt House, Louisville, by the Federal general Jefferson C. Davis, in a personal quarrel.

NELSON, Wolfred (1792-1863). A Canadian physician and revolutionist. The son of an English officer, he was born at Montreal. In 1811 he began the practice of medicine in Saint Denis. In the war with the United States, 1812, he served as surgeon. He was chosen representative of Sorel in the Canadian Parliament of 1827. He took a leading part in the revolution of 1837, and was in command at the victory obtained by the insurgents at Saint Denis, on the Richelieu River, but was captured and sent to Bermuda as an exile. The following year he settled at Plattsburg, N. Y., and in 1842, after the declaration of a general amnesty, returned to Montreal. He was again elected to Parliament from his former district in 1844 and 1845, and in 1851 was made inspector of prisons, a position which he held for several years. He served as Mayor of Montreal two terms and was at the head of the Lower Canada College of Physicians and Surgeons. He died in Montreal.

NELSON MONUMENT. A granite column in the centre of Trafalgar Square, London, copied from a Corinthian column of the Temple of Mars Ultor, in Rome, and crowned with a statue of Nelson, 17 feet in height. The shaft, 145 feet high, was erected in 1843 by voluntary subscriptions. The pedestal bears bronze reliefs, cast from French cannon, depicting scenes from Nelson's life. At the foot of the column are four colossal bronze lions, by Sir Edwin Landseer.

NELSON RIVER. The principal river in the Canadian Territory of Keewatin, forming the lower course of the Saskatchewan (q.v.) (Map: Northwest Territories, K 3). It flows from the north end of Lake Winnipeg, first northward, through a series of lakes, then northeastward, into Hudson Bay at York Factory, after a course emptying through the estuary of Port Nelson of about 400 miles. It is deep, wide, and swift, discharging an enormous volume of water; rapids and falls in its upper reaches limit its navigation by steamers to from 80 to 90 miles, though boats can ascend 127 miles from its mouth.

NELSON'S FARM, Battle of. See Frazier's Farm, Battle of.

NEL'SONVILLE. A city in Athens County, Ohio, 62 miles southeast of the State capital, Columbus; on the Hocking River, and on the Hocking Valley Railroad (Map: Ohio, F 7). There is an important trade in coal, which is mined extensively in the vicinity, this being one of the most productive coal fields of the State. Nelsonville has a large establishment which manufactures mining implements, car wheels, etc., and conducts a large repair business. The water-works are owned by the municipality. Population, in 1890, 4558; in 1900, 5421.

NELUM'BO (Ceylonese name), *Nelumbium*. A genus of aquatic plants similar to water-lilies, and often included under that name in the natural order Nymphæaceæ. The few species which are found in the warm parts of Asia, North America, and the north of Africa, are all distinguished by the beauty of their flowers. *Nelumbium speciosum*, with rose-colored flowers, is the Egyptian bean of Pythagoras, the lotus (q.v.) held sacred by the Hindus and by the people of Tibet, has been used as a food by the Egyptians from remote antiquity, and is much esteemed where it is cultivated, especially in China, for its edible seeds, roots, leaf-stalks, and flower-stalks. The seeds resemble acorns in size and shape, and have a more delicate flavor than almonds. The root contains much starch, and Chinese arrowroot is said to be obtained from it. Great quantities are pickled with salt and vinegar, and eaten with rice. When powdered it makes excellent soup with water or milk. The ancient Egyptian mode of sowing this plant, by inclosing each seed in a ball of clay, and throwing it into the water, is practiced at the present day in India. *Nelumbium luteum* is a North American species, with yellow flowers, which extends almost as far north as Ontario. The edible seeds, called water chinquapins, are sought for by children and others, and the farinaceous roots are agreeable when boiled.

NEM'ATHELMIN'THES (Neo-Lat. nom. pl., from Gk. *νῆμα*, *nēma*, thread + *ἕλμινς*, *helmins*, worm). A large and important phylum of the unsegmented worms, of a more or less elongated cylindrical form and known as 'roundworms.' Their skin is thick and strong, and is usually wrinkled, giving the body a slightly annulated appearance, which, however, disappears if the animal is placed in water. The nervous system in the higher forms consists of two lateral ganglia at the anterior extremity, which are united by a nervous ring, and from which two nervous trunks, one dorsal and one ventral, proceed to the posterior part of the body. In the lower forms the dorsal cord is wanting, or else the ventral cord is wanting and there are two lateral cords. Special organs of sense are rarely met with; but a general sense of touch exists, and a few of the free-living species have two simple eye-spots. The digestive organs are extremely simple. No blood system nor distinct respiratory or excretory organs can be detected. These worms are unisexual; but the males are comparatively rarely found, and are always smaller than the females. With the exception of the two families—the Enoplidæ, which are mostly marine forms, and the Anguillulidæ, or paste and vinegar eels—all the animals of this class are parasitic.

This phylum is divisible into three very distinct classes, namely, *Acanthocephala*, which have a protrusible proboscis armed with continuous hooks, and are destitute of an intestinal canal; the *Gordiacea*, which possess an intestinal canal, but no anus; and the *Nematoda*, which usually possess a perfect intestinal canal, provided with two orifices. See ASCARIS; ENTOZOA; FILARIA; GUINEA-WORM; PINWORM; ROUNDWORM; THREADWORMS; TRICHINA.

NEMATOCYST (from Gk. *νῆμα*, *nēma*, thread + *κύστις*, *kystis*, bladder). One of the lasso-cells, thread-cells, or nettling organs (*cnidæ*) of jellyfishes and other Cœlenterata, acting as organs of offense and defense. These bodies are imbedded in the outer cellular layer or ectoderm of cœlenterates. A nematocyst is an oval, tough capsule, filled with a clear fluid, and invaginated at one end in the form of a hollow process which is prolonged into a long coiled hollow thread. The entire structure is developed in an interstitial cell called a cnidoblast, which, as it approaches maturity, migrates toward the surface and becomes imbedded in one of the large ectoderm cells. At one point on its surface the cnidoblast is produced into a delicate protoplasmic process, the cnidocil or 'trigger-hair.' Any small animal on coming in contact with the lasso-cells of a jellyfish is stung, benumbed, or poisoned by them. Upon contact with one or many of these lasso-cells in the tentacles of a jellyfish or hydra, or a physalia, the cnidoblast suddenly contracts, and the pressure upon the stinging capsule causes an instantaneous eversion of the thread, at the base of which are minute sharp barbs. The threads also convey a poisonous fluid, which benumbs the victim. In this way sea-anemones and coral polyps obtain their food, paralyzing and thus capturing quite large animals, even young fishes. These poison lasso-cells also occur in certain Protozoa, mollusks, and in sponges, and in a modified form exist in the skin of certain worms, both terrestrial and aquatic. They are in these worms minute stiff rods, either coiled up in an irregularly spiral manner, or short and straight, contained in oval cells. They are shot out in great numbers when the animal is irritated, but are not retractile, being projected clear from the skin. That they are true nettling organs is proved by the fact that on touching the worms with the tongue they cause a tingling sensation. See illustration under CŒLENTERATA.

NEMATODA. A class of the phylum Nemathelminthes (q.v.), mostly parasites, but many others are extremely abundant in both fresh and salt water. They are the roundworms (q.v.) and a familiar example is found in Ascaris (q.v.). They are ranked in two orders: *Nematoidea*, in which the cœlom is not lined by epithelium, and *Gordioidea*, in which it is so lined. See HAIRWORM; NEMATHELMINTHES.

NEM'ATOG'NATHI (Neo-Lat. nom. pl., from Gk. *νῆμα*, *nēma*, thread + *γνάθος*, *gnathos*, jaw). An order of fishes. See CATFISH; compare PLECTOSPONDYLI.

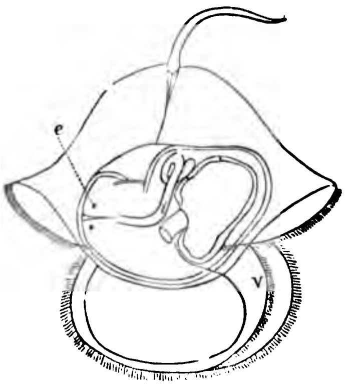
NEMATOPHYTON (Neo-Lat., from Gk. *νῆμα*, *nēma*, thread + *φυτόν*, *phyton*, plant). A gigantic fossil alga found in rocks of Devonian age in the Eastern United States and Canada. The stem is of great size, often 40 feet long by 2 to 3 feet in diameter, and resembles the trunk of a tree to such extent that it was originally supposed to be the trunk of a conifer. This resemblance led Dawson to name it Prototaxites or ancestral yewtree. The cellular structure is that of an alga. Several large trunks were uncovered near Monroe, Orange County, N. Y., during 1897 to 1899. The type species is *Nematophyton Logani.*

NEMAU'SUS. An ancient town of Gallia Narbonensis, now Nîmes (q.v.).

NĚMCOVÁ, nyĕm'tsô-vä, BOZENA (1820-62). A Czech novelist, born in Vienna. She lived in Bohemia for several years, making a study of the life in its villages. One of her novels on this subject, *Babička* ("Little Grandmother," 1855), is especially well known. It has frequently been translated into foreign languages, and into English by Gregor in 1891. Her other works include *Karla* ("Charlotte," 1856) and *Pohorská vesnice* ("The Village in the Mountains," 1856). Her contributions to the study of Bohemian and Hungarian folk-lore in the volumes *Národní báchorky a pověsti* (1845-46) and *Slovenské pohádky a pověsti* ("Slovak Folk Tales," 1858) are valuable. Her complete works, *Sebraně spisy*, were published in 1862-63.

NE'MEA (Lat., from Gk. *Νεμέα*). The ancient name of a well-wooded valley of Argolis, in the Peloponnesus, between Cleonæ and Phlius. It lies north and south, and is from two to three miles long, and more than half a mile broad. In it there was no town but a sacred inclosure and temple of Zeus, of which three columns are still standing, while the others lie where they have been thrown by earthquakes. The valley was the seat of one of the four great national festivals of the Greeks—the *Nemean Games*, which were celebrated in mid-summer every two years, at the beginning of the second and fourth year of each Olympiad. The first of the historical period seems to have been held in B.C. 573, though legend ascribed the foundation of the games to the seven heroes on their march against Thebes, or to Hercules. The games consisted of the usual athletic contests, horse-racing, and a competition for players on the cithara. The prize was a palm branch and crown of parsley.

NEM'ERTIN'EA (Neo-Lat., from Gk. *Νημέρτης*, *nēmertēs*, name of a Nereid, from *νημερτής*, *nēmertēs*, unerring, from *νη-*, *nē-*, not + *ἁμαρτάνειν*, *hamartanein*, to miss). A class of flatworms easily distinguished from the Platodes by the proboscis and the presence of an anus. They are also remarkable for the prodigious length attained by some of the species, which, in the most extended state, is 10 or 12 feet, and one (*Linus longissimus*) reaches 90 feet. But the animal which so stretches itself out is capable of suddenly contracting itself to a quarter of that length. The nemertineans are unsegmented worms, with a ciliated body epithelium, and are more or less dorso-ventrally flattened. There is no distinct body-cavity; the intestine is straight, with lateral diverticula; the anus is at the posterior end of the body. The blood, nervous, and excretory systems are all present, and are usually very well developed. The only sense-organs are little ciliated pits possibly olfactory, and pigment eyes. The sexes are separate and the larva goes through a complicated metamorphosis in most cases. One of the characteristic features of the nemertineans is the proboscis, lying above the œsophagus and opening from its cavity, just over the mouth. This proboscis may be used in the capture of food, which consists, to a large extent, of other sorts of worms. These worms twine themselves into knots and rolls, apparently inextricable, but without any real entanglement. A large number of species are known from all parts of the world. The great majority are marine, but a few are fresh-water, and land forms are known. The latter are all small and dull-colored, but the marine forms, besides being oftentimes very large, are frequently very gaudy, red and green being common colors. These worms usually pass through a metamorphosis; the pre-larva is called a 'pilidium,' which is helmet-shaped with side lobes or lappets. A reduced form of the pilidium is called Desor's larva. The body of the pilidium is not entirely absorbed by the growing worm, but the worm develops within the larva, and finally frees itself, when the remnant of the pilidium dies. Certain forms have a direct development. Multiplication by transverse fission is frequent. Consult Shedson, *Cambridge Natural History*, vol. ii. (London, 1896).



PILIDIUM OF NEMERTES.

The worm is shown growing within the larva; *v*, velum; *e*, eyes; *i*, intestine of the nemertinean worm.

NE'MESIA'NUS, MARCUS AURELIUS OLYMPIUS. A Carthaginian Latinist of the latter half of the third Christian century. He wrote *Cynegetica*, 'On Hunting,' of which the 325 lines preserved constitute what is apparently an introduction to the main work (edited by Baehrens in his *Poetæ Latini Minores*, 1879, and by Stern, together with Grattius, 1832); and four *Eclogæ*, reminiscent of Vergil, of Manilius, and most of all of Calpurnius Siculus, with whose poems they are so constantly found in manuscript that they long passed as his work (edited by Baehrens, as above, and by Schenkl, 1885; translated into English verse by Scott, 1891). The fondness of the author for the refrain and other points of similarity in style have suggested the attribution to Nemesianus of the *Pervigilium Veneris;* but this is entirely problematical.

NEM'ESIS (Lat., from Gk. Νέμεσις, from νέμειν, *nemein*, to distribute). A goddess of fate, who apportions to men their deserts. In Homer Nemesis does not appear as a person, though the word is used as a common noun in the sense of 'righteous anger.' In another early epic, the *Cypria*, Nemesis was a goddess beloved by Zeus, whom she sought to escape by transforming herself into various animals. Finally, the god approached her as a swan, and she brought forth an egg, which was found and kept by Leda, till in fullness of time Helen, the cause of the Trojan War, was born. Nemesis was worshiped at Smyrna, in Ionia, where there seem to have been two goddesses of the same name, and especially at Rhamnus in Attica, where were two temples, an old one, and a large new one erected in the period following the Persian wars. It contained a famous statue of the goddess by Agoracritos, the pupil of Phidias, of which the head is in the British Museum. According to Hesiod, Nemesis was the daughter of destructive night. She is the avenger of wrong, punishing especially vaunting pride, and in general any overstepping of the bounds of due moderation. Those who forget to humble themselves before the gods or who offend against the eternal laws are likely to fall under her power. In Alexandrian poetry Nemesis is frequently invoked to punish a cold or fickle loved one. In art Nemesis appears as a dignified youthful figure, bearing frequently a measuring-rod or an apple-branch in one hand, and commonly drawing forward the upper seam of her tunic. In later art she is frequently winged, with a wheel at her feet, or a griffin at her side, or holding a bridle.

NEME'SIUS (Lat., from Gk. Νεμέσιος, *Nemesios*). A Greek philosopher, of about the middle of the fourth century A.D. He was Bishop of Emesa, and wrote in Greek a treatise on *The Nature of Man*, in which he expressed his belief in the preëminence of the soul, the freedom of the will, and the indestructibility of matter. There is a passage in the book which has been interpreted as showing some understanding of the circulation of the blood. In Latin translation the work was much read during the Middle Ages, and since then it has been translated into several of the languages of modern Europe. There is an edition by Matthaei (Halle, 1802).

NEMI, nā'mė. A lake in Italy about 17 miles southeast of Rome, having on its margin a famous grove of Diana. It was anciently called *Lacus Nemorensis* and also *Speculum Dianæ*, mirror of Diana. The grove of Diana was celebrated on account of its priest, who won his place by slaying his predecessor, and held it only till he was himself slain. The grove seems to have been situated on the northeast shore, near the modern village of Nemi. The lake fills the crater of an extinct volcano, is about 1100 feet above the sea, four miles in circumference, and has no outlet except a passage of unknown antiquity which still serves its original purpose. It had long been known that there were remains of vessels sunk near the shore, but it was not till 1895 that these were satisfactorily examined. One seems to have been about 200 feet in length, and 60 feet beam; the other was perhaps 250 feet long. The decks were paved with thin slabs of porphyry and serpentine, and the railings were of gilded bronze. Lead water-pipes with the name of Caligula furnished a clew to the date, and seemed to imply fountains on board. Though commonly called ships, it is far more probable that they were great rafts used in some spectacle connected with the worship of Diana. On the ritual of the grove, consult Frazer, *The Golden Bough* (2d. ed., London and New York, 1900).

NEMOURS, ne-mo͞or′, Duke of. A French general who gained fame in the Italian wars of Louis XII. See *Gaston de Foix*, Duke of Nemours, under Foix.

NEMOURS, Louis Charles Philippe Raphael d'Orléans, Duke de (1814-96). Second son of Louis Philippe. He was born in Paris and educated at the College of Henry IV. In 1831 he was elected King of the Belgians, but declined the offer. He served in the two Belgian campaigns, and in Algeria, and was in 1837 made lieutenant-general. After the death of his elder brother, the Duke of Orléans (July 13, 1842), it was proposed to confer the regency upon the Duke de Nemours; but this was not sanctioned by public opinion, and he left France on the outbreak of the Revolution in 1848, and did not return till 1871. After the adoption of the anti-royalist bill of 1886 his name was struck off the army list.

NENA SAHIB, nä′nȧ sä′hēb. Leader in the Sepoy Mutiny in India. See Nana Sahib.

NENCIONI, nân-chō′nē, Enrico (1840-96). An Italian poet and critic, born at Florence. He was one of that literary company called the 'Amici pedanti,' of which Carducci was the leader. He wrote for the *Italia Nuova*, and translated much French and English poetry into his language. Especially remarkable are his papers on English literature. Toward the end of his life he held a professorship at the Woman's Normal School in Florence. His works include: *Versi* (1880); *Medaglioni* (1883 and 1897); and *Studi di letterature straniere* (1897-98).

NEN′NIUS. An historian who lived in Wales at the end of the eighth and beginning of the ninth century, and who is believed by some to be the author of the *Historia Britonum*. Little is definitely known about him. The *Historia Britonum* contains a description of Britain; and deals briefly with the period of the Roman occupation, and the subsequent events, as the incursions of the Picts and Scots and the Saxon conquest. As an historical source it has little value, but it is of some importance for the study of early British mythology, especially for the study of the legend of Arthur, and because it contains the genealogies of English kings to 796. The best edition is by Mommsen, in *Monumenta Germaniæ Historica: Auctores Antiquissimi*, vol. xiii. (Berlin, 1898). For secondary works, consult: Zimmer, *Nennius Vindicatus* (Berlin, 1893); Thurneysen, "Nennius Vindicatus," in *Zeitschrift für deutsche Philologie*, vol. xxviii. (Halle, 1895); id., in *Zeitschrift für celtische Philologie*, vol. i. (Halle, 1897); Gross, *Sources and Literature of English History* (New York, 1900).

NE′OCENE (from Gk. *νέος*, *neos*, new + *καινός*, *kainos*, recent). A geologic term employed by the United States Geological Survey to designate the middle portion of American Cenozoic time, and corresponding to the combined Miocene and Pliocene periods of the Lyellian classification.

NEO-DARWINISM. Although Darwin, in his *Animals and Plants Under Domestication*, gave more weight to changes in the conditions of life, conceding that natural selection was not an exclusive factor in organic evolution, Wallace and others, notably Weismann, have insisted on the 'all-sufficiency' of natural selection, pushing, as many think, Darwinism far beyond its legitimate bounds. See Weismannism.

NE′OGÆ′A (Neo-Lat., from Gk. *νέος*, *neos*, new + *γαῖα*, *gaia*, earth). An alternative name in zoögeography for the continent of South America, or Neotropical Region, in conformity with 'Arctogæa,' 'Notogæa,' and so on.

NEO-HEGELIANISM, nē′ô-hā-gā′lĭ-*a*n-ĭz'm. A term often applied by opponents to the doctrine of those English, Scotch, and American thinkers who, more or less under the influence of Hegel, hold that consciousness and object are mutually implicated, and who, believing in the historical priority of the physical universe to the finite consciousnesses which are in some way correlated with physiological organisms, feel themselves forced to the conclusion that there is an eternal consciousness, of which the universe is the object. T. H. Green, J. and E. Caird, J. Watson, H. Jones, D. G. Ritchie, and Josiah Royce may be mentioned as prominent among those to whom the epithet is often applied. See especially Green, Thomas Hill.

NEO-KANTIANISM, nē′ô-kăn′tĭ-*a*n-ĭz'm. A term applied to the doctrine of those followers of Kant who accept the general result of Kant's philosophy so far as the theory of knowledge goes, but do not follow Kant in his endeavor by practical reason to work out a metaphysics. F. A. Lange, H. Cohen, P. Natorp, J. Volkelt, and O. Liebmann may be mentioned as representatives of this tendency.

NEO-LAMARCK′ISM. The modified doctrine held by those naturalists who accept in the main the teachings of Lamarck (q.v.). Lamarck was the first truly scientific thinker to state in a detailed way the causes not only of the origin of species, but of certain types of animal life, such as some orders of birds, of the groups represented by the ai, lemur, the kangaroo, and so on. The chief Lamarckian factors of organic evolution (see Lamarckism) are changes in the environment, direct in plants and the lowest animals, indirect in the higher animals; also, the use and disuse of organs, and the transmission of characters acquired during the lifetime of the individual, or what is called 'use-inheritance.' The first writer after Lamarck, on the lines laid out by the great French zoölogist, was Herbert Spencer. In 1866-71, in his *Principles of Biology*, Haeckel claimed (1868) that we should have to adopt Lamarck's theory of descent for the explanation of biological phenomena, "even if we did not possess Darwin's theory of selection," adding: "The one is so completely and *directly proved* by the other, and established by mechanical causes, that there remains nothing to be desired."

In America, Cope (1866-71) and Hyatt (1866-74) independently advocated Lamarckian views.

Cope first (1871) furnished what he considered as "an actual demonstration of the reality of the Lamarckian factor of use, or motion, as friction, impact, and strain, as an efficient cause of evolution." A. S. Packard (1871), by his studies of the embryology of Limulus, and of cave animals, was led to adopt Lamarckian views in preference to the theory of natural selection, which never seemed to him adequate or sufficiently comprehensive to explain the origin of variations and the rise of new types; and it was he who originated the term *Neo-lamarckism.* "Neo-lamarckism," he explained, "gathers up and makes use of the factors both of the Saint-Hilaire and Lamarckian schools, as containing the more fundamental causes of variation, and adds those of geographical isolation or segregation (Wagner and Gulick), the effects of gravity, the effects of currents of air and of water, of fixed or sedentary as opposed to active modes of life, the results of strains and impacts (Ryder, Cope, and Osborn), the principle of change of function as inducing the formation of new structures (Dohrn), the effects of parasitism, commensalism, and of symbiosis—in short, the biological environment; together with geological extinction, natural and sexual selection, and hybridity."

Among American zoölogists who have advocated Lamarckian views are W. H. Dall, J. A. Allen, R. T. Jackson, C. H. Eigenmann, and others; in England, Spencer, Henslow, Cunningham, Gadow, and others; in France, Giard, Perrier; and in Germany and Holland, Haeckel, Wagner, Eimer, Standfuss, Fischer, Plate, Pfeffer, O. Hertwig, Emery, Roux, and others.

NE′OLITH′IC MAN (from Gk. *νέος, neos,* new + *λίθος, lithos,* stone). The term applied by European archæologists to the races in a supposed geological period when the polishing of stone, agriculture, pottery, weaving, domestication of animals, and the construction of pile dwellings on lakesides in Switzerland, France, Italy, and Ireland, the burying of the dead in dolmens, and the rearing of megalithic monuments, were practiced.

NE′ON (Gk. *νέον,* neu. sg. of *νέος, neos,* new). A gaseous element obtained from the atmosphere by William Ramsay and Morris W. Travers in 1898. It resembles helium, and, like other members of its group, has among its characteristic features a disinclination to unite with other elements. Neon is separated from the atmosphere in the same way as krypton. Its atomic weight is given by Ramsay and Travers as 19.94.

NE′OPHYTE (Fr. *néophyte,* from Lat. *neophytus,* from Gk. *νεόφυτος,* from *νέος, neos,* new + *φυτός, phytos,* grown, from *φύειν, phyein,* to grow). The name given in early ecclesiastical language to persons recently converted to Christianity. The word is used in this sense by Saint Paul, and is explained by Saint Gregory the Great as an allusion to 'their being newly planted in the faith.' It differed from catechumen (q.v.), inasmuch as it supposed the person to have not only embraced the doctrines of the Church, but also to have received baptism. Saint Paul, in the passage referred to, directs Timothy not to promote a neophyte to the episcopate; and this prohibition was generally maintained, although occasionally disregarded in extraordinary circumstances, such as those of Saint Ambrose (q.v.). The duration of this exclusion was left for a time to the discretion of bishops; but several of the ancient synods legislated regarding it. In the modern Roman Catholic Church the same discipline is observed, and extends to persons converted not alone from heathenism, but from any sect of Christians separated from the communion of Rome. The time, however, is left to be determined by circumstances.

NEO-PLA′TONISM. The name applied to the teachings, primarily of the Græco-Alexandrian school of philosophy, and later of a number of Italian humanists, as well as some Englishmen. The extension of the Roman Empire and the growing intercourse between different parts of the world gave rise to an eclectic tendency which combined features of various systems. The process of amalgamation showed itself most prominently at Alexandria, whose central position made it a meeting-place for the chief religions and philosophies of the ancient world. Such a philosophy, therefore, as that promulgated by the Neo-Platonists, combining the peculiar mental characteristics of the East and the West, naturally originated there, though it soon ceased to have any local connection. The term Neo-Platonism is sometimes loosely used to signify the whole new intellectual movement proceeding from Alexandria, and attempts have been made to include among its exponents some of the Christian Fathers, such as Clement of Alexandria and Origen; but the name is more properly applied to the school of Ammonius Saccas (q.v.) and his followers. Plotinus (q.v.), a pupil of Ammonius, was its most important champion. Porphyrius, Iamblichus, and Proclus (qq.v.) represent a continuous decline in philosophic interest, and a greater and greater tendency to wild and fantastic religious syncretism. In common with Neo-Pythagoreanism and the Judæo-Alexandrian philosophy represented by Philo, the teaching of this school is characterized by a dualistic opposition of the divine and the earthly, an abstract conception of God which excludes all knowledge of the divine essence, a contempt for the world of sense which rests on the Platonic doctrines of matter and of the descent of souls into bodies, the supposition of mediating forms which carry over the divine operations into the world of phenomena, the demand for an ascetic liberation from a life of sense, and a faith in a higher revelation obtained in ecstasy. Notwithstanding the assumption that these doctrines were deductions from the teachings of Plato, the school brought the whole of philosophical science under a new systematic form. In their view, the basis of the divine nature is unity, the One; from this as the primordial source of all things emanates 'pure intelligence'; and from this, in turn, emanates the 'soul of the world,' whose creative activity produces other lesser souls, of men and animals. The doctrine of the divine immanence in this *anima mundi* was one of the most marked points in later Neo-Platonism, and led very close to pantheism. One of the last Neo-Platonists of antiquity was Boëthius (q.v.), who by his continued popularity became the most influential medium for the transmission, during the early Middle Ages, of Greek philosophy to Western Europe.

The fifteenth century witnessed a strong revival of interest in these speculations. Nicholas of Cusa (q.v.) and other mystics seek to overcome the doubt arising from the inadequacy of human conceptions by the theory of man's immediate knowledge or intuition of God—a theory distinctly akin to the Neo-Platonic doctrine that the soul in a state of ecstasy has the power to transcend all finite limitations. The Italian humanists, in their reaction against the previously dominant Aristotelianism, paid great devotion to anything that seemed to derive from Plato. Marsilio Ficino, especially, by his translations of Plotinus, Porphyrius, and Iamblichus, contributed to the spread of these doctrines. The Cambridge Platonists (q.v.) were not without their affinities to the Alexandrian teaching; and Wordsworth's prevalent idea of the existence of a soul in nature which holds converse with the soul of man might be traced to the same source. Consult: Whittaker, *The Neo-Platonists* (Cambridge, 1901); Bigg, *The Christian Platonists of Alexandria* (Oxford, 1886); id., *Neo-Platonism* (ib., 1895); Hipler, *Neuplatonische Studien* (Vienna, 1868); Jules Simon, *L'école d'Alexandrie* (Paris, 1843-45); Kellner, *Hellenismus und Christenthum* (Cologne, 1865); and see NEO-PYTHAGOREANISM.

NE'OPTOL'EMUS (Lat., from Gk. Νεοπτόλεμος, *Neoptolemos*). The son of Achilles and Deidamia, also called Pyrrhus. After the death of his father he was taken by Odysseus to Troy, where he was distinguished by his courage, and was one of the band who entered Troy inclosed in the wooden horse. He was the slayer of the aged Priam. He returned with rich spoils to Phthia and married Hermione, the daughter of Menelaus. According to later legend he brought back with him as part of his booty Andromache, the wife of Hector, and settled in Epirus, and later married Hermione when he had gone to Phthia to restore Peleus to his throne. He was killed at the altar at Delphi by Orestes, the former lover of Hermione, or by the Delphians. He was buried within the precincts of the temple, where he was afterwards worshiped as a hero.

NE'O-PYTH'AGO'REANISM. The name of one of the two Græco-Alexandrian schools of philosophy, the other school being the Neo-Platonic. (See NEO-PLATONISM.) Pythagoreanism was revived in the first century B.C., by P. Nigidius Figulus, a Roman prætor, but Apollonius of Tyana (q.v.) was the most prominent representative of this attempt to blend Pythagorean philosophy with Oriental theosophy. The Neo-Pythagoreans regarded it as the greatest task of the philosopher to purify himself from connection with matter by the suppression of desire and by the observance of certain ceremonial rules which were adopted from the earlier Pythagorean brotherhood. In their theoretical system, numbers had symbolic significance. Consult: Zeller, *Die Philosophie der Griechen*, part iii.; *Die nacharistotelische Philosophie* (3d ed., Leipzig, 1880-81); Vacherot, *Histoire critique de l'école d'Alexandrie* (Paris, 1846-51); also the histories of philosophy by Ueberweg-Heinze, Windelband, Erdmann, and Bergmann.

NEORNITHES, nê-ôr'nĭ-thēz (Neo-Lat. nom. pl., from Gk. νέος, *neos*, new + ὄρνις, *ornis*, bird). Modern birds, as distinguished from those of Jurassic times, which are called *Archornithes*. They are characterized by fused metacarpals, the second finger longest, and the caudal vertebræ not more than thirteen in number. The group comprises not only existing groups, but all fossil birds except Archæopteryx.

NEOSHO, nê-ō'shô. A city and the county-seat of Newton County, Mo., 21 miles southeast of Joplin, on the Saint Louis and San Francisco and the Kansas City, Pittsburg and Gulf railroads (Map: Missouri, B 5). It has a public school, library, and the Scarritt Collegiate Institute (Methodist Episcopal South), opened in 1888. The United States Government fish hatchery here includes thirteen ponds, well stocked with various species of fish. The city is on the edge of the zinc and lead mining district of southwestern Missouri, and manufactures foundry and machine-shop products, agricultural implements, flour, etc. Settled in 1839, Neosho was incorporated as a town in 1868, and in 1878 was chartered as a city. Population, in 1890, 2198; in 1900, 2725.

NEOSHO. A river rising in Morris County, east central Kansas (Map: Kansas, G 3). It flows southeast through eastern Kansas, then southwest and south through Indian Territory, joining the Arkansas River near Fort Gibson, after a course of about 350 miles. The chief towns on its banks are Oswego, Burlington, and Emporia. Its principal tributary is the Cottonwood.

NEOTROPICAL REGION. In zoögeography, a primary division embracing South America and its islands, Central America, and the hot lowlands of Mexico and the West Indies. Other names proposed for it have been Austro-Columbian, Dendrogæa, and Notogæa. Its characteristics are more distinctly marked than in some of the other regions, and indicate a remote antiquity for the mainland areas, and also a long period of isolation from North America. It also has some curious resemblances to the Australian Region, especially in the presence of marsupials and ratite birds. It is naturally divided into four subregions by physiographic features. The first, or Brazilian Subregion, comprises the great forested equatorial area from the Caribbean coast to the pampas of Southern Brazil. The second, or Chilean Subregion, stretches along the Andean plateaus and the dry coast strip between the Andes and the Pacific, from Peru to about latitude 4° N. The third, or Mexican Subregion (q.v.), consists of Central America and tropical Mexico. The fourth, or Antillean Subregion, embraces all the West Indies except Trinidad and Tobago, which are continental in their characteristics. The region as a whole is characterized by great richness of life, as well as by marks of isolation. Wallace found that it had eight families of mammals absolutely confined to it, including the distinct group (Cebidæ and Hapalidæ) of 'New World' monkeys; the blood-sucking bats (Phyllostomidæ); the chinchillas, cavies, and three other families of rodents. Nearly all the edentates of the world are collected here—sloths, armadillos, ant-eaters, and the like. It has also many important lesser groups, as the llamas, the opossums (save one species), the hutias, the solenodons, and many peculiar carnivores. The absence of certain groups is notable; it has no civets, no insectivores (save a shrew or two from the North), no wild cattle or sheep, no ruminants, except the llamas and a few deer, and no other hoofed mammals except the tapir (elsewhere known only in Malaya) and the peccary. In birds the case is even more extraordinary. About twenty-five of its families are not known elsewhere, including such large or peculiar groups as the plant-cutters, manakins, cotinga, ant-thrushes, tree-creepers (Dendrocolaptidæ), toucans, todies, mot-mots, curassows, tinamous, sun-bitterns, and many others; while it possesses the great majority of several groups, such as the humming-birds, only scantily present in North America, and not known at all in the Old World. A similar account might be given of regional peculiarities in the departments of reptiles, amphibians, fishes, and the many branches of invertebrate life. The West Indies, as a part of this region, present some extraordinary peculiarities. Though so near to the shores of North America, their zoölogical affinities are distinctly Neotropical, and they present curious resemblances to the island fauna of Madagascar. See AMERICA, paragraph *Fauna;* Zoögeographical Map under DISTRIBUTION OF ANIMALS; and consult the authorities there cited.

NE'OZO'IC (from Gk. *νέος*, *neos*, new + *ζωή*, *zōē*, life). A term introduced by Edward Forbes to include all the strata from the Trias to the most recent deposits. It has been occasionally used as a substitute for Cenozoic (q.v.), and for the Tertiary system (q.v.).

NEPAL, nĕ-pa̤l′, or **NIPAL.** An independent State on the southern slope of the Himalayas, bordering on Northern India (Map: India, D 3). It is bounded by Tibet on the north, by the native State of Sikhim and Bengal on the east, and by Bengal and the United Provinces of Agra and Oudh on the south and west. Its area is estimated at 54,000 square miles.

The southern portion, known as the *terai*, is a level strip of land, partly covered with forests and well cultivated. The rest of the country belongs to the region of the Himalayas (q.v.), and contains some of the highest mountains in the world, such as Mount Everest (29,000 feet) and Dhawalagiri, which are covered with perpetual snow. There are a number of minor ranges intersecting each other and inclosing numerous valleys. The country belongs to the basin of the Ganges, its chief rivers being the Karnali and the Sarju in the west, the Gandak in the centre, and the Kusi in the east. The climate varies considerably in accordance with the configuration of the surface. In the mountainous part it is naturally cold, while in the flat region along the southern boundary and in some of the valleys of the interior it is hot and humid. The average temperature at Khatmandu (over 4300 feet) is about 62°. Deposits of iron, lignite, copper, lead, and zinc are found and exploited to some extent by the natives. There are also many mineral springs and some deposits of gold and silver. The chief occupation of the inhabitants is agriculture; although carried on in a primitive way, it is highly intensive, owing to the scarcity of agricultural land. The slopes of the hills and ledges even, difficult of access, are utilized for agricultural purposes, and the methods employed for diverting mountain torrents for irrigational needs exhibit noticeable and varying degrees of ingenuity.

The chief crops in the central valleys are several varieties of rice, wheat, pulse, corn, sugarcane, potatoes, and various vegetables. In the *terai* region are cultivated tea, cotton, tobacco, etc. Many European fruits are successfully cultivated. The chief manufactures are coarse cloth, paper, brass bells, utensils, and ornaments. Excellent pottery is produced in some parts of the country and the wonderful wood-carving found in the temples testifies to the skill of the natives. The commerce of Nepal is chiefly with British India and Tibet. From British India are imported cotton goods, silver, spices, salt, brass, copper, sugar, iron, leather goods, etc. These are partly reëxported to Tibet, which sends in return drugs, tea, woolen cloth, salt, paper plant, domestic animals, honey, wax, silver, gold, etc. The chief exports to British India are rice, oil seeds, cattle, tobacco, hides, timber, and glue. The exports to and imports from British India amounted in 1900-01 to $5,987,049 and $5,257,372 respectively. Goods are usually transported by human carriers or pack animals.

Theoretically Nepal is an absolute monarchy, but the actual rulers of the State are the Prime Minister and his party. There are a State Council and a number of courts. The savage native code has been humanized by British influence. The revenue of the Government is derived chiefly from land tax, customs, mines, forests, and monopolies. There is an efficient army of about 50,000, which can be greatly enlarged in case of necessity in view of the fact that the Gurkhas (q.v.) are all efficient fighters.

No reliable figures as to the population of Nepal are available. Native statistics place it at 5,000,000, but these figures are probably exaggerated. The great mass of the population of Nepal are by some considered to be Mongolic, with large infusions of Dravidian and Aryan blood, while others regard them as a mixed race of Indo-Afghan and Mongolic descent. The chief divisions are the Kulu-lahuli and Paharias in the west, and the Mangars and Gurkhas in the east. Some of the hill-tribes have, perhaps, more of Mongolian than other blood, but the effects of the Hindu invasions from the twelfth century down are seen everywhere. The typical representatives of the Nepalese are the Gurkhas (q.v.), whose Aryan ancestors from Rajputana mixed with the aborigines. In religion the majority of the Nepalese are Hindus, but there are also several hundred thousand Buddhists. The Kulu-lahulis are dolichocephalic and below the average in stature. Education is entirely in the hands of the priests and the bulk of the population are illiterate. The children of the wealthy classes are sent to the educational establishments of British India. Capital, Khatmandu (q.v.).

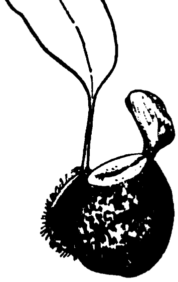
HISTORY. Various ruling dynasties from a remote period are given in the native literature, but the first authentic mention of a ruler—Ançuvarma of the Thakuri dynasty—is made by Hiuen Tsang, the Chinese Buddhist pilgrim, who visited Nepal in the seventh century. In 1324 the country was invaded and occupied by Harisinha-deva, Raja of Simraungarh. Modern history begins in 1768 with its conquest by the Gurkhas, who originally were driven from Rajputana by the Mohammedan invasion. Gurkha aggressions on Tibetan territory in 1790 led to their defeat by China, and the limitation of their northern boundary. In 1814, by way of reprisals, the British invaded the country, but were defeated; the following year, however, advancing on

Khatmandu, they obtained favorable conditions of peace and the establishment of a British Residency at the capital. By the assassination of his uncle in 1845, and by the Kot massacre of his opponents in the following year, Jung Bahadur, a colonel in the army, became Prime Minister and nominal ruler. Having firmly established himself in power, he visited England in 1850, and after his return the fruits of his journey were exhibited in the wise reforms that he introduced. During the Indian Mutiny of 1857 he rendered valuable assistance to the British and was handsomely rewarded. He died in 1877 and was succeeded by his brother, who also resorted to wholesale executions to maintain his ascendency, and ruled until 1885, when he was murdered at the instigation of Bir Shamsher Jang, now Prime Minister and father-in-law, by two daughters, of the reigning Maharaja, Pirthivi Bir Bikram, who was born in 1875 and ascended the throne in 1881.

Bibliography. Hodgson, *Colonization of Nepaul* (Calcutta, 1857); id., *Essays on the Language, Literature, and Religion of Nepaul and Tibet* (London, 1874); Wright (ed.), *History of Nepaul* (Cambridge, 1877); Oldfield, *Sketches from Nepaul, Historical and Descriptive* (ib., 1880); Hunter, *Imperial Gazetteer of India,* vol. x. (ib., 1886); Bendall, *Journal of Literary and Archæological Research in Nepal* (ib., 1886); Vansittart, *Notes on Nepal* (Calcutta, 1895); Ballantine, *On India's Frontier, or Nepal* (New York, 1896); Waddell, *Among the Himalayas* (London, 1898); Boeck, *Durch Indien ins verschlossene Land Nepal* (Leipzig, 1903).

NEPENTHE, nē-pĕn′thē (Gk. *νηπενθής*, *nēpenthēs*, from *νη-*, *ne-*, negative prefix + *πένθος*, *penthos*, grief). In the *Odyssey*, an epithet of a drug given to Helen in Egypt, possessing the power to bring forgetfulness of every pain or grief. Later writers identified the drug with opium, or some preparation of hemp.

NEPENTHES, nē-pĕn′thēz. A genus of herbs or half-shrubby plants of the natural order Nepenthaceæ. The species are natives of swampy ground in India, China, Malaysia, Madagascar, etc., and are chiefly remarkable for the leaves of some species which consist of a dilated foliaceous petiole, prolonged beyond its foliaceous part, as if it were the prolongation of the midrib of a leaf, and terminating in a pitcher (ascidium), from which the name pitcher-plant has been derived. The pitcher is terminated by a lid, which is regarded as the true blade of the leaf. The fluid found in these pitchers is a secretion of the plant itself. Insects often enter the pitcher, and according to investigations of Vines, are dissolved by a ferment secreted by the leaves and absorbed; so that the nepenthes rank among insectivorous plants. Many of the species are epiphytes, being attached to trees and other plants, and are rather commonly grown in hothouses for their strange leaves. The name pitcher-plant is applied to many other plants, as Sarracenia spp., Arisæma triphyllum, etc.



A CULTIVATED VARIETY OF NEPENTHES.

NEPHELENE SYENITE (*nephelene*, from Gk. *νεφέλη*, *nephelē*, cloud + *syenite*), *Laurvigite*. An igneous rock of granitic texture, of which the essential mineral constituents are nephelene and alkali feldspar. Nephelene syenites usually contain also an alkaline variety of pyroxene (acmite or ægerine), and frequently also nosean or haüyne, sodalite, sphene, and peculiar varieties of mica (lepidomelane) and garnet (melanite). These minerals are so generally found together, and so rarely occur except when in association with nephelene or the allied mineral leucite, that the nephelene syenites and a few rare families of rocks (leucite syenites, theralites) are quite marked in their peculiarities. Nephelene syenites are very rich in the alkalies and alumina. They are quite subject to alteration by weathering processes.

NEPH′ELITE (from Gk. *νεφέλη*, *nephelē*, cloud). A mineral sodium-aluminum silicate that crystallizes in the hexagonal system, has a vitreous or greasy lustre, and is generally colorless or light yellow, though sometimes when found massive it is green or red. It occurs in both ancient and modern volcanic rocks, and in such as syenite. It is found in the lavas of the volcanoes of Italy; also in Bohemia, in France, in Brazil, and in Canada; in the United States the massive and crystallized varieties are found in Maine, New Jersey, in the Ozark Mountains (Arkansas), and in Montana.

NEPHE′LIUM. A genus of plants. See Litchi.

NEPHI, nē′fī. A city and the county-seat of Juab County, Utah, 87 miles south of Salt Lake City; at the junction of the Oregon Short Line and the Sanpete Valley railroads (Map: Utah, B 2). It is the distributing point for a district interested chiefly in farming, lumbering, and cattle-raising, and in the mining of salt and gypsum. Population, in 1890, 2034; in 1900, 2208.

NEPHOSCOPE (from Gk. *νέφος*, *nephos*, cloud + *σκοπεῖν*, *skopein*, to view). An instrument used by meteorologists for observing the clouds, and especially for determining the amount and direction of the horizontal component of the apparent motion of a cloud. The modern nephoscope is the development of an idea embodied by Aimé in 1846, in his so-called 'reflecting anemometer,' and in its best form it has a wide range of usefulness. The simplest form is merely a horizontal mirror, having a circular graduated edge. The observer brings one eye to such a position that the reflected image of the cloud is seen to pass from the centre of the mirror to the circumference, and he merely records the direction in which the image appears to pass off. The Marvin nephoscope, an instrument of high precision, is used by the United States Weather Bureau observers, and has been extensively employed in cloud observations. A form of nephoscope for use on vessels at sea was devised by Professor Finemann and used by him about 1888. About the same time Professor Abbe devised his marine nephoscope and a method of using it for determining absolute altitudes and movements of clouds at sea. It consists essentially of a light bronze circle fitting rather loosely on top of the ordinary ship's compass; it therefore replaces the nearly horizontal circle of the apparatus ordinarily used by the navigator to sight upon the sun when measuring azimuths. The bronze circle is graduated, and at its zero point carries a hinge and an adjustable arm, having at its end a knob which serves to define the line of sight. The circle also carries a glass mirror from which the quicksilver backing has been removed, leaving a transparent circle, through which the graduation of the compass needle can be read. As this marine nephoscope enables one to locate a storm centre by the motions of the lower clouds better than can be done by the wind, and as it gives the direction of the pennant at masthead much more accurately than it can be observed by the unaided eye, it is strongly recommended for use by navigators at sea. To ordinary meteorological observers it has the special advantage of being the only instrument by means of which observers at sea can easily determine the absolute altitude and movements of clouds.

Bibliography. A full account of various forms of nephoscopes is given in Abbe, *Treatise on Meteorological Apparatus and Methods* (Washington, 1888), published as part 2 of the *Annual Report, Chief Signal Officer* for 1887. The Marvin nephoscope is described in the *Monthly Weather Review*, vol. xxiv. (Washington, 1896), and also in separate pamphlets. The description of Abbe's marine nephoscope was first published in 1893 in the *Report of the International Meteorological Congress* held in Chicago (*Weather Bureau Bulletin ii.*). A general description of work done with it is contained in the *American Meteorological Journal* for October, 1891.

NEPHREC'TOMY (from Gk. νεφρός, *nephros*, kidney + ἐκτομή, *ektomē*, excision, from ἐκ, *ek* + τομή, *tomē*, a cutting, from τέμνειν, *temnein*, to cut). The total removal of a kidney in rare cases of acute or chronic infection, either because the kidney is useless or because it is a source of infection owing to abscesses in its substance. The oblique extraperitoneal lumbar incision is the operative procedure of choice. Cutting through the lumbar muscles obliquely from the outer border of the sacro-lumbalis muscles, an inch below and parallel to the twelfth rib, making his incision downward and forward, the surgeon reaches the kidney. Blunt dissection frees it from its site and divests it of its capsule. Its pedicle is then tied and it is separated and removed. There is considerable danger from hemorrhage of the vessels of the pedicle. Tuffier states the mortality as follows: Primary nephrectomy, 371 cases, 36.8 per cent.; lumbar nephrectomy, 200 cases, 28.4 per cent.; secondary nephrectomy following nephrotomy (q.v.), 36 cases, 13.9 per cent. Garceau gives the mortality of nephrectomy for tuberculosis as 17.4 per cent., of secondary nephrectomy following nephrotomy, 11.9 per cent. Consult Warren-Gould, *International Text-Book of Surgery* (Philadelphia and London, 1902).

NEPH'RITE (from Gk. νεφρός, *nephros*, kidney). A variety of amphibole that varies from white to dark green in color, according to the amount of ferrous oxide that it contains. It is known chiefly through the carved ornaments and utensils that are found among the remains of primitive man in various parts of the world, especially in China and Mexico, and known under the collective name of *jade* (q.v.). Many imaginary virtues were ascribed to it, and it was especially sought after as a cure for epilepsy and diseases of the kidneys.

NEPHRI'TIS. See Bright's Disease; Cirrhosis.

NEPHROT'OMY (from Gk. νεφρός, *nephros*, kidney + τομή, *tomē*, a cutting). The operation of cutting open a kidney for the purpose of removing a stone or evacuating pus. An incision is made in the lumbar region, obliquely, from the outer border of the sacro-lumbalis muscle, an inch below the twelfth rib, parallel to the rib and forward and downward. The kidney is reached by the finger, and then the incision is modified as the nature of the case demands. The organ being grasped and drawn into reach, after blunt dissection, the surgeon bisects it through its convex edge, removes the calculi, and evacuates the pus. The viscus is then sutured together and replaced. Tuffier gives the results of the operation in these figures: In 43 cases there were 3 deaths, 2 fistulæ, and 38 recoveries. Consult Warren-Gould, *International Text-Book of Surgery* (Philadelphia and London, 1902).

NEPH'THYS (Lat., from Gk. Νέφθυς, Egyptian *Nebt-hat*). An Egyptian goddess, the daughter of Seb and Nût, and the sister and wife of Set (q.v.). By her brother Osiris, she was the mother of Anubis (q.v.). In the legend she joins with her sister Isis in mourning over and guarding the body of Osiris, and therefore in funerary scenes the two goddesses are often depicted protecting the mummy of the deceased. The lamentations of Isis and Nephthys over the body of Osiris form the subject of a poem of which several copies have been preserved. Nephthys is usually represented as a woman wearing upon her head the ideogram of her name. As a protector of the dead from evil influences she was worshiped throughout Egypt. Consult: Wiedemann, *Religion of the Ancient Egyptians* (New York, 1897); Horrack, *Lamentations d'Isis et de Nephthys* (Paris, 1866).

NEPI, nā'pē. An episcopal city in the Province of Rome, Italy, 17 miles southeast of Viterbo (Map: Italy, G 5). It is the Etruscan Nepete and the Roman Colonia Nepensis. The town is encircled by its ancient walls and towers, and has an eleventh-century cathedral, a ruined castle, the residence of Lucretia Borgia in 1500, and a handsome Renaissance municipal palace. Population, in 1901, 3036.

NEP'IGON, Lake. A lake of Canada. See Nipigon, Lake.

NEP'ISSING, Lake. A lake of Canada. See Nipissing, Lake.

NEPOMUK, nā'pō-mụk, John of. See John of Nepomuk.

NE'POS, Cornelius. A Roman historian, who flourished about the middle of the first century B.C. The place and precise time of his birth are unknown. He was the friend of Cicero and Catullus. The only work of his which has survived (if indeed it be his) is a series of twenty-five generally brief biographies of warriors and statesmen, mostly Greeks. These biographies are distinguished by the purity of their Latinity, the conciseness of their style, and their admirable delineation of character, but sufficient care has not been exercised in the examination of authorities, nor is the relative importance of things duly regarded. Until the middle of the sixteenth century, these biographies, on the strength of the titles given in the various manuscripts, were generally ascribed to Æmilius Probus, a writer who lived in the latter part of the fourth century; but in 1569 an edition was put out by the famous Dionysius Lambinus, who pronounced the so-called *Lives* of Æmilius Probus to be in reality the lost work of Cornelius Nepos, *De Viris Illustribus*. There are many editions, among which may be mentioned those of Van Staveren (Leyden, 1773), of Tzschucke (Göttingen, 1804), of Fleckeisen (Leipzig, 1884), of Nipperdey (10th ed., Leipzig, 1896), of Lindsay (New York, 1895), and of Flagg (New York, 1895).

NEP'TUNE (Lat. *Neptunus;* connected with Av. *napta*, moist), or POSEIDON (Gk. Ποσειδῶν, *Poseidōn*, Doric Ποτειδάϝων, *Poteidavōn*, Ποτειδᾶν, *Poteidan;* of uncertain etymology). In classical mythology, a brother of Zeus and lord of the sea. In legend he is the son of Cronus and Rhea. His home is a splendid palace in the depths of the sea near Ægæ, though which town of this name was meant caused much dispute. His wife in Hesiod is Amphitrite, and she shared his cult on the Isthmus. As a lover he rivals his brother Zeus, and many legends traced local heroes to Poseidon and some nymph or daughter of an early king. So Neleus and Pelias were sons of Poseidon and Tyro. In his nature Poseidon is always wild and implacable, never becoming a guardian of higher virtues. He is the 'shaker of the earth,' a natural conclusion from the frequency with which disturbances of the sea accompany the shocks on land, but he is, above all, the master of the sea, who sends the dreaded storms, and at his will controls the waves, which are called his swift horses. His attribute is the trident, or three-pronged harpoon of the Ægean fisherman, with which he controls the waves, or brings springs from rocks. Closely associated with him is the horse. He was the horse-tamer, was honored with horse-races at many points, horses were frequently sacrificed to him, and there are traces of a belief that he was in the form of a horse. His worship was chiefly confined to the coast, though he had temples even in the inland country of Arcadia, and it is not at all improbable that he was originally a god of water and moisture in general. There is some evidence for a decline in Poseidon worship, which seems reflected in the legends of his contest with Athena for Attica and with Hera for Argos. At Athens he was worshiped in the Erechtheum, and it seems clear that both Erechtheus and Ægeus are in essence the same deity. From him was also named the Attic month Poseideon (about December). He was a great Ionian divinity, and the Panionia were celebrated by the twelve Ionic cities at his sanctuary at Mycale. His temple on the island of Calauria, where Demosthenes died, was in very early times the centre of an amphictyony or league of maritime States. His most famous cult, however, was on the Isthmus of Corinth, where the *Isthmian Games* were celebrated in his honor. In art Poseidon has much the same type as Zeus, but without the dignity and benignity of the latter. Statues of him are by no means common. Two of the best are the Poseidon of Melos, now in Athens, and the fine statue in the Lateran, which many regard as derived from the famous bronze by Lysippus on the Isthmus.

At Rome the old Italian or Roman water-god, who appears dimly in religious tradition, seems to have been early identified with Poseidon, and during the historical period Neptune is scarcely distinguishable from the Greek god of the sea.

NEPTUNE. The outermost member of the solar system. Its mean distance from the sun is 2,792,000,000 miles; its diameter 34,800 miles; period of revolution about 165 solar years; mass seventeen times that of the earth; density one-fifth of the earth's. Thus, it is about eighty-five times larger than the earth, but from its extreme remoteness is of almost inappreciable magnitude when seen through an ordinary telescope.

DISCOVERY. The discovery of Neptune was an event unique in scientific history. It was the disturbance in the motion of Uranus, caused by the attractive force of Neptune, which led to its discovery. From 1690 to its discovery as a planet by Herschel, Uranus (q.v.) had been repeatedly recorded as a fixed star. Earlier observations were found not to agree with later observations, and hence it became evident that either the earlier observations were erroneous or that Uranus was wandering from its ancient track. On October 21, 1845, John Couch Adams (q.v.) communicated to the Royal Astronomer estimates of the elements and position in the heavens of a planet, whose mass would account for the orbital irregularities of Uranus. This did not, however, lead to any search for the planet in the heavens, and the matter remained buried in obscurity. In the same year the attention of Jean Joseph Leverrier (q.v.), a teacher of astronomy in the Ecole Polytechnique, was brought to the Uranian difficulty. In two papers communicated to the French Academy, Leverrier proved that only an exterior body could produce the irregularities in the Uranian orbit. In a third paper, submitted August 31, 1846, he had computed the orbit of the supposed planet, the visibility of which he described as that of a star of the eighth magnitude. These results were communicated to Galle of the Berlin Observatory, with a request to look for the planet in the place assigned to it. This Galle did in the evening of September 23d, and perceived a small body with a disk nearly 3″ in diameter. The place where it was found was within less than 1° of the spot indicated. Before the news of the discovery reached England, it had already been duplicated. Under the direction of Airy, director of the Greenwich Observatory, Challis of the Cambridge Observatory had commenced a search for the planet July 29th, and recorded 3150 stars, three of which were different positions of the planet, recorded on August 4th, August 12th, and September 29th. Challis proceeded to map them, but as he had no good star map this required considerable time, and before this was accomplished, news of the discovery arrived from Berlin on October 1, 1846. Neptune had already been seen by Lalande on the 8th and again on the 10th of May, 1795, but was taken to be a fixed star and repeatedly entered in the catalogues as such till its discovery as a planet.

Neptune is attended by one satellite, which was discovered October 10, 1846, by Lassell. This satellite, like those of Uranus, differs from the satellites of other planets in the direction of its motion, which is from east to west in a plane inclined at an angle of 35° to that of the ecliptic. Its period of revolution is 5 days 21 hours, and its distance from the planet somewhat less than that of our moon from the earth. For a complete account of the discovery of Neptune, consult Clerke, *History of Astronomy During the Nineteenth Century* (London, 1890). See PLANETS; SOLAR SYSTEM.

NEPTUNE, TEMPLE OF. (1) A remarkably preserved and majestic Doric temple at Pæstum, originally called Posidonia, in Lucania. The temple is a peripteral hexastyle, and measures 120 by 85 feet. The cella is surrounded by a passageway, and has two columns *in antis* at front and rear. The temple stands on a platform of three steps.

(2) A temple forming part of a group of buildings erected on the Campus Martius at Rome, in B.C. 26, by Agrippa in commemoration of the victories at Mysæ, Naulochus, and Actium. It stood in the midst of a great square surrounded by a colonnade, the Portico of the Argonauts, which was decorated with naval paintings. The whole group was called the Neptunium, and was the seat of the Admiralty. It was destroyed in the great fire of A.D. 80, and was restored by Hadrian. Eleven columns of the temple, with a part of the cella and decorated ceiling, are still preserved. The substructure, now buried, bore under each column the figure of a Roman province, with trophies between the columns, of which there were thirty-six, corresponding to the number of Roman provinces at the time of Hadrian. A number of the figures have been recovered, but are dispersed in various collections. The cornice is mistakenly restored with a copy of the cornice of the Temple of Concord.

NEPTU′NIAN (from Lat. *Neptunius*, relating to Neptune, marine, from Lat. *Neptunus*, name of the Roman sea-god). A term formerly applied to the geologists who maintained the aqueous as against the igneous theory of the origin of rocks. The discussions between the two schools were long and bitter.

NÉRAC, nȧ′räk′. The capital of an arrondissement in the Department of Lot-et-Garonne, France, on the Baise, 16 miles southwest of Agen (Map: France, G 7). The old town on the right bank of the river is united by bridges to the modern industrial quarter on the left bank. The ruins of its former imposing royal castle, now numbered among French historical monuments, and its park of La Garenne, are the chief objects of interest, and there is a small but interesting museum containing numerous remains, indicating the presence of an unknown city of Roman days on the site of Nérac. Corks, machines, coaches, and cloth are manufactured, and there is a general trade in wine, grain, and hemp. Here Henry IV., to whom there is a monument, spent his youth. Population, in 1900, 6435.

NERBUDDA, nĕr-bŭd′dȧ, more correctly **NARBADA** (Skt. *Narmada*). A river of India. It rises in the Maikal Range in the northern part of the Central Provinces, and flows southwestward for 800 miles, emptying into the Gulf of Cambay through an estuary beginning at Broach, 200 miles north of Bombay (Map: India, C 4). In the upper half of its course, below Jabalpur, it flows through a great depression between the Vindhya Mountains on the north and the Satpura range on the south, and is broken by numerous falls and rapids. In this valley, near Hoshangabad, are important deposits of coal and iron ore. In its lower course the river is broad, and becomes a tidal stream 50 miles from its mouth. Sea-going vessels ascend the estuary to Broach, and the river is navigable 82 miles for large boats, while smaller ones can ascend 28 miles farther. The Nerbudda is to the Hindus one of the most sacred streams of India.

NEREID (nē′rê-ĭd) **MONUMENT.** The name given to a sculptured heroön at Xanthus in Lycia, dating from the fourth century B.C., and discovered in 1838 by Sir Charles Fellows. The sculptures from the monument, preserved in the British Museum, show ten female figures with dripping garments, which, with the shells and seaweed represented, gave the monument its name.

NEREIDS (Gk. Νηρηΐδες, Νηρεΐδες, *Nērei-des*). Sea-nymphs, daughters of Nereus and Doris, daughter of Oceanus. Their number is variously given, though fifty seems to have been the popular belief. We have, however, in the various lists some seventy-seven different names. Few of them appear as individuals, and of these Thetis, mother of Achilles, Amphitrite, the wife of Poseidon, and Galatea, beloved by the Cyclops Polyphemus, are alone conspicuous. In art they appear frequently as spectators in scenes involving sea-deities, as at the contest between Nereus and Hercules, or the capture of Thetis by Peleus, while a favorite scene represents them as bringing to Achilles the armor made by Hephæstus. In the later art they appear riding on various sea-monsters, sporting with Tritons, or attending on Poseidon and Amphitrite. The name has continued in the popular belief of the Greeks of to-day, but the Nereids are no longer sea-maidens, but have become nymphs of the land. The stories are in part such as correspond with the ancient ideas, but in many tales they appear as dangerous and vindictive spirits, carrying away children, or, vampire-like, sucking human blood. In summer they are supposed to be especially dangerous at mid-day, seizing their victims by a sudden stroke or destroying their senses. The old belief that whoso saw a nymph might be smitten with madness reappears in the modern popular superstition, and it is thought dangerous to haunt their caves, and still more to be caught in the whirlwinds of dust raised in their dances.

NEREIS. A genus of annelids (family *Nereidæ*) having a long slender body, a distinct head, with tentacles and eyes, the whole body covered with tubercles, and the gills lobed and tufted. They are all marine, and generally hide under rocks or in the sand. They swim actively by rapid and undulating inflections of the body, and by the aid of numerous 'oars' (setæ) arranged along the sides. The proboscis is thick, strong, and armed with two jaws.

NEREITES, nē′rê-ī′tēz (Neo-Lat., from Lat. *Nereis*, Nereid). A peculiar fossil trail found in many of the Cambrian rocks of America and Europe, and supposed to have been made by a crawling worm.

NEREUS, nē′rê-ŭs *or* nē′rōōs (Gk. Νηρεύς). In Greek legend, an ancient sea-divinity, son of Pontus (sea) and Gæa (earth), and father, by Doris, of the Nereids. He seems to have been worshiped at Gythium, and probably elsewhere; but his cult was never prominent, and in legend he plays scarcely any other part than father of the Nereids, among whom was included Thetis, mother of Achilles. In the myths he is usually friendly and helpful, and his only contest is with Hercules, who, in order to learn the way to the Garden of the Hesperides, was obliged to wrestle with and hold Nereus, in spite of his manifold changes of shape.

NER'GAL. A prominent deity in the Babylonian and Assyrian pantheons. The name (probably better, Nerigal) is assured by the Old Testament; its meaning is obscure ('the rager,' or 'the great ruler'), the Babylonian etymologists explaining it as 'the mighty one of the great dwelling-place,' with reference to Nergal's lordship over Hades. His original aspect seems to have been that of a solar deity, representing especially the blazing heat of the sun at noon or the summer solstice; thus he is referred to as 'the hero of the gods, the lofty meridian sun.' As a destructive deity he became the god of war and the god of pestilence. He shares the former characteristic with Ninib, along with whom he also appears as the god of the chase. But he appears more uniquely as the god of pestilence, and so he became by an easy transition of thought the god of those whom he destroyed, and thus the deity of the lower world. Accordingly in the later mythology he stood for the declining sun, and the month of Chislev (December) is dedicated to him. This development in the character of Nergal is presented in a story preserved in an Amarna tablet, to the effect that the gods of the upper world became engaged in war with Allatu (Eresh-kigal), the goddess of Hades; Nergal as their leader makes his way into her presence, but is induced by her supplications to save her life and to marry her, so becoming the god of the lower world. With this may be compared the classic myth of Pluto and Proserpine. Nergal had also as wife Laz, probably an upper-world goddess. As god of war and destruction, Nergal was identified with the planet Mars, while the lion was his symbol. Nergal's ancient sanctuary, with which he was always associated from earliest to latest times, was Cutha, the name of which even became a synonym of Hades. Accordingly, the Cuthæan colony which was settled in Samaria after the deportation of Israel brought thither the cult of Nergal (II. Kings xvii. 30). His cult, however, was widespread and seems to have been especially patronized in the later Assyrian Empire. Consult Jastrow, *Religion of Babylonia and Assyria* (Boston, 1898).

NERI, nā'rē, Philip. See Philip Neri, Saint.

NERIN'EA (Neo-Lat., from Lat. *Nerine*, variant of *Nereis*, Nereid). A genus of siphonostomate gastropods allied to the Cerithiidæ and exclusively restricted to the Mesozoic formations, where it is especially abundant in and characteristic of the Jurassic coral beds of Europe. The shell is long and turreted, with many whorls, and the columella always, and usually also the inner lip of the aperture, are ornamented with strong ridges. Longitudinal sections of the shell show that these ridges increase in size and complexity from the apex to the aperture of the shell, in other words, as the shell increases in growth from its young to its adult stage.

NERIS'SA. In Shakespeare's *Merchant of Venice*, the companion of Portia. She marries Gratiano.

NE'RIUM. A subtropical plant. See Oleander.

NERLY, nĕr'lē (properly Nehrlich), Friedrich (1807-78). A German architectural and landscape painter, born at Erfurt, and educated at Hamburg. After studying in Rome for several years, Nerly visited Southern Italy, and in 1837 settled in Venice. Thenceforth he painted, almost exclusively, views in Venice, one of the first being the "Piazzetta by Moonlight," a subject which met with universal favor. A fine view of "San Giovanni e Paolo" is in the National Gallery, Berlin, and mention may be made of a "Team of Buffaloes Drawing a Huge Marble Block Through the Campagna," in the Schwerin Gallery. His son and pupil, Friedrich (1842—), attained distinction as an able landscape and marine painter.

NERNST, nĕrnst, Walther (1864—). A German physicist, born at Briesen (West Prussia). He studied at the universities of Zurich, Berlin, Gratz, and Würzburg; in 1887 was appointed assistant to Ostwald at Leipzig, and in 1889 lecturer in physical chemistry in the university. In 1891 he became professor at Göttingen, where in 1895 he also organized and became director of the institute for physical chemistry. He is known as the inventor of the Nernst incandescent electric lamp, in which the carbon filament of the ordinary incandescent lamp is replaced by a bar of magnesia, which, unlike the carbon, is efficient at nearly its melting-point, and therefore much superior in illuminating power. The cost of operation is also said to be considerably less. See Electric Lighting.

NERNST LAMP. See Electric Lighting.

NE'RO (A.D. 37-68). A Roman Emperor (A.D. 54-68). He was born at Antium, on the coast of Latium, December 15, A.D. 37, and was the son of Cn. Domitius Ahenobarbus and of Agrippina, the daughter of Germanicus Cæsar, and sister of Caligula. His mother afterwards became the wife of the Emperor Claudius, who adopted him (A.D. 50), and his name, originally L. Domitius Ahenobarbus, was changed to Nero Claudius Cæsar Drusus Germanicus. After the death of Claudius (A.D. 54), the Prætorian Guards, at the instigation of Afranius Burrus, their prefect, declared him Emperor, instead of Claudius's son Britannicus, and their choice was acknowledged both by the Senate and the provinces. His reign began under the guidance of Burrus and his tutor, Seneca, the philosopher; but the influence of his mother, together with his own moral weakness and sensuality, frustrated their efforts, and he soon plunged into debauchery, extravagance, and tyranny. He caused Britannicus, the son of Claudius, to be poisoned at the age of fourteen, because he dreaded him as a rival, and afterwards (A.D. 59) procured the death of his own mother, Agrippina, to please his mistress, Poppæa Sabina. She was the wife of his principal boon-companion, Otho, afterwards Emperor, and in order to marry her he divorced and afterwards put to death his wife Octavia, the sister of Britannicus (A.D. 62). The affairs of the Empire were at this time far from tranquil. In A.D. 61 an insurrection broke out in Britain among the Iceni under their Queen, Boadicea, which was, however, suppressed by Suetonius Paulinus. The following year saw an unsuccessful war against the Parthians in Armenia. At home matters were not much better. The Emperor was lampooned in verse; the Senate and priesthood, alike venal, were also satirized by audacious malcontents; Burrus died, and even Seneca removed from Court. In July, 64, occurred a great conflagration in Rome, by which two-thirds of the city was reduced to ashes. Nero himself is usually believed to have been the incendiary. It is said that he admired the spectacle from a distance, reciting verses about the burning of Troy, but many scholars are doubtful whether he really had any hand in it. At all events, he laid the blame on the Christians, and persecuted them with great fury. He rebuilt the city with great magnificence, and reared for himself a splendid palace extending from the Palatine Hill over the intervening valley to the slopes of the Esquiline, called, from the immense profusion of its golden ornaments, the *Domus Aurea*, or Golden House; and in order to provide for this expenditure, and for the gratification of the Roman populace by spectacles and distributions of corn, Italy and the provinces were unsparingly plundered. A conspiracy against him failed in the year 65, and Seneca and the poet Lucan fell victims to his vengeance. In a fit of passion he killed his wife Poppæa. He then proposed marriage to Antonia, the daughter of Claudius, but was refused, whereupon he caused her to be put to death, and married Statilia Messalina, after killing her husband. His vanity led him to seek distinction as a poet, a philosopher, an actor, a musician, and a charioteer, and he received applause, not only in Italy, but also in Greece, which, upon invitation of the Greek cities, he visited in 67. In 68 the Gallic and Spanish legions, and after them the Prætorian Guards, rose against him, proclaimed Galba Emperor, and Nero fled from Rome to the house of a freedman, Phaon, about four miles distant. The Senate, which had hitherto been most subservient, declared him an enemy of his country, and the tyrant ended his life by suicide, June 9, 68.

NERTCHINSK, nyĕr′chĭnsk. A district town in the Territory of Transbaikalia, Siberia, situated on the Nertcha and the Trans-Siberian Railway, 184 miles east of Tchita, the capital of the Territory (Map: Asia, L 3). It is poorly built. It has a museum and a library. The inhabitants are engaged chiefly in the cultivation of tobacco and vegetables, and in the fur trade, of which Nertchinsk is still an important centre. The town was founded in 1656 over a mile from its present site. It soon rose to great importance as the centre of the trade with China. With the rise of Kiakhta (q.v.) Nertchinsk lost in commercial importance, but it soon became the centre of an extensive mining region and received many immigrants, a considerable proportion being convicts. By the Treaty of Nertchinsk, concluded in 1689, the two rivers of Argun and Gorbitsa and the Stanovoi mountain chain were fixed upon as the boundary lines between Siberia and Manchuria. The mining industry in the vicinity of Nertchinsk is now of secondary importance. Population, in 1897, 6713, including about 1200 exiles.

NER′THUS. In Northern mythology, a goddess worshiped by the tribes of Northern Germany, among whom she journeyed at intervals, bringing peace and fertility. Her shrine was an island, sometimes identified with Rügen. She is also called Hertha, from a former reading of the passage in Tacitus in which she is mentioned.

NÉRUDA, nyĕ′rụ-dȧ, JAN (1834-91). A Bohemian poet and novelist, born at Prague. He was educated at the university in his native city, and began to write under the pseudonym of Janko Hovora. His poetical works belong to the Romantic School, new in Bohemia in his time, and he was influenced by the contemporary movement in the same direction in Germany. His volumes of verse include: *Hřbitovní kvĭtí* ("Flowers from the Cemetery," 1858); *Knihy vešů* ("Books of Verse," 1868); and *Písně kosmické* ("Cosmic Songs," 1878). He also wrote several plays of lesser importance. Néruda was connected with various newspapers as editor and contributor; he founded the review *Květy* in 1866, and much of his best work appeared in the *Národní Listy*, for which he was feuilletonist from 1865 to 1891. His prose masterpiece, the studies of life in Prague called *Malostranské povídky*, was published in 1878. Others of his sketches and novels are: *Arabesky* (1864); *Různí lidé* (1871); *Obrazy z ciziny* (1872); and *Feuilletony* (1876 et seq.), all remarkable for humor, observation, and a style full of charm. His complete works were edited by Herrmann in 1891-99 (Prague).

NERUDA (NORMANN-NERUDA), WILMA MARIA FRANCISCA (1839—). A European violinist, born at Brünn, in Moravia, where her father was organist of the cathedral. She became a pupil of Jansa, and made her first appearance at Vienna, in 1846. In 1849 she went to London to play at the Philharmonic in one of Bériot's concerts. She then returned to the Continent and passed several years traveling as a soloist, chiefly in Russia. In 1864 she visited Paris and played with great success at the Pasdeloup concerts, the Conservatory, and elsewhere. In the same year she was married to Ludwig Normann, a Swedish musician. She returned to London in 1869, again taking part in the Philharmonic; in the winter following she played the first violin at the Monday Popular Concerts; and in 1888 married Sir Charles Hallé, with whom she toured Australia in 1890-91. She visited the United States in February, 1899.

NER′VA, FORUM OF, or FORUM TRANSITORIUM. The fourth of the Imperial fora at Rome, formed from the highway which separated the Forum of Peace from the Forum of Augustus. It was also called Forum Palladium, from the Temple of Minerva (Pallas), of which two Corinthian columns remain, the temple having been destroyed in 1606 to build the Chapel of Saint Paul in the Church of Santa Maria Maggiore.

NERVA, MARCUS COCCEIUS. A Roman Emperor (A.D. 96-98). He was born A.D. 32, of a family belonging to Narnia, in Umbria, and twice held the honor of consulship before his election by the Senate to the dignity of Emperor, after the murder of Domitian. He displayed great wisdom and moderation, rectified the administration of justice, and diminished the taxes; but, finding himself, on account of his advanced age, not vigorous enough to repress the Prætorian Guards, he adopted M. Ulpius Trajanus, then at the head of the Army of Germany, who succeeded him on his death, January 25, 98. After his decease, he obtained an apotheosis.

NERVAL, när'väl', Gérard de. A French writer. See Gérard de Nerval.

NERVE. See Nervous System and Brain.

NERVE-STRETCHING. A variety of treatment of sciatica, which is accomplished by putting the patient on his back and flexing the thigh strongly upon the abdomen. It has been successful in alleviating the pain in a few cases. See Sciatica.

NERVI, nĕr'vê. A town in the Province of Genoa, Italy, situated on the seacoast, six miles east of Genoa. It is a favorite winter health resort of the eastern Riviera. Population (commune), in 1901, 6766.

NERVII, nĕr'vĭ-ī. An ancient tribe in Gallia Belgica, north of the Ambiani. In the time of Cæsar, who first mentions them, they were a warlike people, who prohibited trade with their neighbors, forbade the introduction of luxuries, and attempted to make an alliance of the surrounding tribes against the Romans. Cæsar subdued them in B.C. 57.

NERVOUS DISEASE. An affection of any part of the nervous system, either of the brain, spinal cord, sympathetic nerves, or peripheral nerves. Diseases of the nervous system are divided into functional and organic. In the latter local anatomical alteration of nerve structure is apparent. There are in reality no such things as functional diseases. While not seen or described, undoubtedly anatomical changes are present in many cases; and in others there are lesions at a distance which constitute the real disease, while the symptoms which occupy the attention are the result of reflex action. It cannot be affirmed that there are no structural changes in nerve-fibres in so-called functional diseases of the nervous system, which constitute the bulk of nervous diseases. There are 176 special nervous diseases, classed as follows: peripheral, 87; spinal cord, 40; brain, 28; and functional, 21. Of these there are about 65 which are either very common or extremely important (Dana). In their proper place are found articles on the following nervous diseases or conditions: Acromegaly; Apoplexy; Caisson Disease; Catalepsy; Chorea; Embolism; Epilepsy; Facial Neuralgia; Goitre; Hysteria; Insomnia; Locomotor Ataxia; Meningitis; Myelitis; Neurasthenia; Neuralgia; Neuritis; Neurosis (including *occupation neuroses*); Neurotic; Paralysis; Sclerosis; Sleeping Sickness; Thrombosis, etc. There is also an article on Neurology. In addition there are articles in the domain of psychiatry, on Insanity; Mania; Melancholia; Monomania; Paranoia; Paresis; Kleptomania; Dipsomania; Pyromania; Puerperal Insanity, etc., as well as on Idiocy and Imbecility.

Consult: Starr, *Familiar Forms of Nervous Disease* (New York, 1895); Charcot, *Clinical Lectures on Certain Diseases of the Nervous System*, translated by Hurd (Detroit, 1888); Hirt, *The Diseases of the Nervous System*, translated by Hoch (New York, 1893); Gowers, *Manual of Diseases of the Nervous System* (London, 1899); Beevor, *Diseases of the Nervous System* (Philadelphia, 1898); Church and Peterson, *Nervous and Mental Diseases* (ib., 1901); Dana, *Textbook of Nervous Diseases* (New York, 1901); Oppenheim, *Lehrbuch der Nervenkrankheiten* (Berlin, 1902).

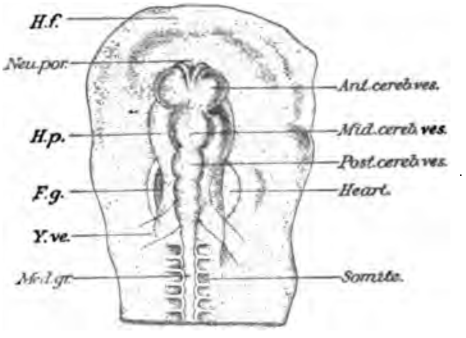
NERVOUSNESS. A condition of unstable nervous equilibrium, which is largely temperamental. A person afflicted with nervousness startles easily at sudden sounds, is unduly emotional, lacks poise and self-possession. If the condition go beyond these limits, actual disease is present, and the person is a neurasthenic, i.e. a sufferer from nerve fag. This state is characterized by unfounded feelings of apprehension, tremor, headache, disordered digestion, insomnia, loss of power of application, and irritability. Overwork, excesses, and disease may cause nervousness in normally stable people, which disappears when the cause is removed.

NERVOUS SYSTEM AND BRAIN. Historical. It is impossible in an article such as the present to do more than touch upon some of the more important investigations which have brought us to our present conception of nervous system structure. To the philosopher Descartes, in the latter part of the sixteenth century, belongs the honor of the first recorded description which gives any intelligent conception of the structure of the nervous system. His drawings of the brain possess a very fair degree of accuracy as regards general shape, though the lobes and convolutions appear much distorted. He pictured the nerves as originating in the brain and described their function as the carrying of the 'animal spirits' from the brain to the periphery. For the next two hundred and fifty years little progress was made in the study of the structure of the nervous system, though some work was done upon the gross anatomy of the brain by men whose names remain to us in our anatomical nomenclature. Thus, Vesalius, Fallopius, and Eustachius were among the earliest. In the seventeenth century we have Willis, whose name we recognize in the circle of Willis, and who described the basal ganglia, the pyramids and the olives; Vieussens, whose name is familiar in the valve of Vieussens; and Duboise, whose medical cognomen of 'Sylvius' marks that prominent sulcus of the cerebrum. The results of the labors of these investigators, as well as of those of Van Leeuwenhoek, of Malacarne, of Rolando, of Vico d'Azyr, of Arnold, of Monro, and others were collected and summed up in an extensive volume published by Burdach in 1819. Descartes had discovered the nerve fibre, and the next step forward in the histology of the nervous system was not taken until Ehrenberg in 1833 discovered the nerve cell in the spinal ganglia. This discovery was emphasized when four years later Purkinje observed the presence of cells not only in the ganglia, but in the cerebrum and cerebellum. The important fact that the dorsal roots of the spinal nerves are concerned with sensation and the ventral roots with motion was discovered by Sir Charles Bell, an eminent British surgeon and anatomist, and communicated by him to the Royal Society of London about 1820. In 1834 Remak discovered that the cells of the sympathetic ganglia had processes, and that these processes were connected with nerve fibres. The importance of this discovery, confirmed in 1842 by Helmholtz, was not at the time appreciated. One of the most careful studies of nerve cells and their processes was made by Otto Deiters of Bonn and published after the investigator's death by Max Schultze in 1865. Deiters divided the processes given off from nerve cells into two kinds, protoplasmic processes, which branched rapidly and the structure of which resembled that of the cell body, and axis cylinder processes or nervous processes which were often continuous with the axis cylinders of medullated nerves. Gerlach's publication in 1872 was far-reaching in its influence. By the use of the chloride of gold method, he was able to demonstrate many more and finer processes of nerve cells than had been recognized by the older methods of staining. These delicate processes were believed by Gerlach to form a diffuse nervous network within the gray matter. Besides describing this nervous network, Gerlach built up upon this as a basis a theory of nervous system structure which was accepted by most neurologists until the advent of the so-called 'newer investigations.' Gerlach believed that from the anterior horn cells of the spinal cord, processes passed directly off to form the motor roots of the spinal nerves. According to his theory the protoplasmic processes of these cells ramified in the gray matter of the cord, where they anastomosed with protoplasmic processes from other cells, forming a reticulum from which arose the fibres which passed out of the cord as the posterior or sensory roots. Gerlach believed that this same relation of afferent and efferent fibres to the nerve cells and to the reticulum obtained throughout the entire nervous system, which thus consisted of a remarkably complex continuum of nervous protoplasm.

The so-called 'newer investigations' upon which is based our present conception of the structure of the nervous system must be considered as begining with the discovery by Golgi of the staining method which bears his name. This was announced by Golgi in 1873, although it was not until ten years later, when Golgi published a considerable volume of his investigations, that the neurological world began to realize the importance of his discovery. To the investigations since that time of Golgi, His, Kölliker, Van Gehuchten, Forel, Retzius, Ramón y Cajal, Von Lenhossèk, and others must be ascribed the overthrow of Gerlach's theory of a diffuse nervous network and the establishment upon a firm basis of the at present accepted neurone theory of nervous-system structure.

METHODS OF NEUROLOGICAL INVESTIGATION. The history of the development of our knowledge of the structure of the nervous system is necessarily intimately associated with the history of advances in methods of investigation. Among the general methods which have proved of greatest value in working out the structure of the nervous system the following may be mentioned: (1) Method of Anatomical Dissection.—Only the coarser fibre tracts can be determined by this method, its main use being in studying the gross anatomy of the nervous system. (2) Method of Embryology.—The extreme value of this method is shown by the important investigations of His. By means of this method it is possible to study the development of the neurone from its first appearance to its adult condition and to observe how groups of neurones become separated off by themselves to form the different parts of the nervous system. Of especial importance is the fact that the fibres of different systems of neurones acquire their medullary sheaths at different embryonic ages. In this way it is possible, by studying the nervous systems of embryos of different ages, to differentiate many of the fibre systems. (3) Method of Pathology.—This is based upon the fact that any disease or injury which destroys the cell bodies of neurones, or which interrupts the continuity of their axones, causes degeneration in the axones whose cells are destroyed or whose continuity is interrupted. Thus, e.g. in an injury crushing the spinal cord at a certain level, there will be found degenerated above the point of injury all fibres whose cells lie below the injury, while below the injury there will be found degenerated all fibres whose cells lie above the injury. More recently it has been determined that not only does the distal portion of a cut nerve or cut fibre tract die, but that in disease of peripheral nerves changes take place in the central stump and in the cells from which the diseased axones originate. It has thus been possible in some cases to determine the cells from which diseased nerves originate. (4) Method of Arrested Development.—This method depends upon the fact that there sometimes occur abnormalities in the nervous system such as absence or malformation of a part, thus causing an absence of development in other parts dependent upon them. (5) Method of Animal Experimentation.—This method consists essentially in subjecting animals to certain conditions which cause changes in the nervous system and then studying those changes.

Most of our knowledge of the nervous system has been acquired by the application to the above general methods of certain special staining methods. Of these the four most important are the method of Weigert, the method of Golgi, the method of Nissl, and the method of Ehrlich. For the details of these methods the reader is referred to text-books on histology and histological technique.



ANTERIOR PORTION OF THE BODY OF A CHICK.

The head distinctly differentiated, seen from the surface. *H. f.*, head fold; *Neu. por.*, neuro-porus; *H. p.*, head plate; *F. g.*, foregut; *Y. ve.*, yolkvein; *Med. gr.*, medullary groove; *Ant. cereb. ves.*, anterior cerebral vesicle; *Mid. cereb. ves.*, middle cerebral vesicle; *Post. cereb. ves.*, posterior cerebral vesicle.

DEVELOPMENT. The differentiation of the nervous system begins very early in embryonic life. There is first the formation of a groove or furrow in the outer layer of the blastoderm. This is known as the medullary or neural groove. By an increase of the cells at the sides of the groove and their union dorsally, this groove is converted into a closed canal, the neural or medullary canal. This canal corresponds to the central canal of the spinal cord and to the ventricles of the brain in the adult nervous system, and it is from the epiblastic cells surrounding the medullary canal that the entire nervous system is developed. At that end of the canal which corresponds to the head of the embryo, three dilatations appear. These are known respectively as the fore-brain (anterior cerebral vesicle—telencephalon), the mid-brain (middle cerebral vesicle—mesencephalon), and the hind-brain (posterior cerebral vesicle—metencephalon). These three vesicles soon become five from the development from the fore-brain of the interbrain or diencephalon, and from the hind-brain of the afterbrain or myelencephalon. From the anterior cerebral vesicles are developed the cerebral hemispheres, the corpus striatum, the optic thalami, and posteriorly, as far as the anterior corpora quadrigemina. From the middle cerebral vesicle are developed the corpora quadrigemina and the cerebral peduncles. From the posterior cerebral vesicles are developed the cerebellum, pons, and medulla oblongata. From the remaining undilated portion of the medullary canal is formed the spinal cord. During the closure of the canal there become separated off at varying intervals groups of cells which form the cerebro-spinal ganglia. Histologically, two kinds of cells may be observed in the walls of the medullary canal, spongioblasts and neuroblasts. From the former is developed the neuroglia or connective tissue of the nervous system, from the latter are developed the nervous elements or neurones. The neuroblast is at first a small round cell. It soon becomes pear-shaped, and from the small end of the pear a process grows out—the axis cylinder process or axone. Other processes of a different nature appear later. They are known as protoplasmic processes or dendrites. This nerve cell with all its processes is what is known as the 'neurone.'

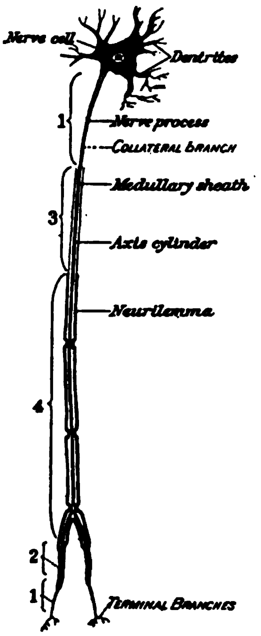
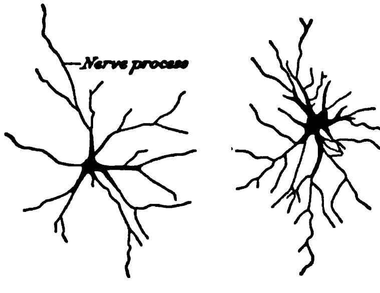


DIAGRAM OF A NEURONE.

1. Nerve process naked; 2. Enveloped only by neurilemma; 3. Enveloped only by medullary sheath; 4. Enveloped by both medullary sheath and neurilemma.

Nervous Tissue. The structural element of nervous tissue is the neurone. This has already been defined as the nerve cell with all its branches. These neurones in their association with one another to form the organs of the nervous system are supported by a peculiar type of connective tissue called neuroglia. As noted above in describing its development, each adult neurone consists of a cell body, and passing off from this two kinds of processes, the axis cylinder process and the dendritic processes. The cell body, as in most other cells, consists of a mass of protoplasm containing a nucleus.

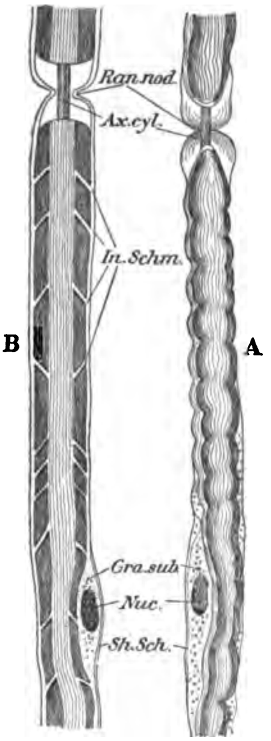
Our knowledge of the internal structure of the nerve cell has been greatly enhanced within the last few years by the application of a new method known as the method of Nissl. This method consists essentially in placing fresh tissue in some quick fixative such as absolute alcohol, and staining sections with such a dye as methylene blue. This method demonstrates two very different types of cell in the nervous tissues. In one of these the nucleus alone stains, the cell body remaining unstained; in the other, both nucleus and cell body are stained. The former are known as caryochrome cells, the latter as somatochrome cells. The structure of a somatochrome cell as shown by the method of Nissl is as follows: The rather large nucleus situated in the centre of the cell differs in no essential from the nuclei of other cells. It is surrounded by a nuclear membrane and traversed by an intranuclear network, both of which stain blue. The nucleoplasm or basement substance of the nucleus remains unstained. Within each nucleus is a darkly staining nucleolus. The body of the cell shows three distinct elements in its structure, a basement substance, a cytoreticulum or fibrillar element, and chromophilic bodies. The basement substance is unstained by Nissl's method and appears homogeneous. Traversing this basement substance may be seen very delicate fibrils. These are described by some investigators as fibrillæ passing through the cell body, by others as a definite reticulum. This reticulum or fibrillar structure extends not only throughout the body of the cell, but also into the dendrites and into the axis cylinder, possibly as far as these processes themselves extend. The chromophilic bodies are blue, staining granular masses scattered throughout the cell body. The size and arrangement of these bodies differ greatly for different cells, and are quite characteristic for certain types of cells. In addition to the elements already described, there is present in many nerve cells more or less yellow or brown pigment. This pigment is absent in the nerve cells of the new-born child. The internal structure of the dendrites is similar to that of the cell body. They usually branch rapidly and end in the gray matter near their cell of origin. The method of Gogli shows them to be covered with little knob-like projections known as 'gemmules.' The axone differs from both cell body and dendrites in that it contains no chromophilic bodies. It arises from a portion of the cell called the axone hill, which is also free from chromophilic bodies. In Golgi preparations the axone is distinguished by



TWO FORMS OF MULTIPOLAR NERVE CELLS.

From the ventral horn of the spinal cord of a new-born rabbit, showing the richly branched protoplasmic processes. (Schaper.)

its fineness, its straight course, approximately uniform diameter, and its few branches. These few branches pass off at right angles and are known as collaterals. In some cells the axone branches rapidly and ends in the gray matter near its cell of origin. Other axones pass into the white matter and become axis cylinders of nerve fibres. At its origin from the cell body and at its termination, the axone is uncovered by any sheath. Some axones—confined to the gray matter—are entirely devoid of any covering. Other axones—fibres of Remak, found mainly in the sympathetic system—are covered by a delicate sheath known as the neurilemma or sheath of Schwann. The axones of the white matter of the brain and cord are protected by a thick sheath called the medullary sheath. The axones of the peripheral cranial and spinal nerves are covered by a medullary sheath and outside of this a neurilemma. Such axones, with their sheaths, are known as medullated nerve fibres. A medullated nerve fibre thus consists of a central core or axis cylinder which is continuous throughout the fibre and is the axone of a nerve cell. This axis cylinder is covered by a rather thick sheath of a fatty nature known as the medullary or myelin sheath, outside of which is the delicate neurilemma. From the neurilemma fine septa extend into the myelin called the incisures of Schmidt. At intervals the medullary sheath is interrupted and the axis cylinder is uncovered or covered only by the neurilemma. These points are known as the nodes of Ranvier, and the portion of the nerve fibre between two nodes as an internodal segment.



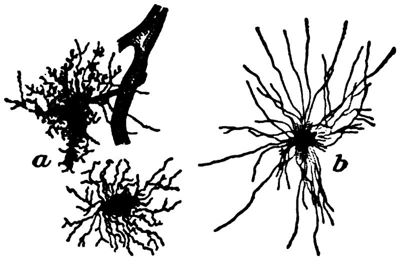
MEDULLATED NERVE FIBRES (OSMIC ACID).

A. View. B. Section. *Ran. nod.*, Ranvier's nodes, where the medullary sheath is interrupted and the axis cylinder appears; *Ax. cyl.*, Axis cylinder: *In. Schm.*, Incisures of Schmidt; *Gra. sub.*, Granular substance at the poles of the nucleus; *Nuc.*, Nucleus; *Sh. Sch.*, Sheath of Schwann.

As to the physiological significance of these different parts of the neurone, our ideas are still based largely upon theoretical grounds. The cell body has been shown to be the birth or genetic centre of the neurone. From the fact that any portion of the neurone which is cut off from the cell body dies, the cell would seem to be the nutritive or trophic centre of the neurone. From the absence of nervous activity in portions of the neurone which have been cut off from their cell of origin, the cell body would also appear to be the functional centre of the neurone. The most generally accepted theories of the significance of the component parts of the cell itself may be summed up as follows. The function of the nucleus is the same as in other cells. It seems to preside over the constructive activities of the neurone, by which food products brought to the cell by the lymph are transformed into food elements of the cell, and finally into its nervous elements proper. The basement substance and the chromophilic bodies represent the food elements of the cell. The cytoreticulum represents the working nervous mechanism of the cell, it alone being concerned in the reception, transformation, and emission of the nervous impulse. Of the processes the axone is centrifugal in function, carrying impulses away from the cell body, the dendrites are centripetal in function, bringing impulses to the cell body. Axones thus act as organs of distribution as regards the nervous impulse, dendrites as organs of reception. Neurones are associated with one another by approximation or by contact, and not by continuity of their protoplasm; that is, no two neurones are believed to be directly connected with each other. The axonal terminations of one neurone simply lie in contiguity, or at most in touch with the dendrites or cell bodies of other neurones, the impulse passing over from one to the other.

Neuroglia, or the connective tissue of the nervous system, differs both in structure and in origin from the form of connective tissue found in other organs. As already stated, it is epiblastic in origin, developing like the neurone from the cells which line the embryonic neural canal. These cells, at first morphologically identical, soon differentiate into neuroblasts, or future neurones, and spongioblasts, or future neuroglia cells.

In adult neuroglia two main types of cells are found, spider cells and mossy cells. The spider cell has a rather small body, from which are given off on all sides straight, unbranching, spine-like processes. They occur mainly in the white matter. The mossy cell has also a rather small body, its processes are fewer, are coarse, rough, and branching; they occur mainly in connection with blood-vessels. As in the case of the nerve cell, the processes of these cells do not anastomose, but interlace, forming a dense feltwork.



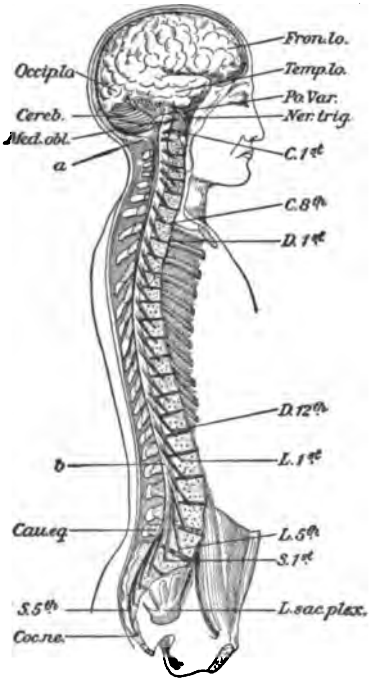
CELLS FROM SECTIONS OF THE BRAIN OF ADULT MAN.
a, Mossy cell; *b*, spider cell.

The nervous system is composed in all vertebrated animals of two distinct portions or systems—viz. the *cerebro-spinal* and *sympathetic* or *ganglionic*.

The *cerebro-spinal system* includes the brain and spinal cord (which form the *cerebro-spinal axis*, or central nervous system) and the cranial and spinal nerves. It was termed by Bichat the nervous system of animal life, and comprises all the nervous organs concerned in sensation, volition, and mental action.

The *sympathetic system* consists essentially of a chain of ganglia connected by nervous cords, which extends from the cranium to the pelvis, along each side of the vertebral column, and from which nerves with large ganglionic masses proceed to the viscera and blood-vessels in the cavities of the chest, abdomen, and pelvis. It was termed by Bichat the nervous system of organic life, since it seems to regulate—almost or quite independently of the will—the due performance of the functions of the organs of respiration, circulation, and digestion.

THE CENTRAL NERVOUS SYSTEM. The brain and spinal cord are covered and protected by three membranes or *meninges*, as they are frequently termed—viz. the *dura mater*, the *arachnoid*, and the *pia mater*. The *dura mater* is a strong fibrous membrane, which supplies the cranial bones with blood in early life, and adheres firmly to their inner surface. The *arachnoid* (so called from its being supposed to be as thin as a spider's web) is a serous membrane, and, like all serous membranes, is a closed sac, consisting of a parietal and a visceral layer. The parietal layer adheres to the inner surface of the *dura mater*, while the visceral layer somewhat loosely invests the brain and spinal cord, from direct contact with which, however, it is separated by the intervention of the *pia mater* and some loose areolar tissue. The *pia mater* is an extremely vascular membrane consisting of minute blood-vessels, held together by an extremely fine areolar tissue. It dips down between the convolutions and fissures of the brain, and is prolonged into the interior, forming the *velum interpositum* and the choroid plexuses of the fourth ventricle. It is by means of this membrane that the blood-vessels are conveyed into the nervous substance.



VIEW OF THE CEREBRO-SPINAL AXIS.

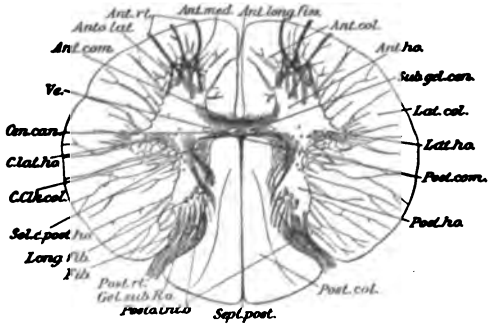
The right half of the cranium and trunk of the body have been removed by a vertical section; the membranes of the right side of the brain and spinal cord have been cleared away, and the roots and first part of the fifth and twelfth cranial nerves, and of all of the spinal nerves of the right side, have been dissected out and laid separately on the wall of the skull and on the several vertebræ opposite to the place of their natural exit from the cranio-spinal cavity.

Fron. lo., frontal lobe; *Temp. lo.*, temporal lobe; *Occip. lo.*, occipital lobe: *Cereb.*, cerebellum; *Po. Var.*, pons Varolii; *Med. obl.*, medulla oblongata; *a* and *b*, upper and lower extremities of the spinal cord; *Cau. eq.* on the last lumbar vertebral spine marks the cauda equina; *Ner. trig.*, the three principal branches of the nervous trigeminus; *C. 1st*, the sub-occipital or first cervical nerve; *C. 8th*, the eighth or lowest cervical nerve; *D. 1st*, the first dorsal nerve; *D. 12th*, the last dorsal nerve; *L. 1st*, the first lumbar nerve; *L. 5th*, the last lumbar nerve; *S. 1st*, the first sacral nerve; *S. 5th*, the fifth sacral nerve; *L. sac. plex.*, the left sacral plexus; *Coc. ne.*, the coccygeal nerve.

THE CEREBRO-SPINAL NERVOUS SYSTEM. In describing this it is more convenient to begin with a description of the spinal cord, the study of which is essential to a proper appreciation of the higher and more complicated centres.

The Spinal Cord is that portion of the cerebro-spinal axis which is contained in the spinal canal. It extends from the upper border of the first cervical vertebra or atlas above, to the middle or lower margin of the first lumbar vertebra below. The cord is continuous superiorly with the medulla oblongata, while its lower extremity tapers off into a slender cord, the filum terminale. At two levels, one in the cervical and one in the lumber region, the diameter of the cord is considerably larger than elsewhere. These are known respectively as the *cervical* and the *lumbar enlargements*. The *posterior median septum* and the *anterior median fissure* almost divide the cord longitudinally into two symmetrical halves, while the spinal nerve roots leaving the cord at quite regular intervals serve to divide it into *segments*. These segments correspond in number to the spinal nerves. There are thus eight *cervical*, twelve *dorsal*, five *lumbar*, five *sacral*, and one or two *coccygeal* segments. The internal structure of the cord can be best appreciated by studying a transverse section through the cervical enlargement stained by Weigert's method. Such a section shows that two substances enter into its composition, one situated centrally, the other on the periphery. On account of their appearance in fresh tissues, the former is called *gray matter*, the latter *white matter*. The gray matter is made up mainly of cells and their dendrites, and of non-medullated axones; the white matter consists mainly of medullated nerve fibres, its whiteness being due to the myelin. The gray matter presents somewhat the form of the letter H. Posteriorly, it is slender, and almost touches the surface—*posterior horns*—while anteriorly it is broad—*anterior horns*—and separated from the surface by a considerable layer of white matter. The expanded tip of the posterior horn is known as the head or *caput*, and contains a gelatinous substance, the *substantia gelatinosa* of Rolando. The narrow portion connecting the head with the central gray matter is called the neck or *cervix*. Laterally, the gray matter extends out somewhat into the white matter as the *lateral horn* or *processus reticularis lateralis*. The gray horns of the two sides of the cord are connected by a commissure containing the *central canal*. In fœtal life this canal is open and continuous with the ventricles of the brain. In adults it is usually more or less obliterated. It is surrounded by the *substantia gelatinosa centralis,* and divides the gray commissure into an *anterior gray commissure* and a *posterior gray commissure.* Passing out from the anterior horns to the surface of the cord are bundles of fibres which constitute the *anterior* or *motor spinal nerve roots.* Just to the median side of the posterior horns are seen the entering fibres of the *posterior* or *sensory nerve roots.* By the posterior horns the white matter of the cord is divided into *posterior columns* and *antero-lateral columns,* the latter being again rather indefinitely subdivided by the fibres of the anterior roots into lateral and anterior columns. The posterior columns are also usually subdivided at this level by a connective tissue septum from the pia mater into an internal portion, the *column of Goll,* and an external portion, the *column of Burdach.*

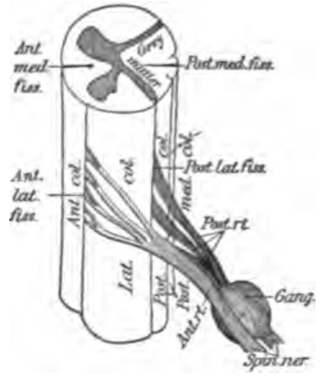
Fibre Systems or Tracts of the Cord. As already noted, the cell bodies of the neurones are grouped in the gray matter of the brain and cord in the ganglia of the cranial and of the spinal nerves and in the end organs of certain of the nerves of special sense. This grouping is for definite physiological purposes. The axones from many of these neurone groups pass into the white matter as distinct bundles and constitute fibre systems or fibre tracts. In the normal adult cord these various tracts of fibres present the same appearance and cannot be differentiated from one another. Certain of the methods described above, however, especially the method of embryology and the method of pathology, have enabled us to determine the following systems: (1) Descending tracts: (a) The direct pyramidal tract or column of Türck; (b) the crossed pyramidal tract; (c) the descending comma tract of the posterior column; (d) the descending cerebellar tract of Loewenthal. (2) Ascending tracts: (a) The column of Goll; (b) the column of Burdach; (c) the column of Lissauer; (d) the direct cerebellar tract; postero-lateral ascending tract or tract of Flechsig; (e) the tract of Gowers or the antero-lateral ascending tract. (3) Short systems, fundamental columns or ground bundles, composed of short ascending and descending fibres intermingled.



TRANSVERSE SECTION OF THE HUMAN SPINAL CORD AT THE LEVEL OF THE EIGHTH DORSAL VERTEBRA.

Ant. long. fiss., anterior longitudinal fissure; *Sep. post.*, septum posterium; *Ant. com.*, anterior commissure; *Sub. gel. cen.*, substantia gelatinosa centralis; *Cen. can.*, central canal; *Post. com.*, posterior commissure; *Ve.*, vein; *Ant. ho.*, anterior horn; *Lat. ho.*, lateral horn, and behind it the process reticularis; *Post. ho.*, posterior horn; *Anto. lat.*, antero median group of ganglionic cells; *C. lat. ho.*, cells of the lateral horn; *C. Clk. col.*, cells of Clark's column; *Sol. c. post. ho.*, solitary cells of the posterior horn; *Ant. rt.*, anterior root; *Post. rt.*, posterior root; *Posto. int. b.*, postero-internal bundle; *Fib.*, bundle of fibres attached to the posterior root; *Long. fib.*, longitudinal fibres of the posterior cornu; *Gel. sub. Ro.*, gelatinous substance of Rolando; *Ant. col.*, anterior column; *Lat. col.*, lateral column; *Post. col.*, posterior column.

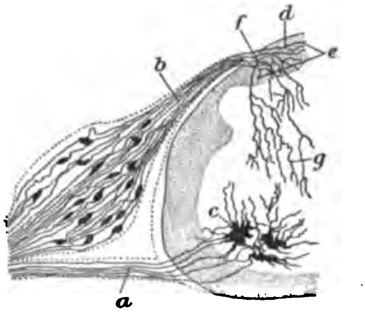
Location of the Fibre Systems of the Cord and Origin of Their Fibres. The location of the fibre tracts can be best understood by reference to the accompanying diagram: The *direct pyramidal tract* occupies a small oval area adjacent to the anterior fissure. It decreases in size as it passes downward and disappears entirely in the mid or lower dorsal regions. The *crossed pyramidal tract* occupies the postero-lateral region of the cord. In the cervical and dorsal regions it is separated from the surface by the direct cerebellar tract. In the lumbar region the latter tract is no longer present and the crossed pyramidal comes to the surface. This tract extends to the lowermost part of the chord, decreasing in size as it descends. The fibres of the pyramidal tracts are axones of cells situated in the brain in the region of the fissure of Rolando or motor area. These fibres descend through the internal capsule, pons, and medulla. In the medulla they form a large bundle of fibres known as the *anterior pyramids,* lying on either side of the anterior fissure. At the junction of medulla and cord most of these fibres cross over, in what is called the *pyramidal decussation,* to the opposite postero-lateral region, to continue down the cord as the *crossed pyramidal tract.* A small number of fibres remain in the anterior region and pass down the cord as the *direct pyramidal tract.* Both tracts as they descend send collaterals and terminals into the gray matter of the anterior horns, where they end in arborizations around the motor cells there situated. These tracts thus constitute the *motor pathway* connecting the brain and cord, carrying voluntary motor impulses from the brain to the cells of the anterior horns, which latter directly control muscular movements. The *descending comma tract* is a small tract of fibres in the dorsal region situated about the middle of the column of Burdach. By some investigators it is believed to



SPINAL CORD. SIDE VIEW.

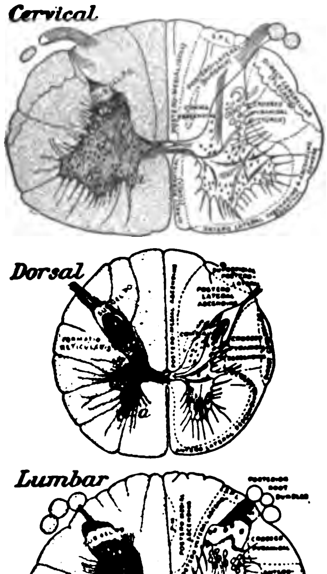
Plan of the fissures and columns. *Post. med. fiss.*, posterior median fissure; *Post. lat. fiss.*, posterior lateral fissure; *Post. rt.*, posterior root; *Gang.*, ganglion; *Spin. ner.*, spinal nerve; *Ant. med. fiss.*, anterior median fissure; *Ant. lat. fiss.*, anterior lateral fissure; *Ant. rt.*, anterior root; *Ant. col.*, anterior column; *Lat. col.*, lateral column; *Post. col.*, posterior column; *Post. med. col.*, posterior median column.

represent descending branches from posterior root fibres, by others, descending axones of cells situated in the cord. The *descending cerebellar tract*, or tract of Loewenthal, consists, as its name intimates, of descending axones of neurones whose cells are situated in the cerebellum. The results of investigations as to the paths which these axones follow in passing from cerebellum to cord are not in accord. It is probable that in the case of many of the fibres two neurones are involved, the connection being made through the olivary nucleus of the medulla. These axones end in the gray matter of the cord. The *column of Goll* and *the column of Burdach* are composed of the axones of the cells of the ganglia of the posterior roots of the spinal nerves. Entering the posterior columns, these axones divide into ascending and descending arms. The latter is short and soon ends in the gray matter. The ascending arm may be short, of medium length, or long. The short and medium length fibres end in the gray matter of the cord, after sending in collaterals at different levels. The long fibres pass up to the medulla and end, those of the column of Goll in the nucleus gracilis, those of the column of Burdach in the nucleus cuneatus. The *column of Lissauer* consists of the shortest fibres which enter the posterior roots. These fibres end in the posterior horns. These neurones, whose central axones form the entering fibres of the posterior roots of the spinal nerves taken in connection with the analogous sensory roots of the cranial nerves, constitute the *peripheral sensory neurone system*. It is by means of these neurones that all impulses are conveyed from the periphery or surface of the body to the cord and brain. By their influence over the motor cells of the cord they determine the *direct reflex actions*. By their influence over other cells situated in the cord, medulla, and mid-brain, sensory impressions are transmitted through other systems of neurones to the brain, and thus enter into consciousness. By their influence upon motor cells of the cortex they complete the cycle of a sensory impression entering consciousness and being transformed into a voluntary motion. The *direct cerebellar tract* or *dorso-lateral ascending tract* lies near the lateral surface of the cord from the posterior horn to about the mid-lateral point. It begins in the upper lumbar region and extends to the cerebellum. Its fibres are axones of the cells of Clark's column or the nucleus dorsalis of the same side. This nucleus is a group of cells lying in the gray matter just to the median side of the base of the posterior horn. It extends as a continuous column from the mid-lumbar to the lower cervical region. In the medulla the direct cerebellar tract enters the restiform body and thus reaches the cerebellum by means of the inferior cerebellar peduncle. *Gowers's tract*, or the *ventro-lateral ascending tract*, lies along the periphery of the cord from the anterior limit of the direct cerebellar to the anterior nerve roots. The tract first appears in the upper lumbar cord and increases in size as it passes upward. Its fibres are axones of cells scattered through the gray matter



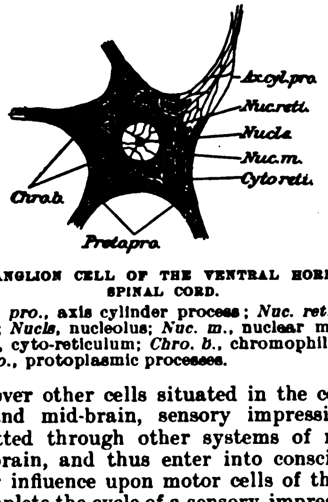
TRANSVERSE SECTION OF THE SPINAL CORD OF A CHICK ON THE 9TH DAY OF INCUBATION.

a, Axis cylinders of anterior root fibres issuing from large cells of the anterior horn (*c*); *b*, posterior root fibres passing from the bi-polar cells of the spinal ganglion into the posterior column of the spinal cord; *d*, when they bifurcate, and *e*, when they become longitudinal; *f* and *g*, collaterals from the fibres passing into the gray matter.



SECTIONS OF THE SPINAL CORD, IN THE LOWER CERVICAL, MID-DORSAL, AND MID-LUMBAR REGIONS (ON THE RIGHT SIDE THE CONDUCTING TRACTS ARE INDICATED).

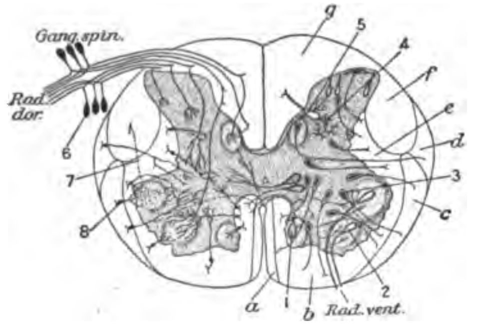
Nerve cells: *a*, mesial group; *b*, lateral or ventro-lateral group; *c*, dorsal or dorso-lateral group; *d*, lateral cell column group; *e*, Clark's column group.



LARGE GANGLION CELL OF THE VENTRAL HORN OF THE SPINAL CORD.

Ax. cyl. pro., axis cylinder process; *Nuc. reti.*, nucleo-reticulum; *Nucls.* nucleolus; *Nuc. m.*, nuclear membrane; *Cyto reti.*, cyto-reticulum; *Chro. b.*, chromophilic bodies; *Proto. pro.*, protoplasmic processes.

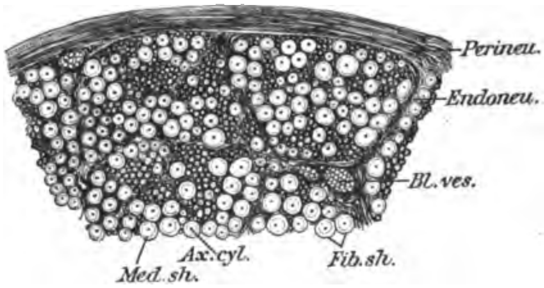
of the same and opposite sides of the cord. Many of the fibres of this tract are probably spinal association fibres and reënter the gray matter to terminate there. Other fibres, however, pass upward to higher centres, their exact terminations being as yet undetermined. The remainder of the white matter of the cord is constituted by the short fibre systems (fundamental columns or ground bundles). It will be seen that in the main these short fibres lie adjacent to the gray matter and are more extensive in the anterior part of the cord. They are axones of cells situated in the gray matter of the cord. These axones enter the white matter, pass up or down, or, splitting, send one branch up, the other down, and finally terminate in the gray matter. Along their course they send collaterals into the gray matter. These fibres of the fundamental columns thus serve to connect the gray matter of different levels of the cord and may be considered of the nature of longitudinal commissural fibre systems. By means of these neurones an impulse coming into the cord by the posterior nerve root may be conveyed to many motor or sensory cells within the gray matter. In this way are accomplished the more *complex reflex actions.*



SCHEME OF THE STRUCTURE OF THE SPINAL CORD.

a, Fasciculus cerebro-spinalis ventralis; *b*, fasciculus ventralis proprius; *c*, fasciculus ventro-lateralis Gowersi; *d*, fasciculus cerebello spinalis; *e*, fasciculus cerebro-spinalis lateralis; *f*, fasciculus lateralis proprius; *g*, funiculus dorsalis; *Rad. dor.*, radix dorsalis; *Rad. vent.*, radix ventralis; *Gang. spin.*, ganglion spinale; 1, commissural cell, or heteromeric neurones; one is seen sending its axone into the gray substance of the other side, the others send their axones into the white matter of the opposite side; 2, motor cells; sides of fibrils are seen arising from their axones; 3, tautomeric neurones, the axones going to the ventral and lateral funiculi; among these are cells in the nucleus dorsalis and some of the cells in the substantia gelatinosa of Rolando, collaterals are coming off from the axones; 4, a Golgi cell, or dendraxone; 5, cells sending their axones to the dorsal funiculi; 6, cell bodies of peripheral sensory neurones situated in the ganglion spinale; their central prolongations are shown entering the spinal cord as dorsal root fibres which bifurcating send collaterals to terminate in different parts of the substantia grisea; 7, collaterals and terminals representing fibres from the fasciculi cerebro-spinales or pyramidal tract; 8, collaterals from the white fibres in the ventral and lateral funiculi.

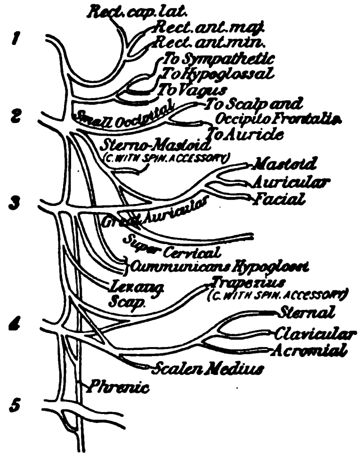
Nerve Cells of the Cord. In describing the origin of fibre systems of the cord, many of the cells of the cord have been necessarily referred to, e.g. those cells the axones of which form the columns of Gowers and of Flechsig, and the fundamental columns. There are also found in the gray matter cells which have short axones which never leave the gray matter, but terminate in the vicinity of their cells of origin. The most important groups of cells remaining to be described are those of the anterior horns connected with the motor spinal nerve roots. These are large multipolar cells rich in chromatic substance. They are arranged in columns, two long columns extending the entire length of the cord for the innervation of the muscles of the trunk, while in the cervical and lumbar enlargements extra columns are added for the supply of the muscles of the extremities.



PORTION OF A CROSS SECTION OF THE HUMAN MEDIAL NERVE.

Perineu., perineurium; *Endoneu.*, endoneurium; *Bl. ves.*, blood-vessel containing blood corpuscles; *Fib. sh.*, fibre sheath; *Ax. cyl.*, axis cylinder; *Med. sh.*, medullary sheath.

The Spinal Nerves. These are the peripheral nerves connected with the spinal cord. There are 31 pairs of spinal nerves, which are named from the levels of the cord from which they originate: 8 cervical, 12 dorsal, 5 lumbar, 5 sacral, and 1 coccygeal. Each spinal nerve is connected with the cord by two roots, an anterior or motor root and a posterior sensory root. The anterior root consists of axones of the motor cells of the anterior horns. These pass out in small bundles, by the ganglion of the posterior root, beyond which they join the fibres from the ganglion to form the mixed spinal nerve. The fibres of the sensory root have been already described in connection with the posterior columns. These are the central processes of the spinal ganglion cells. The peripheral processes of these cells pass out of the outer end of the ganglion and join the motor fibres. The nerves leave the spinal canal through the intervertebral foramina, beyond which each nerve divides into two branches, a posterior and an anterior.

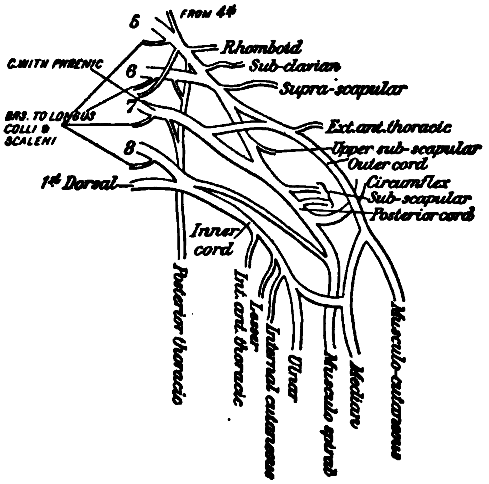


PLAN OF CERVICAL PLEXUS.

The posterior divisions of the spinal nerves are smaller than the anterior and are distributed to the muscles and skin of the back.

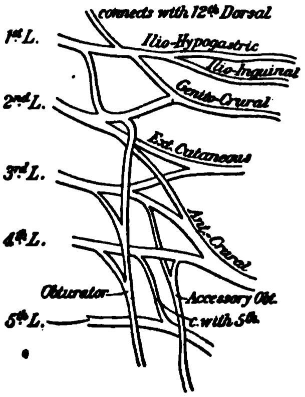
The anterior divisions of the spinal nerves supply the anterior parts of the body and the extremities. Each anterior branch is connected by some slender filaments with the sympathetic. In the dorsal region the anterior divisions are separate and distributed quite evenly, but in the cervical, lumbar, and sacral regions they unite to form intricate plexuses.

THE CERVICAL PLEXUS. This is formed by the anterior divisions of the first four cervical nerves. The branches of distribution of this plexus may be divided into a superficial set and a deep set, the former supplying the integument and the more superficial muscles of the side and front of the neck and upper part of the throat; the latter supplying the more deeply seated muscles of the neck and sending one very important branch, the phrenic, to the diaphragm.



PLAN OF THE BRACHIAL PLEXUS.

The *brachial plexus* is formed by the anterior divisions of the last four cervical and the first dorsal nerves. These five nerves unite to form three main cords known respectively as the outer, the inner, and the posterior cords of the brachial plexus. Before uniting to form these cords, four main branches or sets of branches are given off. These are (1) a communicating branch to the phrenic; (2) muscular branches to the longus colli, scaleni, rhomboidei, and subclavius; (3) posterior thoracic nerve, to the serratus magnus; (4) the supra-scapular, sending branches to supply the supra- and infra-spinatus. From the three main cords of the plexus branches are given off to the chest, shoulders, and arms. Those to the chest are the external and internal anterior thoracic, which supply the pectoralis major and pectoris minor muscles. The branches to the shoulder are the subscapular and the circumflex, the former supplying the subscapularis, the latissimus dorsi, and the teres major; the latter supplying the deltoid and the teres minor. The circumflex nerve also supplies part of the integument of the shoulder and sends filaments to the musculo-cutaneous nerve. This nerve in the arm supplies the biceps, coraco-brachialis, and part of the brachialis anticus muscles. In the forearm it becomes cutaneous, supplying the integument on the radial side. The internal cutaneous nerve is a small nerve to the integument of the front of the arm and forearm. The lesser internal cutaneous or nerve of Wrisberg, the smallest branch of the plexus, is a branch to the integument on the inner side of the arm. The musculo-spiral supplies the triceps, anconeus, supinator longus, extensor carpi radialis longior, and part of the brachialis anticus. It sends a cutaneous branch to the skin of the outer part of the forearm. It then divides into radial and posterior interosseous branches, the former passing to the skin of the radial side of the hand, including thumb, index, middle and radial side of ring fingers; the latter supplying the carpal articulations and muscles of the back of the forearm. The ulnar nerve supplies the flexor carpi ulnaris and inner part of the flexor profundus digitorum. In the hand it supplies the adductor and part of the short flexor of the thumb, the interossei, the two inner lumbricales, and the muscles of the ball of the little finger. It supplies a cutaneous branch to the back of the little and ulnar side of the ring fingers, and to the front of the same fingers. It also supplies articular branches to the elbow and wrist joints. The median nerve supplies all the flexors and pronators of the forearm except those supplied by the ulnar. In the hand it supplies the two outer lumbrical muscles, part of the short flexor of the thumb, the opponens and the abductor. It also innervates the skin of the palm and of the palmar surfaces of the fingers not supplied by the ulnar.



PLAN OF LUMBAR PLEXUS.

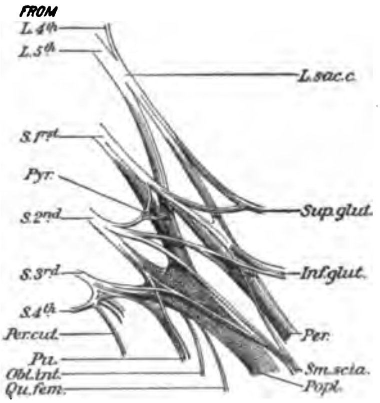
The *lumbar plexus* lies at the back of the abdominal cavity behind the peritoneum. It is formed by the anterior divisions of the four upper lumbar nerves. Communicating branches connect the plexus with the lumbar ganglia of the sympathetic. Some muscular branches pass directly from the plexus to the quadratus lumborum and psoas muscles. Cutaneous branches are the (1) ilio-hypogastric, which sends an iliac branch to the skin of the buttock and a hypoglossal branch to the skin of the lower abdomen; (2) the ilio-inguinal, to the skin of the groin; (3) the external cutaneous, to the skin of the outer side of the thigh. Mixed branches of the plexus are (1) the genito-crural, to the skin of the groin and to the cremaster muscle; (2) the anterior crural, a large and important branch which supplies the sartorius, the pectineus, the psoas iliacus, and the extensors of the knee joint, besides giving off three cutaneous branches, the internal cutaneous to the skin of the inner aspect of the thigh, a middle cutaneous to the skin of the front of the thigh, and the long saphenous to the skin of the inner side of the knee, leg, and foot; (3) the obturator, which supplies the obturator externus, the adductor longus gracilis, and adductor magnus. Branches of this nerve sometimes pass to the adductor brevis and pectineus. It forms the main nerve supply of the hip and knee joints and sometimes sends a cutaneous branch to the skin of the lower and inner part of the thigh. There is sometimes an accessory obturator nerve to the pectineus and hip joint. It is usually connected with the obturator.

The *lumbo-sacral cord* is formed by the union of the fifth lumbar nerve with a branch from the fourth lumbar. It gives rise to a communicating branch to the fifth lumbar ganglion of the sympathetic, and a muscular branch, the superior gluteal, to the gluteus medius and minimus and the tensor fasciæ femoris, after which the cord joins the sacral plexus.

The *sacral plexus* is formed by the union of the lumbo-sacral cord with the first, second, third, and part of the fourth sacral nerves. It is a large plexus situated in the cavity of the pelvis. Like the other plexuses, it gives rise to communicating muscular and mixed branches. The communicating branches pass to the upper sacral sympathetic ganglia. The muscular branches supply the quadratus femoris, the obturator internus, the gemelli, the pyriformis, and a part of the gluteus maximus. The mixed nerves are: (1) The small sciatic, which supplies part of the gluteus maximus and the skin of the back part of the thigh, buttock, popliteal space, and part of the leg. By means of the long pudendal branch it also supplies the skin of the perineum. (2) The pudic supplies the muscles and skin of the external generative organs. (3) The great sciatic. This nerve is the largest nerve of the body. It passes down the back of the thigh, giving off branches to the adductor magnus and the hamstring muscles. Above the popliteal space the nerve divides into the internal and the external popliteal branches. The internal popliteal sends a branch to the knee joint, supplies the popliteus muscle, and the muscles of the calf of the leg. It furnishes a branch called the communicans tibialis, which joins the communicans peronei to form the external saphenous nerve, which supplies the outer side of the foot. Below, the internal popliteal is continued into the posterior tibial, which supplies the long flexor of the toes, the tibialis posticus, and the skin of the heel. In the foot it divides into the internal and the external plantar nerves. The former supplies the skin of the sole of the foot, and the great, second, third, and inner side of the fourth toes, the flexor brevis pollicis, the flexor brevis digitorum, the abductor pollicis, and the two inner lumbrical muscles; the latter supplies the skin of the little and outer side of the fourth toes, and the muscles of the sole of the foot not supplied by the internal plantar. The external popliteal sends branches to the knee joint, gives off the communicans peronei to the skin of the outer side of the back of the leg, supplies the peronei longus and brevis, and divides into the external cutaneous and anterior tibial nerves. The former supplies the skin of the upper surface of the foot and of all the toes except the outer side of the little toe and adjacent sides of the great and second toes. The anterior tibial supplies the extensors of the toes, the tibialis anticus, and peroneus tertius, and ends as a cutaneous branch to the skin of the adjacent sides of the great and second toes.

The *sacro-coccygeal plexus* is a small plexus formed by the fourth and fifth sacral and the coccygeal nerves. It sends communicating branches to the sacral and coccygeal ganglia of the sympathetic, cutaneous branches to the skin of the arms and coccygeal region, muscular branches to the external anal sphincter, the levator ani, and coccygeal muscles, and branches to the pelvic plexus of the sympathetic, whence they supply the rectum and bladder.

Peripheral Terminations of Spinal Nerves. The modes of terminations of these processes are extremely varied and complicated. The terminations are always 'free' in the sense that while possibly sometimes penetrating cells, they are never directly continuous with their protoplasm. The motor nerve fibres end in voluntary and involuntary muscle. On its way to a muscle a motor fibre, which, as noted above, is the axone of an anterior horn cell, may divide into several branches, a single cell thus innervating more than one muscle fibre. On reaching a voluntary muscle the bundle of nerve fibres breaks up to form a plexus in the connective tissue which surrounds the bundles of muscle fibres. From this plexus nerve fibres pass to the individual muscle fibres. Having arrived at the muscle fibre in which it terminates, the nerve fibre loses its medullary sheath, and its neurilemma fuses with the sarcolemma. The naked axone then (according to most observers) penetrates the sarcolemma and terminates in a more or less elaborate expansion known as a 'motor end plate.'



THE SACRAL PLEXUS OF THE RIGHT SIDE FROM BEHIND.

L. sac. c., lumbo-sacral cord; *Sup. glut.*, superior gluteal; *Inf. glut.*, inferior gluteal; *Per.*, perforating; *Sm. scia.*, small sciatic; *Popl.*, popliteal: *Pyr.*, nerves to pyriformis; *Per. cut.*, perforating cutaneous; *Obt. int.*, obturator internus; *Qu. fem.*, quadrator femoris; *Pu.*, pudic.

The sensory or afferent part of the spinal nerves is made by the peripheral processes of the spinal ganglion cells. In the skin, and in those mucous membranes which are covered with squamous epithelium, the nerve fibres lose their medullary sheaths in the subepithelial tissue, and, penetrating the epithelial layer, split up into minute fibrils which pass in between the cells and terminate there, often in little knob-like swellings. In addition to such comparatively simple nerve endings, there are also found in the skin and mucous membranes, especially where sensation is most acute, much more elaborate terminations. Among these may be mentioned Merkel's *tastzellen*, or touch cells, the tactile corpuscles of Meissner, and the Pacinian bodies. In tendons and in muscle, sensory nerve fibres, after losing their medullary sheaths, divide into minute fibrils which are often studded with irregular expansions. In gland tissue, nerve fibres usually end as fine fibrils, which pass to the epithelial cells.

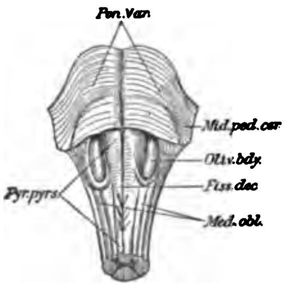
PHYSIOLOGY OF THE SPINAL CORD AND SPINAL NERVES. The sensory nerve endings serve as the receptive apparatus by means of which external stimuli may induce a nervous impulse. The motor nerve endings serve as organs of distribution through which an impulse may so affect a muscle as to cause a contraction and consequent muscular action. The nerves themselves apparently serve merely as a conductive apparatus for transmitting the sensory impulses from the periphery to the spinal cord and the motor impulses from the cord to the muscles. The spinal cord must be considered as subserving several quite different though related physiological purposes, of which the following are the most important: (1) Its gray matter acts as a reflex centre, i.e. a centre in which an impulse brought to it by the fibres of the posterior nerve root (usually a sensory impulse) can determine an impulse passing out in the fibres of an anterior nerve root (usually a motor impulse). In this way a motion is produced by an external stimulus without any involvement of consciousness. A simple reflex is one in which the impulse passes directly from the posterior root fibres to the cells of the anterior horns. A compound reflex is one in which the impulse passes through another neurone situated within the cord in passing from the posterior root fibre to the anterior horn cell. (2) An automatic centre. By an automatic action is meant one which *apparently* occurs without any determining external stimulus, e.g. the rhythmical action of the heart or the contraction and expansion of the arteries. (3) A relay station in the transmission of impulses from and to the higher centres. This takes place through the fibre tracts of the cord and has been already referred to in connection with the description of those tracts. (4) A conduction path. This also has been noted in connection with the description of the fibre tracts of the cord.

THE BRAIN.

By this term is usually meant all that portion of the cerebro-spinal axis contained in the cranial cavity.

The human brain is larger and heavier relatively to the size and weight of the body than the brain of any other animal, with the possible exception of some of the smallest birds and mammals. It is larger and heavier absolutely than that of any other animal except the elephant and larger whales. It is largest in the white races, smallest in some of the Central African savages. It is larger in the male than in the female. The average weight of the adult male brain of the white races of Europe and America has been estimated at from 49 to 50 ounces, of the female at from 43 to 45 ounces. The brain is much larger relatively to the size of the body in the infant than in the adult, the brain of the new-born child weighing on an average from 10 to 12 ounces. The brain increases in weight up to middle life. After sixty it usually decreases somewhat in weight. It is a common idea that large brains are apt to be associated with unusual intellectual development. Such is not, however, the case. While the brains of some men of great intellectual attainments have proved to be above the average in weight—Cuvier, 64 ounces; Abercrombie, 63 ounces; Goodsir, 57 ounces—the brains of other men apparently equally intellectual have not been above the average in weight, and Thurman reports a case of a male epileptic whose brain weighed 62 ounces, and Bicknill one from a similar case which weighed 64½ ounces. Brains weighing over 60 ounces have also been observed in the insane.

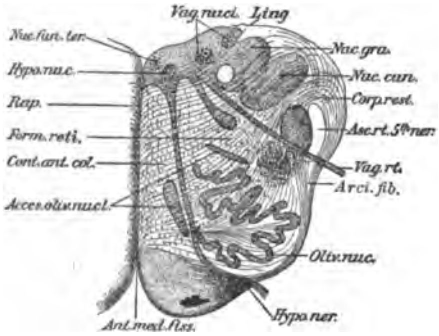
The brain may be subdivided into the medulla oblongata, the pons Varolii, the mid-brain, the cerebellum, the basal ganglia, and the cerebral hemispheres.



MEDULLA OBLONGATA AND PONS VAROLII.

Pon. Var., pons Varolii; *Mid. ped. cer.*, middle peduncle of cerebellum; *Oliv. bdy.*, olivary body; *Fiss. dec.*, pyramidal decussation; *Med. obl.*, medulla oblongata; *Pyr. pyrs.*, anterior pyramids.

The medulla oblongata is the continuation upward of the spinal cord and extends from the lower limit of the pyramidal decussation below, to the lower margin of the pons above. The length of the medulla is about an inch, and its diameters, which at its lower portion correspond to those of the cord, increase from below upward. Externally the medulla shows the continuation upward of the anterior and of the posterior fissures of the cord. These fissures become more shallow as they ascend, the posterior fissure disappearing at about the middle of the medulla, where the central canal opens into the fourth ventricle. On either side of the anterior fissure is a prominence caused by the anterior pyramid, and to the outer side of the pyramid the bulging of the olivary body may be seen. The antero-lateral surface of the medulla is also marked by the exit of the sixth to the twelfth (inclusive) cranial nerves. The posterior surface shows two prominences on either side, one next the posterior fissure known as the clava, caused by the nucleus gracilis or nucleus of the column of Goll; the other just to the outer side of the clava, due to the nucleus cuneatus or nucleus of the column of Burdach. The internal structure of the medulla shows considerable resemblance to that of the cord. This is especially true of the lower part of the medulla, the structures of which are directly continuous with those of the cord. The fibre tracts of the cord, however, assume, in the medulla, new directions, and in doing so break up the formation of the gray matter. This, together with the appearance of some new masses of gray matter and some new fibre bundles, is the main factor in determining the difference in structure between cord and medulla. The internal structure of the medulla can be best understood by tracing into it the structures of the spinal cord. At the junction of medulla and cord occurs the pyramidal decussation. Above this decussation the fibres of the main cortico-spinal motor tracts lie in two large bundles, one on either side of the anterior median fissure, and known as the anterior pyramids. In the decussation of the pyramids the majority of these fibres cross over to the opposite postero-lateral region and pass down into the cord as the crossed pyramidal tract, the few fibres remaining next the anterior fissure forming the direct pyramidal tract. The crossing fibres of the decussation separate off the anterior horns from the rest of the gray matter, while the intermingling of white matter and gray matter is known as the formatio reticularis. Shortly above the pyramidal decussation masses of gray matter begin to appear in the posterior columns. These are known respectively as the nucleus gracilis or nucleus of the column of Goll and the nucleus cuneatus or nucleus of the column of Burdach. In these nuclei terminate most or all of the fibres of the columns of Goll and of Burdach. The nuclei increase in size pari passu with the decrease in the size of the columns, the latter finally entirely disappearing. These nuclei are therefore nuclei of termination for the fibres of these columns and are of the nature of a relay station in the main spino-cortical sensory conduction path. From cells in these nuclei, axones pass around the central canal—internal arcuate fibres—decussate in the median line—sensory decussation—and then turn upward as the fillet or lemniscus. This is the main continuation brainward of the great sensory tract. Some axones from cells in the nuclei do not turn upward in the fillet, but, skirting the ventral surface of the pyramids, as the external arcuate fibres, pass to the cerebellum in the restiform body. Of the lateral tracts of the cord, the direct cerebellar tract joins the restiform body and thus reaches the cerebellum through its inferior peduncle, while the tract of Gowers continues upward in the lateral region of the medulla, its exact terminations being as yet undetermined. The posterior horns become, in the medulla, separated from the rest of the gray matter, and, becoming broken up, serve as nuclei of termination for the sensory divisions of some of the cranial nerves. As it passes up through the medulla, the central canal, surrounded by an increased amount of gelatinous substance, gradually approaches the posterior surface, to open at about the middle of the medulla into the fourth ventricle. Of the new masses of gray matter which appear in the medulla, the largest are the olivary nuclei. These are irregular convoluted masses of gray matter situated in the ventral part of the medulla behind and to the outer side of the pyramids. They extend from the upper limit of the sensory decussation to the pons. Each olivary nucleus has a central core of white fibres which cross the median line and pass to the opposite restiform body forming the cerebello-olivary tract. To the inner side of the lower part of the olivary nucleus is a smaller mass of gray matter known as the accessory olivary nucleus, while above the main mass of the olive is the superior olivary nucleus. The distinct line of decussating fibres which extends through the centre of medulla and pons is called the median raphe. The nuclei of certain of the cranial nerves form masses of gray matter in the medulla. These, together with the root fibres of the nerves, will be found described below in connection with the cranial nerves.



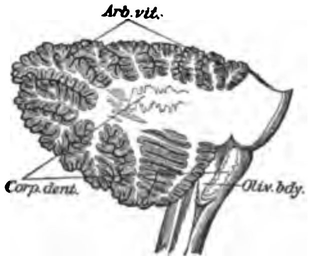
SECTION OF THE MEDULLA OBLONGATA AT ABOUT THE MIDDLE OF THE OLIVARY BODY.

Nuc. fun. ter., nucleus of funiculus teres; *Vag. nucl.*, vagus nuclei; *Ling.*, lingula; *Nuc. gra.*, nucleus gracilis; *Nuc. cun.*, nucleus cuneatus; *Corp. rest.*, corpus restiforme; *Asc. rt. 5th ner.*, ascending root of 5th nerve; *Vag. rt.*, vagus root; *Arci. fib.*, arciform fibres; *Oliv. nuc.*, olivary nucleus; *Hypo. ner.*, hypoglossal nerve; *Ant. med. fiss.*, anterior median fissure; *Hypo. nuc.*, hypoglossal nucleus; *Rap.*, median raphe; *Form. reti.*, formatio reticularis; *Cont. ant. col.*, continuation of the anterior column; *Access. oliv. nucl.*, accessory olivary nuclei.

The pons Varolii, or bridge, lies just above the medulla. Superficially its ventral surface is seen to be composed of fibres which pass transversely, forming a sort of bridge between the two cerebellar hemispheres. Internally the pons is composed of tracts of fibres (white matter) and of nuclei (masses of gray matter). The fibre tracts pass both longitudinally and transversely. The longitudinal fibres are mainly the continuation upward of tracts already mentioned in the description of the medulla, the pyramidal tract or main motor tract, and the fillet or main sensory tract. Some of the longitudinal fibres are, however, fibres connecting the nuclei pontis with higher centres and commissural fibres between the nuclei pontis. The transverse fibres of the pons are mostly fibres connecting the cerebellum with the nuclei pontis, and are consequently often called the middle cerebellar peduncles. They are composed of two sets of fibres, which from their location are known respectively as the superficial transverse pontile fibres and the deep transverse pontile fibres. In the median line the fibres decussate, forming a median raphe continuous with that of the medulla. Fibres of the roots of the fifth and some of the higher fibres of the roots of the sixth and seventh nerves pass from their nuclei of origin to the ventro-lateral surface of the pons. The gray matter of the pons consists of the nuclei of the nerves just mentioned and of nuclei scattered throughout the pons, which are known as the nuclei pontis and are connected with the middle cerebellar peduncles and with the cerebrum. Near the posterior surface of the pons is the fourth ventricle, which becomes narrow in the upper part of the pons as it approaches the aqueduct of Sylvius. In the floor of the ventricle is a group of nerve cells which are so deeply pigmented as to present a dark appearance to the naked eye. This dark area is called the locus cæruleus.

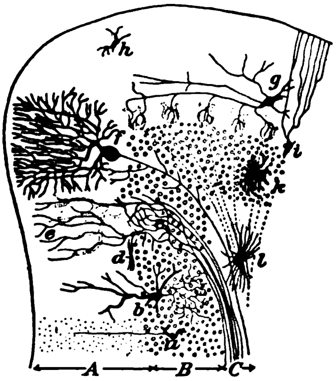
Above the pons is the mid-brain. Here the long fibre tracts are collected into two main bundles known as the cerebral peduncles or crura cerebri. Each peduncle, or crus, consists of a ventral portion or crusta, a dorsal portion or tegmentum, and, between these, a mass of gray matter, the substantia nigra. The dorsal part of the cerebral peduncle, or tegmentum, represents the continuation brainward of the main sensory tract to the cortex cerebri. Of the ventral part of the peduncles, or crusta, about the middle three-fifths are taken up by the fibres of the pyramidal system (including fibres to the motor nuclei of the cranial nerves). Medial to these fibres in the peduncle are the fibres which pass from the frontal lobe to the nuclei pontis, while external to the pyramidal fibres are the fibres connecting the temporal lobe with the nuclei pontis. As the peduncles approach the basal ganglia the substantia nigra disappears and the tegmentum lies just dorsal to the crusta. These bundles of fibres pass through the basal ganglia between the nucleus caudatus and the optic thalamus on the mesial side and the nucleus lenticularis on the lateral side. Here they form the internal capsule, which is directly continuous above with the corona radiata, through which the fibres enter the cortex cerebri. A bend divides the capsule into an anterior portion and a posterior portion. The anterior portion lies between the caudate nucleus internally and the lenticular nucleus externally. This part of the capsule consists mainly of fibres which connect the cortex cerebri and the optic thalamus. The posterior portion of the internal capsule lies between the lenticular nucleus on its outer side and the optic thalamus on its inner side. About the anterior two-thirds of this portion is occupied by the fibres of the pyramidal tracts (including descending fibres to the motor cranial nerve nuclei). The corticopontal fibres connecting the cortex cerebri with the nuclei pontis pass through the internal capsule in two separate bundles; one bundle, coming from the frontal lobe, passes down in front of the main motor tract; the other bundle, coming from the temporal lobe, passes through the posterior portion of the internal capsule just behind the pyramidal tract. Through the posterior part of the internal capsule also passes the continuation upward of the tegmentum or main sensory tract to the cortex. On the posterior surface of the mid-brain are the corpora quadrigemina or optic lobes. These are four in number, two anterior and two posterior. Their structure is complex. The anterior pair seems to be connected in some way with vision. In the mid-brain the fourth ventricle becomes narrowed and is known as the iter or aqueduct of Sylvius.

The *cerebellum*—or little brain—is that part of the brain which lies in the inferior occipital fossa. It is situated beneath the occipital lobes of the cerebrum, from which it is separated by the tentorium cerebelli. The average weight of the cerebellum is about 5½ ounces. Its size relative to that of the cerebrum is about 1 to 8. In the infant the cerebellum is relatively much smaller than in the adult, its weight being about $\frac{1}{10}$ that of the cerebrum. The cerebellum measures from 3½ to 4 inches in transverse diameter and about 2 inches from before backward at its centre. It consists of two hemispheres or lateral lobes and a smaller central lobe called the vermiform process. The cerebellum is connected with other parts of the nervous system by means of bundles of fibres known as peduncles. Two of these, one on either side, the superior peduncles, connect it with the cerebrum. Two others, the inferior peduncles or restiform bodies, connect the cerebellum with the spinal cord. The third set of peduncles, the middle peduncles, connect it with the pons. The hemispheres of the cerebellum are separated in front by a fossa which encircles the corpora quadrigemina. Posteriorly the furrow is deeper and narrower. On the superior surface of the cerebellum, between the anterior and posterior furrows, the central lobe has a very slight elevation and is called the superior vermiform process. On the inferior surface of the cerebellum the central lobe, called the inferior vermiform process, lies at the bottom of the furrow, where it forms a distinct projection and is subdivided into an anterior portion, the nodule, a middle portion, the uvula, and a posterior portion, the pyramid. Two small lobes stand out distinctly from the main bulk of the hemisphere, one, the flocculus, lying to the outer side of the nodule, the other, the tonsil, lying to the outer side of the uvula. Each hemisphere is divided transversely by a deep fissure called the great horizontal fissure, which separates it into an upper or tentorial surface and a lower or occipital surface. In addition to the flocculus and tonsil, the surface of the cerebellum is divided into several less distinct lobes. On the upper surface are the anterior or square lobe and the posterior or semi-lunar lobe. On the under surface may be seen from before backward the digastric lobe, the slender lobe, and the inferior posterior lobe. Besides the deeper furrows sepa-



VERTICAL SECTION OF THE CEREBELLUM.

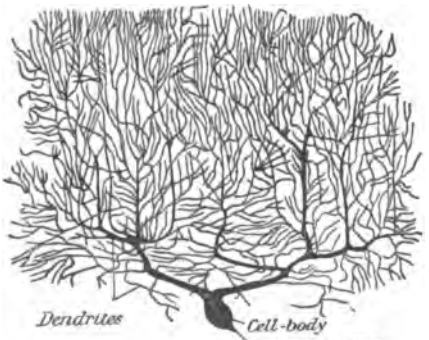
Arb. vit., arbor vitæ; *Oliv. bdy.*, olivary body; *Corp. dent.*, corpus dentatum.



SCHEME OF THE CEREBELLAR CORTEX.

A, Gray or molecular layer; *B*, granule layer; *C*, medulla or white matter; *a*, small granule cell; *b*, large granule cell; *c*, plexus of nerve fibres; *d*, horizontal bundle; *e*, fibres of molecular layer; *f*, cell of Purkinje; *g*, basket cell; *h*, small cortical cell; *i*, glia cell of the molecular layer; *k*, mossy cell resembling a glia cell; *l*, spider cell.

rating the lobes, the entire surface of the cerebellum is crossed by a multitude of transverse grooves which divide it into plates or lamellæ and give it a foliated or laminated appearance. On cutting into the cerebellum it is seen to consist of a central portion or core of white matter which extends outward into the cortex as a series of transversely disposed branching plates. These, covered over by a layer of gray matter, form the lamina already referred to, which on cross-section present the characteristic leaf-like appearance known as the "arbor vitæ." The white matter of the cerebellum is composed of medullated nerve fibres which pass out in a radial manner into the gray matter of the cortex. These fibres are axones coming from cells situated in the cerebellum and passing out to terminate either in some other part of the cerebellum or in some other part of the nervous system, or coming from cells located in other parts of the nervous system to their terminations in the cerebellum. The gray matter of the cerebellum is composed of three layers, an external or molecular layer, an internal or granular layer, and, between the two, a layer composed of a single layer of large cells, the layer of Purkinje cells. The molecular layer contains multipolar cells of various sizes known as 'basket cells' from the fact that while their dendrites pass mostly toward the surface, their axones pass downward and end in a basket-like network around the Purkinje cells. The granular or nuclear layer derives its name from the fact that after the ordinary methods of staining it appears to be composed of a mass of small closely packed cells, each cell consisting of a nucleus surrounded by an extremely small amount of protoplasm. Intermingled with these cells are medullated and non-medullated fibres. By the application of the method of Golgi these cells have been divided into small granule cells (by far the more numerous) and large granule cells. In the case of the small granule cell the dendrites ramify in the granular layer, while the axone terminates freely in the molecular layer. The large granule cells, on the other hand, send their dendrites into the molecular layer, while their axones form a rich plexus within the granular layer. The dense network of fibres found in the granular layer is derived from the cells just described, from axones and collaterals of Purkinje cells, and from fibres coming from the white matter. The cells of Purkinje form a single layer along the boundary between the molecular layer and the granular layer. From the outwardly directed part of the cell a thick neck is given off, from which arise two main dendritic processes, which subdivide and give rise to an enormous number of processes which ramify and terminate in the molecular layer. From the opposite pole of the cell is given off the axone which passes through the granular layer and becomes a medullated fibre of the white matter.



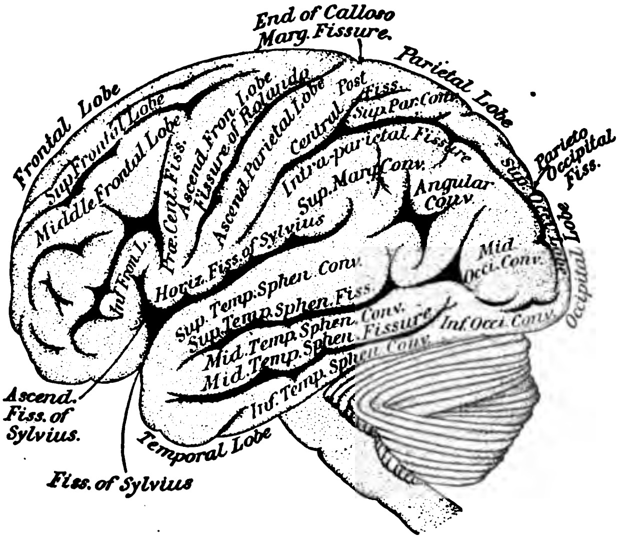
NERVE CELL (CELL OF PURKINJE).
From a section through the human cerebellar cortex.

Besides the gray matter of the cortex, certain independent masses of gray matter occur in the cerebellum. These are the corpus dentatum, a convoluted body of gray matter situated to the inner side of the centre of the core of white matter, and the roof-nuclei of Stilling, situated at the anterior end of the superior vermiform process and projecting forward into the roof of the ventricle.

The functions of the cerebellum have been made the subject of much discussion and investigation. It is itself insensible to irritation, and has been cut away in various animals, without eliciting signs of pain; moreover, its removal or disorganization by disease is generally unaccompanied with loss or disorder of sensibility, animals from whom it has been removed being apparently able to smell, see, hear, and feel as perfectly as before. Flourens extirpated the cerebellum in birds by successive layers. Feebleness and want of harmony of the movements resulted from the removal of the superficial layers. When he reached the middle layers, the animals became restless; their movements were violent and irregular. By the time that the organ was entirely removed, the animals had completely lost the power of flying, walking, standing, and preserving their equilibrium. When a pigeon in this state was laid upon its back, it could not recover its former position, but fluttered its wings, and saw and tried to avoid a threatened blow. Hence volition, sensation, and memory were not lost, but merely the faculty of combining the actions of the muscles. From a large series of experiments of this kind, subsequently made on all classes of animals, Flourens inferred that the cerebellum belonged neither to the sensitive nor to the intellectual apparatus; that it was not the source of voluntary movements, although belonging to the motor apparatus; that it is the organ for the coördination of the voluntary movements, or for the excitement of the combined and harmonious action of the muscles.

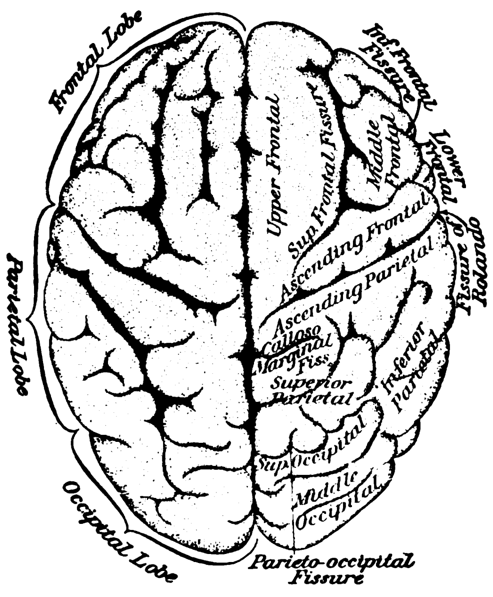
In spite of the above facts, the extent to which muscular coördination is dependent upon the cerebellum cannot be considered as satisfactorily determined.

The *cerebrum*—sometimes called the brain proper—constitutes in man the largest part of the cerebro-spinal axis. Lying within the cavity of the skull, its shape conforms to that of the cranial cavity. Anteriorly, superiorly, and posteriorly, a deep fissure runs lengthwise of the brain, called the great longitudinal fissure, separating the brain into two equal halves or hemispheres. At the bottom of the fissure a broad band of fibres—the corpus callosum—unites the two hemispheres. Each hemisphere presents three surfaces—an outer, which is convex and corresponds to the inner surface of the skull; an inner, which is flat, lying against the similar surface of the opposite hemisphere, from which it is separated by the falx cerebri; and an under surface, which is somewhat concave and rests upon the anterior and middle fossæ of the skull and upon the tentorium cerebelli. The surface of each hemisphere is marked by numerous elevations and depressions, the former known as convolutions or gyri, the latter as fissures and sulci. These convolutions serve to increase the actual surface of the brain without increasing the actual size of the organ, and the number and extent of the convolutions are in direct relation to the intellectual development, increasing throughout the ascent of the mammalian scale, and reaching their highest complexity in civilized man.



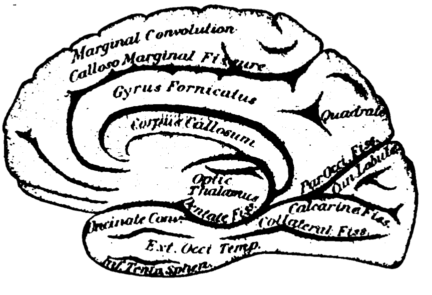
CONVOLUTIONS AND FISSURES OF THE OUTER SURFACE OF THE CEREBRAL HEMISPHERE.

Fissures. Of the five principal fissures of the brain, two have already been mentioned—the great longitudinal fissure, separating the hemispheres, and the great transverse fissure, separating the cerebrum from the cerebellum. Each hemisphere presents three fissures which separate the hemisphere into lobes. These are: (1) The fissure of Sylvius. This begins at the base of the brain (see diagram) and passes upward and backward on the external surface of the hemisphere, where it divides into a shorter ascending limb and a longer horizontal limb. It separates the frontal and parietal lobes from the tempero-sphenoidal lobe. (2) The fissure of Rolando begins a little behind the mid-point of the great longitudinal fissure and extends downward and forward to a point somewhat above and behind the bifurcation of the Sylvian fissure. It separates the frontal lobe from the parietal lobe. (3) The parieto-occipital fissure begins about midway between the fissure of Rolando and the posterior extremity of the brain, sends a short branch outward, while its longer branch extends downward and forward on the inner surface of the hemisphere.



UPPER SURFACE OF THE BRAIN, THE ARACHNOID HAVING BEEN REMOVED.

Lobes. The *frontal lobe* includes that part of the brain which lies in front of the fissure of Rolando and above the fissure of Sylvius. It presents the following convolutions: (a) The ascending frontal convolution, lying just in front of the fissure of Rolando and separated from the rest of the lobe by the vertical or precentral sulcus. This remaining portion of the frontal lobe is divided by two longitudinal sulci into (b) the superior frontal convolution, (c) the middle frontal convolution, and (d) the inferior frontal convolution. The last is sometimes known as the convolution of Broca. These convolutions also extend more or less into the under surface of the lobe, which is also marked by a groove in which lies the olfactory bulb.

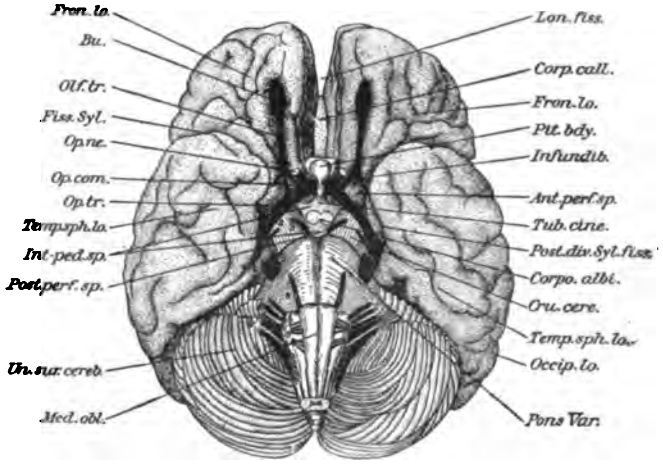


CONVOLUTIONS AND FISSURES OF THE INNER SURFACE OF THE CEREBRAL HEMISPHERE.

The *parietal lobe* is separated from the frontal lobe by the fissure of Rolando, from the tempero-sphenoidal lobe below by the horizontal limb of the fissure of Sylvius, from the occipital lobe by the parieto-occipital fissure. It may be subdivided into four fairly well marked convolutions: (a) The ascending parietal, lying just behind the fissure of Rolando. Behind the ascending parietal convolution is the intra-parietal sulcus. The portion of the parietal lobe above the horizontal part of the sulcus is known as (b) the superior-parietal convolution, and is continuous with the ascending parietal. That part of the lobe below the horizontal arm of the sulcus is divided by a vertical sulcus into (c) an anterior part, the supramarginal convolution, and (d)' a posterior part, the angular convolution.

The *occipital lobe* is separated from the upper part of the parietal lobe by the parieto-occipital fissure, while it is more or less continuous with the lower part of the parietal lobe and with the tempero-sphenoidal lobe by small connecting convolutions. The lobe is rather indefinitely divided by two small transverse fissures into first, second, and third occipital convolutions.

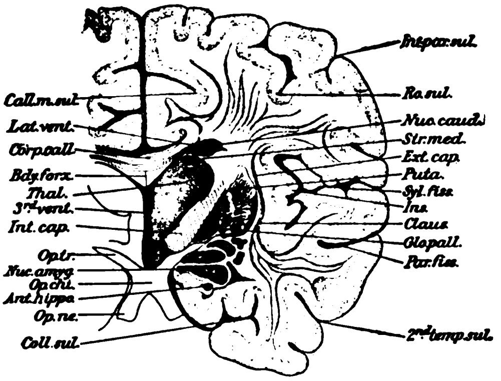
The *tempero-sphenoidal lobe* lies in the middle fossa of the skull and is bounded above and in front by the Sylvian fissure. Posteriorly, connecting convolutions unite it with the parietal and occipital lobes. It is divided by two horizontal sulci into three convolutions called from above downward, the first, second, and third tempero-sphenoidal convolutions.



BASE OF THE BRAIN.

Fron. lo., frontal lobe; *Bu.*, bulb; *Olf. tr.*, olfactory tract; *Fiss. Syl.*, fissure of Sylvius; *Op. ne.*, optic nerve; *Op. com.*, optic commissure; *Op. tr.*, optic tract; *Temp. sph. lo.*, temporo-sphenoidal lobe; *Int. ped. sp.*, interpeduncular space; *Post. perf. sp.*, posterior perforated space; *Un. sur. cereb.*, under surface of cerebellum; *Med. obl.*, medulla oblongata; *Lon. fiss.*, longitudinal fissure; *Corp. call.*, corpus callosum; *Pit. bdy.*, pituitary body; *Infundib.*, infundibulum; *Ant. perf. sp.*, anterior perforated space; *Tub. cine.*, tuber cinereum; *Post. div. Syl. fiss.*, posterior division of Sylvian fissure; *Corpo. albi.*, corpora albicantia; *Cru. cere.*, crura cerebri; *Temp. sph. lo.*, temporo-sphenoidal lobe; *Occip. lo.*, occipital lobe; *Pons Var.*, pons Varolii

The *central lobe* or *island of Reil* is situated in the depth of the fissure of Sylvius, and composed of five or six rather small convolutions.

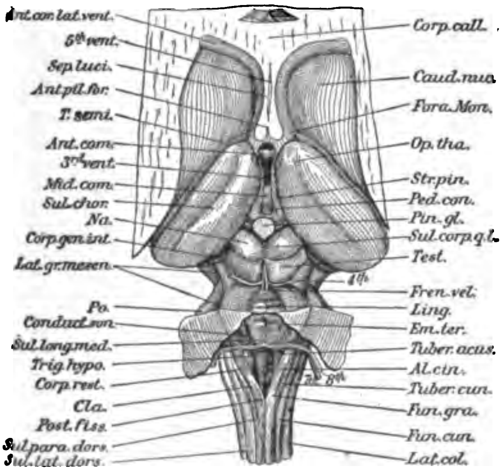


THE BRAIN VIEWED FROM BEHIND A FRONTAL SECTION THROUGH THE RIGHT HEMISPHERE TAKEN JUST BEHIND THE OPTIC CHIASMA.

Call. m. sul., calloso-marginal fissure; *Lat. vent.*, lateral ventricle; *Corp. call.*, corpus callosum; *Bdy. forx.*, body of fornix; *Thal.*, thalamus; *3rd vent.*, third ventricle; *Int. cap.*, internal capsule; *Op. tr.*, optic tract; *Nuc. amyg.*, nucleus amygdala; *Op. chi.*, optic chiasma; *Ant. hippo.*, anterior end of hippocampus major projecting into the descending cornu of the lateral ventricle; *Coll. sul.*, collateral sulcus; *Int. par. sul.*, intraparietal sulcus; *Ro. sul.*, Rolandic sulcus; *Nuc. caud.*, nucleus caudatus; *Str. med.*, stria medullaris; *Ext. cap.*, external capsule; *Puta.*, putamen; *Syl. fiss.*, Sylvian fissure; *Ins.*, insula; *Claus.*, claustrum; *Glo. pall.*, globus pallidus; *Par. fiss.*, parallel fissure; *2nd temp. sul.*, second temporal sulcus.

The internal surface of the cerebrum is less distinctly marked off into lobes than the external surface. The fissures on the internal surface are the calloso-marginal, the parieto-occipital, the calcarine, the collateral, and the dentate. The calloso-marginal is the longest of these fissures, begins on the superior surface just behind the mid-point, and runs forward parallel to the curve of the surface of the brain, separating the marginal or first frontal convolution from the gyrus fornicatus, which lies just over the corpus callosum. The quadrate lobule lies between the calloso-marginal sulcus and the parieto-occipital sulcus. The cuneus or occipital lobule lies between the parieto-occipital sulcus in front and above and the calcarine sulcus below. The uncinate gyrus lies below the Sylvian fissure and the dentate sulcus, while below it is separated from the tempero-sphenoidal lobe by the collateral sulcus. The tempero-sphenoidal lobe is continuous with the already described lobe of the same name in the outer surface of the cerebrum. It presents two convolutions in addition to those already described on its outer surface.

The under surface of the cerebrum shows some important features, which, passing from before backward, are as follows: (1) the longitudinal fissure, separating the frontal lobes. (2) The corpus callosum, appearing in the depth of the longitudinal fissure and serving as a great transverse commissure connecting the two hemispheres. (3) The olfactory nerve with its expanded extremity the olfactory bulb, lying in a groove in the under surface of the frontal lobe. (4) The fissure of Sylvius, separating the anterior from the middle lobe. (5) The anterior perforated space—so called from the perforations for the passage of blood-vessels—is the under surface of the corpus striatum (see below). (6) The pituitary body or hypophysis cerebri. (7) The infundibulum is a narrow tube of gray matter connecting the pituitary body with (8) the tuber cinereum, an eminence of gray matter lying between the diverging cerebral peduncles. (9) The corpora albicantia or corpora mamillaria are two small white protuberances each about the size of a pea just behind the tuber cinereum. They are composed externally of white matter, internally of gray matter, and are formed by the anterior crura of the fornix. (10) The posterior perforated space lies between the corpora albicantia and the anterior fibres of the pons. Its perforations are due to vessels which pass to the optic thalami. (11) The optic commissure is the crossing of the right and the left optic tracts to form the optic nerves. It is situated just in front of the tuber cinereum. (See also below—optic nerve, under *Cranial Nerves.*) (12) The cerebral peduncles or crura cerebri are two diverging bundles of white fibres which appear to come out from behind the anterior border of the pons. Each peduncle passes upward, forward, and outward, and enters the under surface of the hemisphere. (For description of cerebral peduncles, see above under *Mid-Brain.*) (13) The under surface of the cerebrum also shows the exit of the third and fourth cranial nerves, the former coming out from the inner margins of the crura in front of the pons, the latter from the outer margins in front of the pons.



METENCEPHALON, MESENCEPHALON, AND THALAMENACEPHALON FROM THE DORSAL SURFACE.

Ant. cor. lat. vent., anterior cornu of lateral ventricle; ***5th vent.***, fifth ventricle; *Sep. luci.*, septum lucidum; ***Ant. pil. for.***, anterior pillar of fornix; ***T. semi.***, tænia semicircularis; ***Ant. com.***, anterior commissure; ***Sul. chor.***, sulcus choroideus; ***Na.***, nates; ***Corp. gen. int.***, corpus geniculatum internum; ***Lat. gr. mesen.***, lateral groove of mesencephalon; ***Po.***, pons; ***Conduct. son.***, conductor sonorous; ***Sul. long. med.***, sulcus longitudinalis medianus; ***Trig. hypo.***, trigonum hypoglossi; ***Corp. rest.***, corpus restiforme; ***Cla.***, clava; ***Post. fiss.***, posterior fissure; ***Sul. para. dors.***, sulcus paramedianus dorsalis; ***Sul. lat. dors.***, sulcus lateralis dorsalis; *Corp. call.*, corpus callosum; *Caud. nuc.*, caudate nucleus; *Fora. Mon.*, foramen of Monroe; *Op. tha.*, optic thalamus; *Str. pin.*, stria pinealis; *Ped. con.*, pedunculus conarii; *Pin. gl.*, pineal gland; *Sul. corp. q. l.*, sulcus corpus quadratus longitudinalis; *Test.*, testis; ***Fren. vel.***, frenulus veli; ***Ling.***, lingula; ***Em. ter.***, eminentia teres; ***Tuber. acus.***, tuberculum acusticum; ***Al. cin.***, ala cinerea; ***Tuber. cun.***, tuberculum cuneatum; ***Fun. gra.***, funiculus gracilis; ***Fun. cun.***, funiculus cuneatus; ***Lat. col.***, lateral column.

VENTRICLES OF THE BRAIN. The lateral ventricles represent the expanded anterior end of the embryonic neural canal, and are the cavities of the hemispheres. They are lined by a single layer of simple cylindrical epithelium, the ependyma, derived from the epiblastic lining of the neural canal. The two ventricles are separated from each other in the median line by a vertical septum known as the septum lucidum. The shape of the ventricles is irregular, each ventricle consisting of a main cavity or body and extending off from this three smaller cavities called cornua or horns. The anterior horn passes outward and forward into the anterior lobe. The posterior horn extends backward into the posterior lobe, while the middle horn descends into the substance of the middle lobe. The main cavity of the ventricle is roofed in by the under surface of the corpus callosum. Its floor is made by the corpus striatum and optic thalamus, although the tænia semicircularis, choroid plexus, corpus fimbriatum, and fornix are also situated in its floor. The third ventricle is a long narrow cavity lying between the optic thalami. Above it is bounded by the under surface of the velum interpositum, to which is attached the choroid plexus of this ventricle. Its floor is made by the lamina cinerea, tuber cinereum, infundibulum, corpora albicantia, and posterior perforated space. Three commissures cross the cavity of the ventricle, known respectively as the anterior, the middle, and the posterior commissures. Four openings connect the third ventricle with other cavities. In front the foramina of Monroe, one on each side, serve to connect the third ventricle with the lateral ventricles. Posteriorly, the aqueduct of Sylvius connects the third ventricle with the fourth. A fourth opening in the anterior part of the floor leads into the cavity of the infundibulum. The so-called fifth ventricle of the brain is, properly speaking, not a true ventricle, being simply a part of the great longitudinal fissure which has been cut off in the development of the brain, by the union of the two hemispheres, through the corpus callosum and the fornix. It is not lined by epithelium as are the other ventricles. The fourth ventricle is described above in connection with the medulla oblongata.

Certain structures remain to be described which have already been mentioned as lying in the floor of the lateral ventricles. The two largest of these, often called the basal ganglia, are the corpora striata and the optic thalami.

The corpora striata are two masses of mingled gray matter and white matter, the superior surfaces of which appear in front of the body of the lateral ventricles. The extra-ventricular portion is known as the lenticular nucleus. The intra-ventricular part known as the caudate nucleus is smaller than the extra-ventricular, from which it is separated by the internal capsule, a large band of fibres which represents the continuation upward of the main tracts of the cord and crura on their way to the cerebrum. A layer of white matter which covers the extra-ventricular portion of the lenticular nucleus is known as the external capsule.

The optic thalamus lies to the inner side and behind the lenticular nucleus, from which it is separated by a part of the internal capsule. Each thalamus is composed of white matter externally, of gray matter internally, and rests upon the corresponding crus cerebri. It forms a part of the lateral wall and floor of the body of the lateral ventricle. As the middle or descending horn of the ventricle descends the thalamus comes to form the roof of this portion of the ventricle. In front is a prominence known as the anterior tubercle, while its posterior part presents two small rounded eminences, the internal and the external geniculate bodies.

The tænia semicircularis is a narrow band of white fibres which lies in the depression between the caudate nucleus and the optic thalamus. Anteriorly, it follows the descending pillar of the fornix; posteriorly, it passes into the descending horn of the ventricle, and at the bottom of the horn enters a mass of gray matter known as the nucleus amygdalæ.

The velum interpositum is a vascular extension of the pia mater into the interior of the brain through the great transverse fissure. It enters the third ventricle beneath the corpus callosum and above the optic thalami, corpora quadrigemina, and pineal gland. Anteriorly, it bifurcates, a part entering each lateral ventricle through the foramen of Monroe. In the third ventricle two vascular fringes hang down from the velum. These are the choroid plexuses of the third ventricle. In the lateral ventricles similar fringes are attached to the lateral margin of the velum. These are the choroid plexuses of the lateral ventricles.

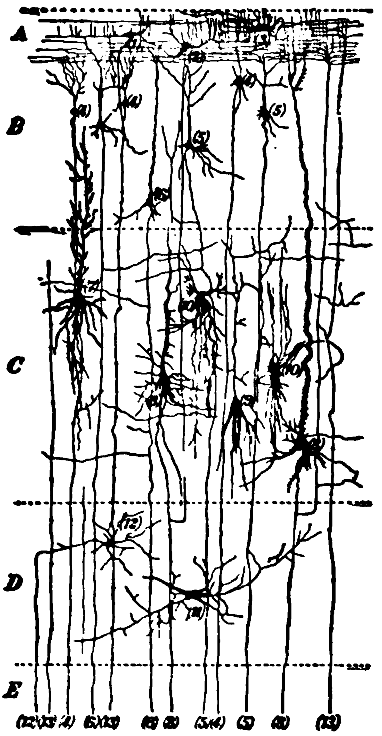


DIAGRAM OF THE CELLS OF THE CEREBRAL CORTEX.

A. Superficial or molecular layer; (*1*) fusiform; (*2*) triangular; (*3*) polygonal cells of Cajal. *B.* Layer of small pyramids; (*4*) smallest; (*5*) small; (*6*) medium-sized pyramidal cells with their axones descending to the white matter, giving off collaterals in their course. *C.* Layer of large pyramidal cells; (*7*) large pyramidal cells with very numerous dendrites; (*8*) largest giant pyramidal cells; (*9*) Martinotti cell with descending dendrites and ascending axone; (*10*) polygonal cells. *D.* Deep layer; (*11*) fusiform cells; (*12*) polygonal cells. *E.* The white matter containing axones from pyramidal cells: (*4*), (*5*), (*6*), (*8*), and from cells (*12*) of the deep layer; (*13*) neuroglia fibre.

The corpus fimbriatum or tænia hippocampi is the lateral edge of the posterior pillar of the fornix. It is a narrow white band lying just behind the choroid plexus of the lateral ventricle.

The fornix is an arch-shaped band of white fibres, running longitudinally, which bifurcates both anteriorly and posteriorly, forming the anterior and the posterior pillars of the fornix. The central portion or body of the fornix is triangular in shape, its narrow anterior end being attached to the septum lucidum, its broad posterior extremity being continuous with the corpus callosum. The anterior pillars curve downward in the lateral walls of the ventricle and enter the corpora albicantia, from which they pass into the optic thalami. The posterior pillars of the fornix pass downward in the descending horns of the lateral ventricle, their thin margin forming the already described corpora fimbriata.

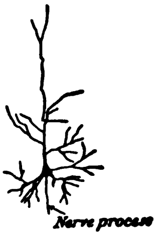
The hippocampus major or cornu Ammonis, so called from its fancied resemblance to a ram's horn, is a long curved body consisting of both gray matter and white matter which follows the curve of the floor of the middle horn of the lateral ventricle. It is formed by an extension inward of the dentate sulcus. The gray substance of the sulcus forms an irregular ridge along the margin of the hippocampus major, known as the fascia dentata. The lower end of the hippocampus major is marked by several rounded elevations which from their resemblance to the paw of an animal are known as the pes hippocampi. The hippocampus minor is a longitudinal eminence in the floor of the posterior horn of the lateral ventricle. It is due to the extension inward of the calcarine sulcus. The eminencia collateralis or pes accessorius is an eminence caused by the inward projection of the collateral fissure. It lies between the hippocampus major and hippocampus minor, and between the posterior and descending horns of the lateral ventricle.

General Histology of the Cerebrum. Each cerebral convolution consists of a central white core covered over by a layer of gray matter, which latter constitutes the cerebral cortex. The cerebral cortex may be divided into three fairly distinct layers: (1) an outer barren or molecular layer; (2) a middle layer, or layer of pyramidal cells; (3) an inner layer, or layer of polymorphous cells.

(1) The nerve cells of the barren or molecular layer are known as the cells of Cajal. They are fusiform, triangular, or irregular in shape, and both their dendrites and axones ramify in this outer layer, the axones passing mainly in a direction parallel to the surface. This layer also contains the terminations of the apical dendrites of the pyramidal cells, some medullated nerve fibres running parallel to the surface, called superficial tangential fibres, and a rich plexus of neuroglia.

(2) The layer of pyramidal cells is often described as two separate layers, an outer layer of small pyramidal cells, and a deeper layer of large pyramidal cells. Each pyramidal cell has passing off from its outwardly directed angle a large apical or main dendrite. Smaller dendrites pass off from the sides and base of the cell. The axone originates from the base of the cell and enters the white matter of the corona radiata. During its passage through the gray matter it sends off collateral branches. Some of these collateral branches are medullated and form the deep tangential fibres. Among the deeper cells of this layer are found some very large pyramidal cells, called the cells of

Betz. These cells are found only in the motor cortex, and it is believed that it is the axones of these cells which pass down through the internal capsule to the cord as the main motor tract. In this layer are also found cells—cells of Martinotti—the dendrites of which pass downward, while their axones pass upward to the molecular layer, where they turn and run parallel to the surface as the superficial tangential fibres. Cells of Golgi type II. are also found in this layer. The axones of these cells branch rapidly and end in the gray matter in the vicinity of their cells of origin. The fibres of this layer consist of the axones and dendrites of the cells above described, and of axones from cells in other regions which are passing to their terminations here.



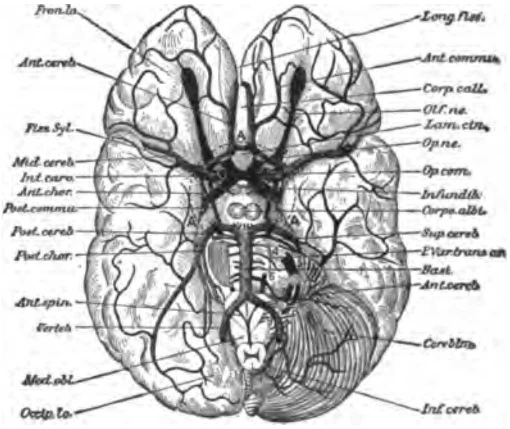
PYRAMIDAL CELL FROM A PERPENDICULAR SECTION OF THE CEREBRAL CORTEX OF ADULT MAN.

The terminal branches of the dendrites running toward the molecular layer are not visible.

(3) The cells of the third layer are fusiform or irregular in shape. They have no apical dendrites, their protoplasmic processes coming off irregularly and ramifying mainly in this layer. Their axones pass down into the corona radiata. The fibres of this layer consist of axones and dendrites of the cells just described, of the axones of pyramidal cells, and of axones of cells in other parts of the nervous system which are passing to their terminations here.

The corona radiata or central core of white matter radiating out into the gray matter consists of: (1) Descending fibres, which are axones of the large and small pyramidal cells and of the polygonal cells of the third layer. These axones become medullated and pass (a) to other convolutions of the same hemisphere—association fibres; (b) through the corpus callosum to the opposite hemisphere—commissural fibres; (c) to the internal capsule as fibres of the descending tracts—projection fibres. (2) Ascending fibres, which are axones of cells situated elsewhere in the nervous system, and which are here passing to their terminations. These fibres are (a) axones of cells situated in other convolutions of the same hemisphere—association fibres; (b) axones of cells situated in the opposite hemisphere, which have come through the corpus callosum—commissural fibres; (c) axones which have come through the internal capsule from cells situated in lower centres—projection fibres.

Circulation. The arterial supply of the brain comes from two sources, the internal carotids and the vertebrals. At the base of the brain these four vessels form a remarkable anastomosis of large arterial trunks which is known as the circle of Willis. The arrangement of these vessels can be best appreciated by reference to the accompanying diagram. From this circle there pass off to the brain three main sets of branches: (1) The anterior cerebral, which pass forward in the great longitudinal fissure, curve around the anterior border of the corpus callosum, and, running backward on its upper surface, terminate by anastomosing with the posterior cerebral arteries. They supply the under surfaces of the anterior lobes, part of the internal surfaces of the hemispheres, the corpus callosum, the third ventricle, and the anterior perforated space. Near their origin from the internal carotids, the two anterior cerebrals are united by a short thick trunk, the anterior communicating. (2) The middle cerebral or Sylvian arteries, which pass outward along the Sylvian fissures, within which each divides into three branches—an anterior to the anterior lobe, a posterior to the posterior lobe, and a median to the small lobe near the end of the fissure of Sylvius. (3) The posterior cerebral arteries, which, arising from the basilar, pass backward and outward on the under surfaces of the occipital lobes, each terminating in three branches, which pass respectively to the uncinate gyrus, to the temporo-sphenoidal lobe, and to the lingual lobule, cuneus, and occipital lobe.



THE ARTERIES OF THE BASE OF THE BRAIN. (The right half of the cerebellum and pons Varolii have been removed.)

Fron. lo., frontal lobe; *Ant. cereb.*, anterior cerebral; *Fiss. Syl.*, fissure of Sylvius; *Mid. cereb.*, middle cerebral; *Int. caro.*, internal carotid; *Ant. chor.*, anterior choroid; *Post. commu.*, posterior communicating; *Post. chor.*, posterior choroid; *Ant. spin.*, anterior spinal; *Verteb.*, vertebral; *Med. obl.*, medulla oblongata; *Occip. lo.*, occipital lobe; *Long. fiss.*, longitudinal fissure; *Ant. commu.*, anterior communicating; *Corp. call.*, corpus callosum; *Olf. ne.*, olfactory nerve; *Lam. cin.*, lamina cinerea; *Op. ne.*, optic nerve; *Op. com.*, optic commissure; *Infundib.*, infundibulum; *Corpo. albi.*, corpora albicantia; *Sup. cereb.*, superior cerebellar; *P. Var. trans. ar.*, pons Varolii transverse arteries; *Basi.*, basilar; *Ant. cereb.*, anterior cerebellar; *Cereblm.*, cerebellum; *Inf. cereb.*, inferior cerebellar; *A.*, circle of Willis.

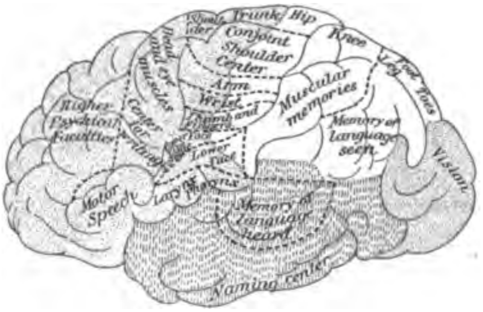
All these arteries ramify in the pia, where they anastomose freely. From this anastomosis are given off small branches which enter the substance of the brain, the shorter ones breaking up into a capillary network in the gray matter, the longer ones passing to the more deeply situated white matter. After entering the brain substance, there is no further anastomosis, the arterial capillaries passing directly into venous capillaries without communicating with the capillaries of neighboring arteries.

Besides these cortical branches, branches from the circle of Willis supply the basal ganglia. Like those in the cortex, these arteries do not anastomose after entering the brain substance.

The blood supply of the spinal cord is derived from three main arteries, the anterior spinal and two posterior spinal. The anterior spinals arise from the vertebrals, and, passing downward on the anterior surface of the medulla, unite to form a single trunk, which passes down the cord along the anterior median fissure. The posterior spinal arteries also arise from the vertebral arteries and pass down the posterior aspect of the cord along the line of the posterior nerve roots. Branches from the spinal arteries form an extensive anastomosis in the pia mater. From this network branches pass into the substance of the cord. These arteries, like those in the brain, do not anastomose after entering the nervous tissue proper.

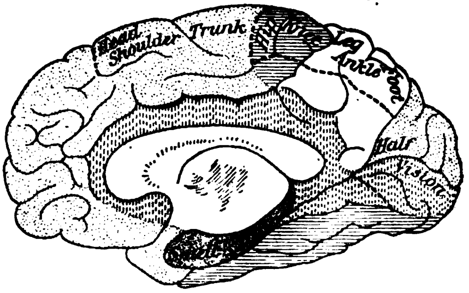
FUNCTIONS OF THE CEREBRUM. The brain, and more especially the cerebral hemispheres, must be considered as the organ of the mind. It is here that those material activities take place which underlie those mental attributes which we recognize as consciousness, intellect, emotions, and will. In the case of the higher animals removal of the cerebrum results so promptly in death of the animal that few conclusions can be drawn. In one of the lower animals, e.g. the frog, the result is the destruction of all volition and apparently of all consciousness. Stimulation, such as pinching the toes or applying the electric current to nerves or muscles, causes muscular contraction and consequent movement, but if left entirely alone the frog shows no sign of movement, with the exception of the automatic movements connected with the heart beat and with breathing. In some cases where after a time slight voluntary movements seemed to occur, it was found that small portions of the brain had not been removed. Professor Dalton's description of a pigeon from which the cerebrum had been removed is as follows: "The effect of this mutilation is simply to plunge the animal into a state of profound stupor in which it is almost entirely inattentive to surrounding objects. The bird remains sitting motionless upon his perch or standing upon the ground with eyes closed and head sunk between the shoulders. The plumage is smooth and glossy, but is uniformly expanded by a kind of erection of the feathers, so that the body appears somewhat puffed out and larger than natural. Occasionally the bird opens its eyes with a vacant stare, stretches its neck, perhaps shakes its bill once or twice, or smooths down the feathers upon its shoulders, and then relapses into its former apathetic condition." The brain would thus seem to be essential to any conscious activity. Whatever functions are carried on by the rest of the nervous system enter into consciousness only through the brain. Thus stimulation of a sensory nerve may be conceived as causing a motion (as in the case of the frog without a cerebrum) entirely independent of the brain, but in such a case there is neither any consciousness of the stimulation (sensation), nor any knowledge or control of the resulting motion. It is a purely reflex act. By means of the brain, then, stimulation of sensory nerves results in an activity in consciousness which we call sensation, and by the same means both knowledge of and control over motion are accomplished. The so-called higher mental activities, intellect or thought, and feeling or emotion, are also entirely dependent upon the cerebrum.

Our knowledge of the localization in the brain of its various functions is still far from perfect. Much of the experimentation upon cerebral localization has been done upon the monkey by exposing the brain and electrically stimulating its surface. The work of Ferrier along this line has been of extreme importance. By electrically stimulating the cortex in the monkey he determined the area stimulation of which caused motion of some part of the body, and, by comparing the convolutions of the monkey's brain with those of the human brain, he determined the probably analogous areas. The results may be briefly summed up as follows: There is a considerable area having the fissure of Rolando for its central line, which is known as the general sensory-motor area. The motor relations of this area are well shown in the accompanying diagrams. Stimulation of other parts of the brain failed to elicit any reaction. The sensory areas are not so well defined, and for obvious reasons are much more difficult of determination. Within this same region are probably located the areas which have to do with general sensations. The special senses have, however, special localizations. Thus the cortical visual centre is situated in the occipital lobe, the centre for the conscious appreciation of sound (hearing centre) in the front and upper part of the temporal lobe, while the sense of smell is located below the latter in the tip of the temporal lobe.



THE LEFT CEREBRAL HEMISPHERE (HUMAN) SHOWING THE DIFFERENT LOCALIZABLE AREAS ON THE EXTERNAL SURFACE.

That the frontal lobes are most concerned in the higher intellectual activities has long been believed. Stimulation of these lobes causes no reaction. According to Ferrier their complete removal causes no sensory or motor disturbances. His description of the monkey after complete removal of the frontal lobes is as follows: "The animals retain their appetites and instincts and are capable of exhibiting emotional feeling. The sensory faculties—sight, hearing, touch, taste, and smell—remain unimpaired. The powers of voluntary motion are retained in their integrity and there is little to indicate the presence of such an extensive lesion or the removal of so large a part of the brain. And yet, notwithstanding this apparent absence of physiological symptoms, I could perceive a very decided alteration in the animal's character and behavior, though it is difficult to state in precise terms the nature of the change. The animals operated on were selected on account of their intelligent character. After the operation, though they might seem to one who had not compared their present with the past fairly up to the average of monkey intelligence, they had undergone a considerable psychological alteration. Instead of, as before, being actively interested in their surroundings, and curiously prying into all that came within the field of their observation, they remained apathetic or dull, or dozed off to sleep, responding only to sensations or impressions of the moment, or varying their listlessness with restless and purposeless wanderings to and fro. While not actually deprived of intelligence, they had lost to all appearance the faculty of attentive and intelligent observation."



THE RIGHT CEREBRAL HEMISPHERE (HUMAN) SHOWING LOCALIZABLE AREAS ON THE MEDIAN SURFACES.

The separate localization of the different emotions, such as hate, love, fear, etc., which the teachings of phrenology would lead one to expect, has never been accomplished. In fact, there is every reason to believe that no such localization exists, the same parts of the cortex being concerned in very different emotions.

The Cranial Nerves. The cranial or encephalic nerves arise from the under surface of the encephalon or brain and leave the cranial cavity through foramina in its floor. According to the older classification of Willis, the cranial nerves were divided into nine pairs. The later and now more generally used classification of Sommerring recognizes twelve pairs of cranial nerves. The names of these nerves, taken in order from before backward, are, according to these classifications, as follows:

	Sommerring	Willis
	Pair	*Pair*
Olfactory	First	First
Optic	Second	Second
Motor oculi	Third	Third
Pathetic	Fourth	Fourth
Trifacial	Fifth	Fifth
Abducens	Sixth	Sixth
Facial (Portio dura)	Seventh	Seventh
Auditory (Portio mollis)	Eighth	
Glosso-pharyngeal	Ninth	Eighth
Pneumogastric	Tenth	
Spinal accessory	Eleventh	Ninth
Hypoglossal	Twelfth	

From the physiological standpoint these nerves fall into three groups, according to their functions. (1) Motor nerves: (a) oculo-motor; (b) pathetic; (c) abducens; (d) facial; (e) hypoglossal. (2) Sensory nerves: (a) olfactory; (b) optic; (c) auditory. (3) Mixed nerves: (a) trifacial; (b) glosso-pharyngeal; (c) pneumogastric; (d) spinal accessory. Of these the olfactory, optic, auditory, and parts of the glosso-pharyngeal and trifacial are sometimes classified by themselves as nerves of special sense.

The cranial nerves are connected with the surface of the brain at various points. These points are known as the apparent or superficial origin of the nerves. From these points their fibres can be traced into the substance of the brain to their real or deep origins in the gray matter.

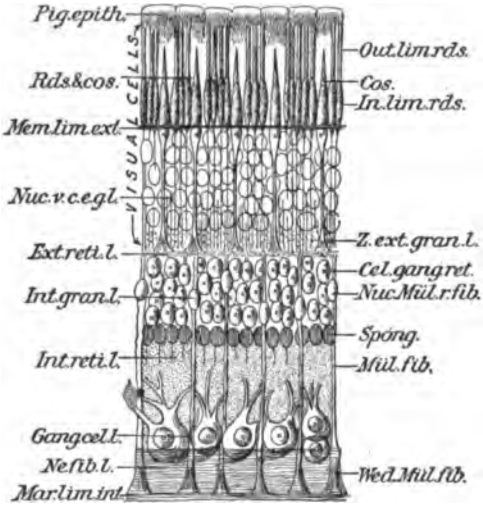
The cranial nerves, with the exception of the first (olfactory) and the second (optic), are analogous, both embryologically and anatomically, to the spinal nerves.

The motor root fibres of the cranial nerves are the axones of neurones whose cell bodies are situated in the gray matter of the medulla and parts above (motor nuclei of the cranial nerves), just as the motor root fibres of the spinal nerves are the axones of neurones whose cell bodies are situated in the gray matter of the cord (anterior horns). These motor nuclei are the nuclei of origin for these nerves. They are nuclei of termination for neurones of higher systems which serve to bring the peripheral neurone under the control of higher centres.

The neurones which constitute the sensory portions of the cranial nerves have their cell bodies situated in ganglia outside the central nervous system. These ganglia correspond to the posterior root ganglia of the spinal nerves. The outwardly directed processes of these cells pass to their peripheral terminations, as do those of the spinal ganglia cells. The central axones of these neurones enter the medulla and form longitudinal tracts of fibres in a manner quite analogous to the formation of the posterior columns by the central axones of the spinal ganglia cells. The sensory root fibres of the cranial nerves, however, do not ascend, as do those of the spinal nerves, but turn spineward, forming descending roots. These fibres terminate in the gray matter of the medulla (terminal nuclei of the cranial nerves) in the same manner as do the spinal sensory root fibres in the gray matter of the cord and medulla.

The first, or olfactory nerve, is properly not a nerve, but a slender process of the brain which terminates in an enlargement, the olfactory bulb, from which the olfactory nerves themselves are given off. The size and development of this olfactory process and bulb vary greatly in different animals, being in man quite rudimentary as compared with animals noted for their acute sense of smell. The olfactory process is connected with the rest of the brain by three roots called respectively the internal, or short root, the middle, or gray root, and the external, or long root. The olfactory nerves proper, that is the bundles of filaments extending from the under surface of the olfactory bulb through the foramina in the cribriform plate of the ethmoid to the mucous membrane of the nose, are made up of axones of neurones whose cell bodies are located in the nasal mucous membrane. In this respect the peripheral olfactory neurones differ from all other human peripheral sensory neurones. The short, hair-like processes of these cells which pass outward toward the surface are the dendrites. The centrally directed processes are the axones. They are non-medullated, and, passing through the cribriform plate in bundles (olfactory nerves), enter the olfactory bulb, where they terminate in end-arborizations in the olfactory glomeruli. In the glomeruli they come into relation with the dendrites of the mitral cells of the olfactory lobe. The axones of these mitral cells are medullated and form the main mass of fibres which pass back to the brain through the olfactory process or tract and its roots.

The second cranial, or optic nerve, is the nerve concerned in the special sense of sight. It is distributed entirely to the eyeball. The nerves from the two eyes, passing backward and inward, unite to form the optic commissure. From the commissure two large bundles of fibres—the optic tracts—pass backward and outward to the brain. The eye differs from all other sense organs in that its nervous apparatus is developed by a direct outgrowth from the embryonic neural canal. Later, the ingrowth of mesoblastic tissue separates the external or retinal part from the central nervous system. This retinal part is analogous to the posterior root ganglion of the spinal nerves, and, as is the case with the latter, its subsequent connection with the central nervous system is made by the growth of axones from the peripherally situated cells back into the central system. For structure of retina, see **EYE**.

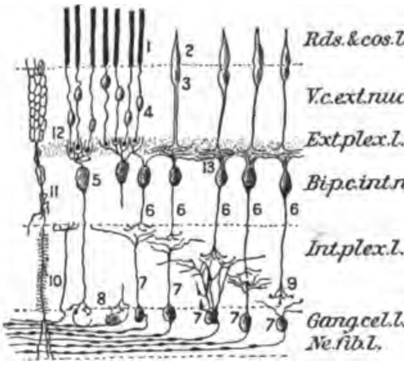


TRANSVERSE SECTION THROUGH THE RETINA OF MAN.

Pig. epith., pigment epithelium; *Rds. & cos.*, rods and cones; *Mem. lim. ext.*, membrane limitans externa; *Nuc. v. c. e. g. l.*, nuclei of visual cells (external granular layer); *Ext. reti. l.*, external reticular layer; *Int. gran. l.*, internal granular layer; *Int. reti. l.*, internal reticular layer; *Gang. cel. l.*, ganglion cells layer; *Ne. fib. l.*, nerve fibres layer; *Mar. lim. int.*, margo limitans internus; *Out. lim. rds.*, outer limbs of rods; *In. lim. rds.*, inner limbs of rods; *Cos.*, cones; *Z. ext. gran. l.*, zone of external granular layer free from nuclei (Henlis external fibre layer); *Cel. gang. ret.*, cells of the ganglion retinæ; *Nuc. Mül. r. fib.*, nuclei of Müller's radial fibres; *Spong.*, spongiblasts; *Mül. fib.*, Müller's fibres; *Wed. Mül. fib.*, wedge of Müller's fibres.

The third, or oculo-motor nerve, is a purely motor nerve. Its fibres are the axones of a group of cells situated just to one side of the median line in the floor of the iter beneath the corpora quadrigemina. Passing internally to the red nucleus, the nerve reaches the ventral surface of the mid-brain at the inner margin of the cerebral peduncle just in front of the pons. The nerve runs forward along the inner wall of the cavernus sinus, and, dividing into two parts, enters the orbit through the sphenoidal fissure. The superior branch of the nerve supplies the superior rectus and levator palpebræ. The inferior branch supplies the internal rectus, the inferior rectus, and the inferior oblique.

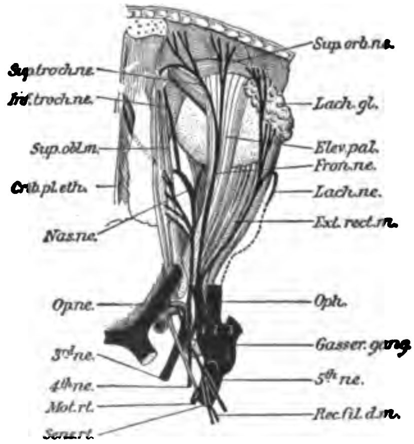
The fourth, or pathetic nerve, is the smallest cranial nerve. Like the preceding, it is a purely motor nerve. Its fibres originate in a group of cells in the floor of the iter just below the nucleus of the third nerve. The nerve winds around the outer side of the crus cerebri just in front of the pons, and, passing along the outer wall of the cavernus sinus, enters the orbit through the sphenoidal fissure. It supplies the superior oblique muscle.



SCHEME OF THE STRUCTURE OF THE RETINA, MAN.

Rds. & cos. l., rods and cones layer; *V. c. ext. nuc. l.*, bodies of visual cells (external nuclear layer); *Ex. plex. l.*, external plexiform layer; *Gang. cel. l.*, ganglion cell layer; *Ne. fib. l.*, nerve fibre layer; 1, rods; 2, cones; 3, cone granule and fibre; 4, rod granule and fibre; 5, bi-polar (rod) cells; 6, bi-polar (cone) cells; 7, ganglion cells branching in different layers of the internal plexiform zone; 8, lower branching of bi-polar (rod) cells; 9, lower branching of bi-polar (cone) cells; 10, centrifugal nerve fibre; 11, Müller's cells; 12, contact between the rods and the bi-polar (rod) cells; 13, contact between the cones and the bi-polar (cone) cells; *Bi. p. c. int. nuc. l.*, layer of bi-polar cells (internal nuclear layer); *Int. plex. l.*, internal plexiform layer.

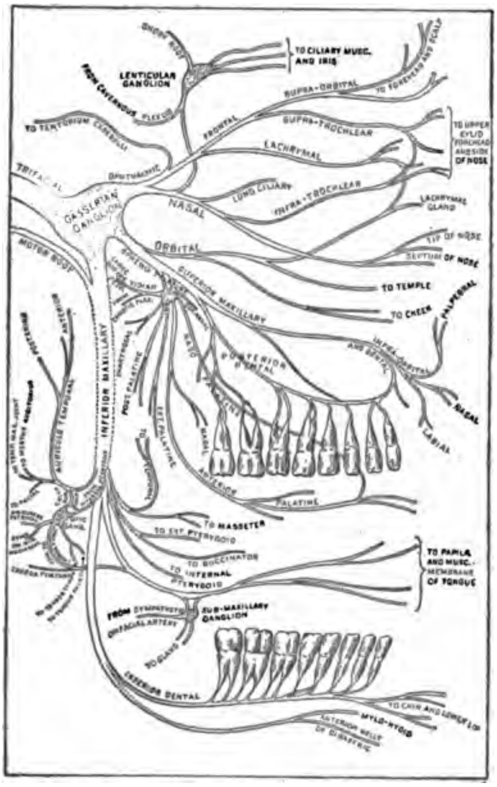
The fifth, trifacial, or trigeminus, is the largest of the cranial nerves. It resembles the spinal nerves in being composed of a motor part and a sensory part. The fibres of the smaller motor root come from cells situated in the medulla. The fibres of the sensory root come from cells in the Gasserian ganglion. The central processes of these cells enter the pons and pass to two nuclei in the floor of the fourth ven-



NERVES OF THE ORBIT, SEEN FROM ABOVE.

Sup. troch. ne., supratrochlear nerve; *Inf. troch. ne.*, infratrochlear nerve; *Sup. obl. m.*, superior oblique muscle; *Crib. pl. eth.*, cribriform plate of ethmoid; *Nas. ne.*, nasal nerve; *Op. ne.*, optic nerve; *3rd ne.*, third nerve; *4th ne.*, fourth nerve; *Mot. rt.*, motor root; *Sens. rt.*, sensory root; *Sup. orb. ne.*, supra-orbital nerve; *Lach. gl.*, lachrymal gland; *Elev. pal.*, elevator palpebræ; *Fron. ne.*, frontal nerve; *Lach. ne.*, lachrymal nerve; *Ext. rect. m.*, external rectus muscle; *Oph.*, ophthalmic; *Gasser. gang.*, Gasserian ganglion; *5th ne.*, fifth nerve; *Rec. fil. d. m.*, recurrent filament to dura mater.

tricle. The Gasserian ganglion lies in a depression in the petrous portion of the temporal bone. From the anterior aspect of the ganglion three branches are given off—the ophthalmic, the superior maxillary, and the inferior maxillary. The ophthalmic divides into three branches, the lachrymal, frontal, and nasal, which enter the orbit through the sphenoidal fissure and supply the eyeball, lachrymal gland, mucous membrane of the eye and nose, and the skin of the eyebrow, forehead, and nose. Connected with the ophthalmic branch is a small ganglion called the ophthalmic or ciliary ganglion. The superior maxillary is the middle of the branches of the Gasserian ganglion. It crosses the spheno-maxillary fossa, in which it gives off three branches, the orbital, the spheno-palatine, and the posterior dental. The nerve next enters the infra-orbital canal, where it gives off the anterior dental branch. The nerve then passes to the face through the infra-orbital foramen and terminates in palpebral, nasal, and labial branches. The spheno-palatine or Meckel's ganglion is connected with this branch of the fifth nerve. It sends off four main sets of branches: ascending, to the orbit; descending, to the palate; posterior, to the pharynx; and internal, to the nose. The inferior maxillary is the largest branch of the Gasserian ganglion and receives the entire motor portion of the nerve. Just beneath the base of the skull the nerve divides into two branches, an anterior branch and a posterior branch. The anterior branch contains nearly all the motor fibres, and, splitting up into masseteric, deep temporal, buccal, and pterygoid branches, supplies the muscles of mastication. The posterior division is mainly sensory and is distributed as three branches—the auriculo-temporal, gustatory, and inferior dental. Two small ganglia, the otic or Arnold's, and the submaxillary, are connected with this branch of the fifth nerve.



PLAN OF THE FIFTH CRANIAL NERVE.

The sixth, or abducens nerve, is a small motor nerve whose fibres are axones of a group of cells situated in the floor of the fourth ventricle. The nerve reaches the under surface of the medulla just behind the pons between the pyramid and the olive. It passes through the sphenoidal fissure, enters the orbit, and is distributed entirely to the external rectus muscle.

The seventh, or facial nerve, is a motor nerve. Its nucleus of origin consists of a group of cells situated deep in the formatiò reticularis of the upper part of the medulla. The nerve leaves the surface of the brain just behind the pons between the olive and the restiform body, thus lying to the outer side of the sixth nerve. The nerve passes forward and enters the internal auditory meatus with the sixth nerve. At the bottom of the meatus it passes into the Fallopian aqueduct, by means of which it traverses the petrous portion of the temporal bone, finding exit through the stylomastoid foramen. It then enters the parotid gland, and just behind the jaw divides into two main branches, the tempero-facial and cervico-facial. During its passage through the temporal bone it is connected with a small gray mass known as the geniculate ganglion. Its branches of distribution are as follows: Within the Fallopian aqueduct a tympanic branch to the stapedius muscle, and the corda tympani to the muscle of the tongue (lingualis); at its exit from the styloid foramen, the posterior auricular branch to the retrahens aurem and part of the occipito-frontalis, the stylo-hyoid to the muscle of that name, and the digastric to the digastric; on the face, the tempero-facial, dividing into temporal branches and malar branches, and the cervico-facial, distributed to the muscles of the head and face.

The eighth, or auditory nerve, is the nerve of the special sense of hearing and is distributed to the internal ear. The nerve is composed of two divisions, the cochlear division and the vestibular division. The fibres of the cochlear division are axones of bipolar cells in the ganglion of Corti. The peripheral processes of these cells end among the epithelial cells of Corti's organ within the cochlea. Their central processes enter the medulla at the junction of the medulla and pons and terminate in two nuclei known as the ventral and dorsal nuclei of the cochlear nerve. By means of neurones whose cell bodies are situated in these nuclei, auditory impressions are carried to higher centres. The neurones of the vestibular division of the nerve have their cell bodies located in Scarpa's ganglion or the ganglion vestibulare. These cells are bi-polar and their peripheral processes end among the hair cells of the crista and mascula acustica. Their central processes enter the medulla and pass to two nuclei of termination in which are cells whose axones carry the impulses to higher centres. See also EAR.

The ninth, or glosso-pharyngeal nerve, leaves the upper part of the medulla in the groove between the olive and the restiform body. It consists of a sensory part and a motor part. The nerve cells of the sensory part are situated in two small ganglia, the jugular ganglion and the petrous ganglion. The central processes of these cells enter the medulla and terminate in a nucleus in the floor of the fourth ventricle, which is common to this nerve and the tenth. The cells whose axones make up the motor root are situated in a nucleus which is called the nucleus ambiguus because of its connection with this nerve and the tenth, and which lies deep in the formatio reticularis. The two parts of the nerve unite and leave the skull through the jugular foramen. Branches of this nerve are distributed to the tympanum, to the carotid, to the muscular coat and mucous membrane of the pharynx, to the stylo-pharyngeus, to the tonsil, and to the tongue.

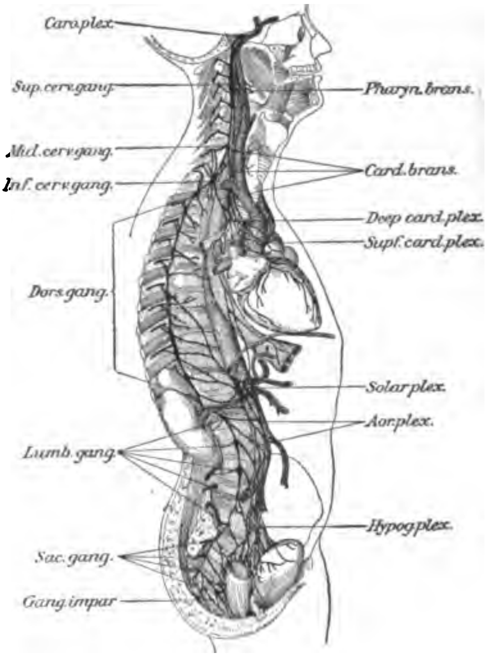
The tenth, vagus, or pneumogastric nerve, leaves the medulla just behind the ninth. It is composed of two portions, a sensory and a motor, which are connected with the already described nuclei common to both ninth and tenth nerves. The nerve leaves the cranial cavity through the jugular foramen. In the foramen it presents a swelling known as the ganglion jugulare or ganglion of the root, while just outside the foramen is a second ganglion, the inferior ganglion or ganglion of the trunk. It is in these two ganglia that the cell bodies of the sensory neurones of the nerve are situated. After its exit from the foramen, the nerve passes vertically down the neck within the sheath of the carotid vessels.

The eleventh nerve, or spinal accessory, is composed of two parts, a spinal part and a cerebral part, or part accessory to the vagus. The latter is the smaller, and arises from a group of cells situated in the medulla below the nucleus of the vagus. It leaves the medulla as three or four small filaments just below the exit of the vagus. It passes through the jugular foramen in a sheath common to it and the vagus. The spinal portion of the nerve originates in a long nucleus situated in the lateral region and extending from the middle of the medulla to the fifth or sixth cervical nerve. The fibres leave the cord in the mid-lateral region and pass through the jugular foramen.

The twelfth, or hypoglossal nerve, serves as the motor nerve for the tongue. Its nucleus is situated in the middle and lower part of the medulla, in the floor of the fourth ventricle, and ventral and lateral to the central canal. Fibres from this nucleus leave the medulla in bundles, from ten to fifteen in number, between the olive and the anterior pyramids. The nerve passes through the anterior condyloid foramen. The branches of distribution are the descendens noni, the thyro-hyoid muscular branches, and meningeal branches.

The Sympathetic Nervous System. This is composed of (a) two series of ganglia which are connected with one another by nerve fibres and extend along either side of the vertebral column from the base of the skull to the coccyx; (b) plexuses, three in number, which lie in front of the spine in the thoracic, abdominal, and pelvic cavities; (c) smaller ganglia which are situated in or upon various viscera; (d) nerve fibres which serve to connect the ganglia with one another, with the cerebro-spinal system, and with the periphery.

The series of ganglia is known as the gangliated cord and may be subdivided into three cervical, twelve dorsal, four lumbar, and five sacral ganglia. In the neck these ganglia lie upon the transverse processes of the vertebræ, in the thorax upon the heads of the ribs, in the abdomen and pelvis, upon the bodies of the vertebræ and upon the sacrum. As the two cords pass into the pelvis they unite in a ganglion called the ganglion impar, in front of the coccyx. Superiorly, the gangliated cord is continued into the sympathetic plexus on the carotid artery, this plexus being connected by filaments with the lower cranial nerves. The ganglia are connected with one another by bundles composed of intermingled gray fibres and white fibres, the white fibres being derived from the spinal nerves. The branches which connect the sympathetic ganglia with the cerebro-spinal system are composed of both white fibres (medullated) and gray fibres (non-medullated). The former are derived from the cerebro-spinal axis and pass to the sympathetic, the latter originate in the sympathetic system and end in the cerebro-spinal.



THE SYMPATHETIC NERVE.

Caro. plex., carotid plexus; *Sup. cerv. gang.*, superior cervical ganglion; *Mid. cerv. gang.*, middle cervical ganglion; *Inf. cerv. gang.*, inferior cervical ganglion; *Dors. gang.*, dorsal ganglia; *Lumb. gang.*, lumbar ganglia; *Sac. gang.*, sacral ganglia; *Gang. impar*, ganglion impar; *Pharyn. brans.*, pharyngeal branches; *Card. brans.*, cardiac branches; *Deep card. plex.*, deep cardiac plexus; *Supf. card. plex.*, superficial cardiac plexus; *Solar plex.*, solar plexus; *Aor. plex.*, aortic plexus; *Hypog. plex.*, hypogastric plexus.

The three great gangliated plexuses are known respectively as the cardiac, the solar or epigastric, and the hypogastric. They are composed of nerve fibres and ganglia, the former coming from the cerebro-spinal nerves and from the gangliated cord. The cardiac plexus consists of a superficial portion which lies in the concavity beneath the arch of the aorta, and of a deep portion situated between the aorta and trachea.

The solar plexus is the great plexus of the abdomen and supplies all the abdominal viscera. It is subdivided into several smaller plexuses, the names of which sufficiently indicate their location and distribution. They are known as the aortic plexus, the cœliac plexus, the phrenic (diaphragmatic) plexus, the supra-renal plexus, the renal plexus, the spermatic plexus, and the superior mesenteric plexus. The hypogastric plexus lies on the front of the sacrum between the two common iliac arteries. Below the hypogastric plexus is continued into the pelvic plexus, which is situated at the side of the rectum and bladder in the male; of the rectum, vagina, and bladder in the female. It sends branches to all the pelvic viscera and gives rise to the following subsidiary plexuses, the inferior hemorrhoidal, the prostatic, the vesicle, and in the female the uterine and vaginal.

Smaller ganglia are situated in certain viscera, notably in the heart, stomach, intestines, and uterus. They are mostly microscopic in size.

All of these ganglia serve as true nerve centres and from them pass off branches of distribution to the involuntary muscles of the blood-vessels and of the gastro-intestinal canal, to the thoracic and abdominal viscera, to the secreting cells of the various glands, etc.

Functionally the sympathetic system is quite distinct from the cerebro-spinal system. It has been called the system of vegetative existence because of its presiding over the processes of nutrition and growth, the so-called vegetative functions, in contra-distinction to the cerebro-spinal system, which presides over such distinctly animal faculties as sensation, motion, and intellect. The sympathetic system controls the so-called automatic mechanisms of the body, the rhythmical beating of the heart, contraction and dilatation of the arteries, the peristaltic action of the gastro-intestinal tract, the contraction of smooth muscle in general wherever found, the control of secretion of various glands, etc. It has also been customary to ascribe to the sympathetic a certain 'trophic' function by which was meant the determination of the nutrition of the various tissues and organs. It seems more proper to ascribe this nutritional control to its vaso-motor function, by means of which it determines the blood supply to the various parts. The sympathetic nerves contain both afferent and efferent fibres, so that impulses are transmitted both to and from the ganglionic centres. It is doubtful how many of the afferent impulses are sensory, while certainly many of the efferent impulses are not motor. The close anatomical relation which exists between the cerebro-spinal and the sympathetic system has been mentioned, and while the latter seems to be to a certain extent independent in its action, it is not infrequently brought under the control of the former even in our conscious activities. Thus in the case of blushing, an impulse reaching the cerebro-spinal centres through the eye, ear, or other sense organs causes such a reaction on the part of the sympathetic as to bring about a dilatation of the capillaries of the face. Again, in the case of the heart, quick beating and palpitation are frequently caused by the reaction of the sympathetic to impulses which have passed in through the cerebro-spinal nerves.

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For review of the finer structure of the neurone, consult *The Nervous System and Its Constituent Neurones*, by Lewellys F. Barker (New York, 1899). For gross anatomy of nervous system, consult: *Gray's Anatomy*, 14th edition; *Quain's Anatomy*, vol. iii., parts 1 and 2; Gardinier, *The Anatomy of the Central Nervous System.* For histology of the nervous system, consult: Stohr, *Text-book of Histology* (Philadelphia, 1901); Piersol, *Normal Histology;* Schäfer, *A Course of Practical Histology* and *Essentials of Histology.*

NERVOUS SYSTEM, Evolution of the. The nervous system comprises those tissues that have the property of irritability or of sensitiveness to external influences, and whose function it is to mediate between the outer world and the inner, and to convey to the muscles and other organs motor impulses so as to bring about movements harmonious and advantageous to the organism. In the nervous system also are centred those phenomena which we designate as thought, reason, will, etc. The origin of the nervous system is apparently independent of that of the muscular system, but the development of nervous tissue accompanies that of the contractile organs. In the most primitive organisms, such as the amœba, the whole protoplasm of the animal body is sensitive to external influences; there is a diffuse irritability. Thus the whole body of the amœba moves away from strong light. Moreover, it has the ability to move with reference to objects that stimulate it in some physical or chemical way.

Lower Invertebrates. In the Metazoa the nervous system develops in the ectoderm or outer layer of the body wall, which is the region that comes in contact with the outside world and hence is the one in which we should expect sensitiveness to become first developed and localized. Some of the cœlenterates have in the ectoderm superficial sensory cells with which the nerve cells are in contact. Fibres from the nerve cells connect in turn with the fibrillar part of the muscle cells. In the flatworms the nervous system is almost completely separated from the epithelium and lies in or close under the dermal musculature, and a 'brain' is best developed in some of the Polycladida and some trematodes. The nervous system of echinoderms has a development unknown in other animals. It is composed of three independent systems: (1) the superficial oral; (2) the apical oral; (3) the deeper oral. The superficial oral consists of a ring around the œsophagus, and of radial nerves which branch out from this ring to the arms and radii. This system innervates the intestine, ambulacral feet, and integument. The nervous system of Mollusca is of a complex type of its own, but shows some affinities to that of annelids and arthropods. In its simplest form (chitons) it consists of a cerebral part, from which four pairs of commissures are sent off. Passing ventrally from it there is a ring with ganglia, and passing backward two pairs of commissures, one called 'pedal' and the other 'pallial.' All of these contain ganglion cells along their whole length, and send off various branches and commissures. The pallial commissures are united posteriorly. In the Pelecypoda the nervous system is somewhat more complex, but it is always symmetrical, and consists of two ganglia, the cerebro-pleural, one on each side of the gullet, and united above by a commissure. Each ganglion gives off a nerve cord, which passes downward and backward to the bilobed pedal ganglion of the foot. Directly backward from the cerebral ganglia also proceed two other cords to the bilobed, fused, visceral ganglion, situated on the ventral side of the posterior adductor muscle; this ganglion sends out branches to the palps and mantle. The pedal ganglion innervates the foot, the viscera, the enteric canal, the heart, the gills, and a part of the mantle. The nervous system of gastropods varies in the different groups both in regard to the arrangement of the ganglia and the commissures. There is usually a pair of ganglia near together or some distance apart, which lie above the gullet, and give off the visceral nerve cords behind. The visceral cords pass eventually into a pair of ganglia, but only after they have passed through the pleural ganglia. Pedal and buccal ganglia with their commissures also exist.

The nervous system of annelids is well developed and has a bilateral and metameric arrangement. It consists of the bilobed cerebral ganglion or brain and of a double ventral chain of ganglia and commissures. The brain lies in the prostomium or a little farther back, as in the case of the earthworm. Branches are given off from it to the eyes, tentacles, and sensory epithelium. Two lateral commissures from it pass ventrally around the alimentary canal and unite below it into the double ventral nerve chain. One ganglion occurs in this nerve chain for each segment. In some forms the two halves of the chain are widely separated and are united by transverse commissures. The arrangement of the nervous system of arthropods is essentially like that of annelids. There is a supraœsophageal ganglion or brain that gives off commissures which pass downward and backward to unite with the first ganglion of the ventral nerve chain. Various degrees of concentration of the nervous system occur throughout the Crustacea and the insects. The higher Crustacea, as well as the insects, have a visceral nervous system. The brain of insects is relatively large and is lobed.

Vertebrates. The nervous system of the higher vertebrates consists of a double chain of ganglia lying in the median line on the dorsal side of the body, which consists of the spinal cord and the brain. The segmental origin of the spinal cord is shown by the regular repetition of the spinal nerves that branch out from it in pairs, one on each side. The visceral or sympathetic system of vertebrates consists of a series of ganglia on each side of the vertebral column. Fibres connect this system with the spinal and cranial nerves. Nerves from the neural axis pass to all the various sense organs, muscles, and glands. The spinal cord is made up of two kinds of nervous matter, a superficial white layer and an internal H-shaped rod of gray matter. The cord merges gradually into the brain, which has a bilateral form and consists, in its simplest form, of three parts, the fore-brain, mid-brain, and hind-brain. The two lobes of the cerebrum comprise the most anterior part of the brain. The mid-brain connects the fore and hind brain. The hind-brain includes the bilobed cerebellum on its dorsal side and the pons Varolii and medulla oblongata on the ventral side. The brain is made up of two kinds of nervous matter, the white and the gray. Its surface is much convoluted, so as to give a greater surface for the gray matter which forms the outer coating. The cranial nerves arise from the lower surface of the brain.

The brain of the Acrania (Amphioxus) is the enlarged anterior end of the neural axis and in it the central canal enlarges to form the ventricle. The ventricle opens dorsally to the exterior of the brain. Anterior to the opening there is a pocket known as the olfactory lobe. The brains of cyclostomes and teleosts represent a low stage of development in that they possess an unpaired prosencephalon whose dorsal wall, the corti cerebri, consists of a single layer of cells covered by the pia mater. In the larva of cyclostomes (Ammocetes) the metencephalon is the largest part of the brain. Selachians possess a more complicated brain. They lead an active, predatory life, and correspondingly the prosencephalon is relatively large and shows a slight furrow or division into two lateral parts or lobes. A prominent pair of bulbi olfactorii pass from in front to the nose. The thalamencephalon gives rise to two small optic thalami and there are other modifications in the rest of the brain which render it a more complex organ. There is a bundle of fibres from each side of the prosencephalon that probably corresponds to the crus cerebri of mammals. The brains of ganoids and dipnoans resemble those of amphibians in the absence of the lobi inferiores. In all three the cerebral hemispheres show a marked development. The cerebellum exists only as a small fold at the anterior end of the medulla. In the Anura the optic lobes are well developed.

In Reptilia, as in Amphibia, the cerebellum is small. A well-developed median eye-like structure, the pineal eye, is present on the root of the mid-brain. The prosencephalon is the largest part of the brain. It is paired, and its surface is smooth. There is a large olfactory lobe and a well-developed corpus striatum. The avian brain is characterized by a considerable cranial flexure, by large cerebral lobes, by a cerebellum. In sagittal section the latter shows the arbor-vitæ structure so evident in the brain of man. Externally the brain is folded transversely or convoluted. The mammalian brain exhibits in the different groups a steady growth in complexity from the reptilian to the human condition. The cranial flexure is most pronounced in the mammalian brain.

That the degree of development of the different organs within the group of mammals is dependent upon their functional activity can hardly be doubted. Thus, the 'pyramids' are the motor nerves coming from the coördinating centres of movement. These are relatively small in the dolphins, which possess no hinder extremities. The frontal lobe of the cerebrum, upon which probably many of the higher functions, such as speech, depend, are best developed in man; so, too, the olfactory lobes are reduced in man in correspondence with the rudimentary condition of their function in man. While the mid-brain is more or less exposed in some of the lower mammals (e.g. marsupials, rodents, and insectivores), the hemispheres come gradually to cover the entire brain. The mammalian brain is characterized by the presence of large commissures, the corpus callosum and fornix, which connect the hemispheres. The pons Varolii is another large commissure and connects the two lateral lobes of the cerebellum, and a number of other bands serve as connectives. In mammals the mid-brain is relatively smaller than in other vertebrates. The brain of Tertiary mammals was relatively small. The reduction was especially evident in the hemispheres. In many points of structure their brain, too, was reptilian in character, although the possessors were related to groups as high as ungulates.

Three main and well-defined types of nervous system may be determined in the animal kingdom. There is first the radial type, such as has been described for the starfish. This consists of a ring of nervous tissue in the disk which surrounds the œsophagus and sends out a branch to each arm. This is the echinoderm type. Another type is the symmetrical, bilateral type of annelids and arthropods, to which the nervous system of mollusks may also be relegated. This type consists of a brain ganglion above the œsophagus, with commissures that pass around and below the digestive tract, where they unite ventrally with a chain of ganglia extending posteriorly. The pedal ganglion of mollusks represents the subœsophageal ganglion. The rest of the ventral chain is absent in unsegmented mollusks. The third type of nervous system is the bilateral type of vertebrates. Here the double nerve cord, segmental in origin, as is shown by the repetition of paired spinal nerves, lies on the dorsal side of the alimentary tract. Except in Amphioxus the vertebrate nerve cord widens anteriorly into a large and complex ganglion mass, the brain. The sympathetic system, which appears first in leeches and arthropods, is an almost independent nervous system, for while it is in direct union with the other nervous system, it is not at all under its control.

Sense Organs. As soon as sense organs appear the nervous elements of animals consist of three parts: (1) the so-called terminal, end, or sense organ; (2) the ganglia; and (3) the nerves. End organs appear first clearly defined in the Cœlenterata, although the pigment spots of Euglena are in a particularly sensitive region in that infusorian. The sense organs of the Cœlenterates are most developed in the medusæ and consist of the tentaculocysts with calcareous lithites, pigment spots or ocelli, and sensory pits known as olfactory pits. Pigment cells or 'eye spots' are found in many of the flatworms, some of the polyclads possessing several hundred. These eyes, in many forms, are grouped in pairs at the anterior end of the body or are scattered along the anterior margin, or even along the entire margin of the body. In many forms the eyes are simple pigment spots. In others a refractive body occurs. In triclads and polyclads the eye consists of a pigmented apparatus with retinal or light-perceiving cells within a cup-shaped organ. These cells connect with the optic nerve. Auditory organs also occur in the flatworms, each consisting of a fluid-filled sphere lying close to the brain in which is an otolith. The skin is everywhere very sensitive, due to tactile hairs, especially on the tentacles. The proboscis of certain forms contains an invagination which is capable of extrusion, and is believed to be a touching organ. The suckers of trematodes, too, are especially sensitive. There are ciliated pits in the epithelium of triclads and other forms to which an olfactory function has been ascribed.

Sense organs occur over the whole integument of mollusks. These cells, when in exposed positions, may have a tactile function. The pallial sensory organs and the ospharadium, which occur near the gills, are probably olfactory organs to test the condition of the water. The optic tentacles of pulmonates and the dorsal tentacles of opisthobranchs are stated by some authorities to be olfactory organs. Ciliated ridges in the mantle furrows of certain chitons are supposed to have an olfactory function. Auditory organs are absent in the Amphineura alone among mollusks. The auditory organ consists of a closed, fluid-filled vesicle, or 'otocyst,' in which a varying number of otoliths are inclosed. Sensory cells occur on the wall of the otocyst, which bear sensory hairs. The otocysts of cephalopods have been shown to have a statical function also. The simplest visual organs of mollusks are optic pits. The retina lies at the base of the pit, and along this base the optic nerve spreads out. The retina consists of cells with and without pigment. External to the retina is a gelatinous cuticle or even a lens. By the approach and fusion of the edges of the pit the vesicular eye is formed. That part of the epithelium which is free from pigment constitutes the cornea. This type of eye occurs on the tentacles of gastropods. By a further development the simple cup-like eye is differentiated into the complex, highly developed organ of cephalopods. The mantle eyes of the scallop resemble vertebrate eyes in that the visual rods are turned away from the light, that is to say, they are directed toward the body.

The sense organs of echinoderms comprise the auditory organs and eyes. The auditory organs are of two types. The first type is represented in holothurians, and consists of an otocyst which is lined with ciliated epithelium, container and otolith, and filled with fluid. In echinoids is found the second type of auditory or orienting organs, which are believed to be transformed spines. Organs of this type are known as 'sphæridia,' and are developed only on the oral side; they are spherical, stalked bodies and may be inclosed in a pit of the test. The organs of special sense in the annelids are the eyes, tentacles, cirri, and otocysts. The structure of the eye, when that organ is present, is very simple. The eyes are confined to the prostomium, but there are eye-like organs on many or all the body segments or on the branchial filaments of many species. Eyes are lacking in nearly all Oligochæta and some of the Polychæta. The eye is usually a capsule with a layer of elongated cells on the side toward the brain. A thickening of the cuticle may form a lens. Otocysts with otoliths are not common. Tactile cells occur generally all over the body and especially on the prostomium.

The organs of special sense in arthropods are eyes, olfactory setæ, auditory organs, and organs of touch. The eyes are of two sorts, median eyes and a pair of faceted, compound eyes. The median or 'nauplius' eyes sometimes occur in the larvæ only, and are composed of a cuticular lens and a group of specially modified epidermal cells.

The paired, compound eyes are covered by a transparent cuticula. A single visual element of the compound eye is called an ommatidium. Each element is composed of two parts, an outer vitreous and an inner sensory group of cells. The latter is known as the rhabdome and is made up of the retinule and a refracting rod. Each ommatidium is in a state of optical isolation. Fibres pass from the optic ganglia to the retinule. The organs of touch are bristled cells on the appendages, especially on the antennæ, the palpi, and on other parts of the body. The olfactory organs of the crayfish consist of a number of delicate setæ borne on the antennules. The auditory organ is a pit upon the exterior and lined with auditory setæ. Grains of sand in the case of Crustacea often serve the function of otoliths. These must be renewed after each molt.

Amphioxus possesses an olfactory pit. It is a ciliated depression at the level of the anterior end of the brain. It is connected with the olfactory lobe of the brain. This pit may correspond with the 'pituitary body' of Urochorda and Craniata. The organ of sight is merely a pigment spot. It is median and without a lens. Cells supposed to have a sensory function occur on the roof of the oral hood and tactile cells occur on the buccal cirri.

The organs of special sense of vertebrates comprise various kinds of tactile organs, of which may be mentioned the lateral-line organs, which in structure resemble the organs of chætopods. The lateral-line organs occur in amphibians and fishes, and are supposed to perceive vibrations in the water and also to have an auditory function. End-bulb organs likewise occur here and there over the entire surface of fishes. From amphibians upward they are restricted to the mouth. Specialized tactile cells, such as the Pacinian corpuscles of the duck's beak, occur in different vertebrates.

The olfactory organ is in fishes a pair of sensory pits near the anterior end of the snout. From the Dipnoi onward these pits communicate with the mouth cavity as well as with the exterior. From the Dipnoi onward also these organs are more or less inclosed either in a cartilaginous capsule or they are included in the cranium. The internal nostrils with their glands are developed in Dipnoi and Amphibia. The nasal cavity of Lacertilia is divided into an outer and an inner part. From the crocodiles onward the nasal organs recede in correspondence with the forward extension of the facial region. Both in reptiles and birds there is only one true turbinal bone in the nasal canal. Because of the extreme facial development of the skull of mammals, the nasal cavity is proportionately larger. The turbinals consequently greatly develop here. The nasal cavity of mammals communicates with certain sinuses of the face.

The sensitive elements of the vertebrate eye develop from outgrowths, primary optic vesicles, of the brain. The pigment epithelium develops from an inpocketing of this vesicle. The lens develops from thickened epidermal cells. In cyclostomes the lens and iris are absent and the sclerotic and cornea are undifferentiated. A globular lens is present in the eyes of true fishes. Amphibian eyes are simpler than those of fishes, but a ciliary muscle is present. The sclerotic is cartilaginous with bony plates even in lizards and birds. The eye-ball of nocturnal birds is elongated and tubular. The iris of birds may be highly colored owing to the presence both of pigment and of fat globules. The eye of mammals is more or less inclosed in the bony orbit, the sclerotic is fibrous, and the fibres of the optic nerve pass into the retinal cells. The retina is histologically a complicated structure and consists of seven layers; the light must pass through all the layers in order to reach the innermost rod and cone layer. The region of acutest vision is the fovea centralis, where only the cones persist.

As to auditory organs, it is the sacculus and cochlea in the vertebrate ear that attain a higher and higher degree of development. In fishes the cochlea is a knob-like appendage of the sacculus. In amphibians it is constricted off from the sacculus and only remains connected by a strand of cells. In mammals the cochlea becomes spirally coiled. There are three coils in man. A chain of three auditory ossicles appear in the higher vertebrates.

Literature: Wiedersheim, *Comparative Anatomy of Vertebrates* (Eng. trans., London, 1897); Kingsley, *Text-book of Vertebrate Zoölogy* (New York, 1899); Lang, *Text-book of Comparative Anatomy* (London, 1891-96); Lang, "Ueber primäre Metamerie des Neuralrohres der Vertebraten," in *Sitzungsberichte der königlich baierischen Akademie der Wissenschaften* (Munich, 1885).

NES'BIT, Edith. An English poet. See Bland, Edith Nesbit.

NESS, Loch. A lake in the County of Inverness, Scotland. It occupies, together with Loch Lochy and Loch Linnhe, the bottom of the great fracture which in an almost straight line severs the northwestern Highlands from the rest of Scotland, and which is known as Glen More, or Great Glen (Map: Scotland, D 2). Loch Ness is 23 miles long, from one-half to one and one-half miles broad, and connected by rivers and canals with the Firth of Lorne on the southwest and Moray Firth on the northeast. It receives the waters of several small rivers, and is surrounded by high and steep mountains which make the scenery very picturesque. Owing to its immense depth the Loch never freezes.

NESSELRODE, nĕs'sel-rō'de, Karl Robert, Count (1780-1862). A Russian diplomat, born at Lisbon, where his father then resided as Russian Ambassador. The young man devoted himself to a diplomatic career, won the confidence of the Emperor, Alexander I., and was in the diplomatic suite of the latter during the eventful year of 1813 and the negotiations at Paris after the first defeat of Napoleon. He was one of the signers of the treaty of the quadruple alliance at Chaumont, and also of the treaty with Marshal Marmont for the surrender of Paris. He was one of the most prominent of the plenipotentiaries in the Congress of Vienna, and in 1816 became Minister of Foreign Affairs, and accompanied the Emperor Alexander to the congresses of Aix-la-Chapelle, Troppau, Laibach, and Verona, where he always advocated a policy of moderation. Under Nicholas I., Nesselrode became Vice-Chancellor (1829) and Imperial Chancellor (1844). It fell to him to direct the Russian policy in the affairs of Greece and Turkey. Nesselrode was opposed to the policy which brought on the war of 1853-56 and retired from the Foreign Office after signing the Treaty of Paris in 1856, though he retained the dignity of Chancellor of the Empire and a seat in the Ministerial Council. He died at Saint Petersburg, March 23, 1862. His autobiography, which is not of especial value, was published in 1866.

NESSLER, nĕs'lĕr, Julius (1827—). A German agricultural chemist, born at Kehl. He established at Karlsruhe the important experimental station which afterwards passed under Government control. Among the preparations known by his name are Nessler's reagent for ammonia, a mixture of iodide potassium and iodide of mercury with free potash, and Nessler's insect powder, powdered tobacco, fusel oil, soap, and spirits of wine. He described his important studies on the culture of the vine and of tobacco, and on the tests of the purity of wine, in *Der Wein, seine Bestandteile und seine Behandlung* (2d ed. 1866); *Der Tabak, seine Bestandteile und seine Behandlung* (1867); and *Die Bereitung, Pflege und Untersuchung des Weins* (7th ed. 1897).

NESSLER, Victor (1841-90). A German composer, born in Baldenheim, Alsace. He received his musical education in Leipzig, where he was a student of theology, during which period he successfully conducted several singing societies. The success of his opera *Fleurette* (1864) determined his career; and after further study in Leipzig, he devoted himself entirely to composition. His works comprise half a score of operas and operettas of varying merit, the most successful of which is the universally popular *Der Trompeter von Säkkingen;* also choruses, song-cycles, and part-songs. He died at Strassburg.

NES'SUS (Lat., from Gk. Νέσσος, *Nessos*). In Greek mythology, a centaur who carried travelers over the river Evenus. When Hercules came with Deïanira to the river, he swam across, but allowed the centaur to carry his wife. Nessus offered violence to her and was killed by Hercules. In revenge, he told Deïanira that his blood would prove an invincible love philter. Later, becoming jealous of Iole, she dipped a robe in the blood and sent it to her husband, who was so tortured by the venom from the arrows poisoned in the hydra's blood, that he sought death on the funeral pile. Sophocles deals with this myth in the *Trachiniæ.*

NEST. A receptacle for eggs or young, provided by many sorts of animals. The nest reaches its greatest elaboration among birds, where in some cases, as that of the cotton-bird, hangnests, weaver-birds, etc., it becomes a fabric woven with astonishing ingenuity. The nests of certain swifts (see Salangane) are further remarkable for edible qualities. Nests and the habits, instincts, and utilities connected with them are fully discussed under Nidification.

NES'TOR (Lat., from Gk. Νέστωρ). In the Homeric epic, the type of the wise yet vigorous old man. He was said to be a son of Neleus and Chloris, and at the time of the Trojan War had already outlived two generations. He is the persuasive speaker, drawing on his stores of wisdom and experience for the guidance of the younger leaders. In the war which Hercules waged against Neleus, all the brothers of Nestor were killed, but he escaped through his absence in Geronia. On his return to Pylos he punished the neighboring Epeians of Elis for their raids. He even took part in the war between the Lapithæ and Centaurs, but it is only in later writers that he appears as a participant in the Calydonian Hunt and the Argonautic expedition. His part in the *Iliad* is prominent, since the Ionian princes of Asia Minor regarded themselves as his descendants. He appears in the *Odyssey* as safely returned from Troy to Pylos, where he hospitably receives the young Telemachus. Of his death there was no tradition, but Pausanias mentions his grave at Pylos.

NESTOR (1056-1114). The first Russian chronicler. In 1083 he entered the convent at Kiev, where he died after a life of asceticism and holiness. The original of his chronicle has not come down to us, nor is there any faithful copy of it extant. One can only gather what it was from the numerous later chronicles, all based on one archetype directly ascribed to Nestor in one codex. Like the mediæval chronicles of Joannes Malalas and Georgios Hamartolos, on which it drew for much information in general history, Nestor's story begins with the distribution of mankind after the flood and then leads up to the Slavs—a branch of the Japhetic race—and their subdivisions. A note after the year 1110 shows that the subsequent narrative belongs to another person. Nestor made use of all possible sources of information, incorporating treaties with Greek emperors, didactic works written by princes for their children's instruction, lives of saints, church annals, popular legends and traditions, personal reminiscences of old people, and finally his own recollections. The rapid growth of Kiev inspired the author to a high pitch of patriotism, the narrative often attaining great poetic fervor and charm. Besides the chronicle, Nestor is reputed to have written the *Lives of Saint Boris and Glyeb* and the *Life of Saint Theodosius.* Consult: *Chronique dite de Nestor,* trans. by L. Leger (Paris, 1884); Pogodin, *Nestor,* trans. into German by F. Löwe (Saint Petersburg, 1844).

NESTO'RIANS. The name commonly given to one of the schismatic churches of the East, formely large and flourishing, but now small in numbers and with little influence. The name is derived from Nestorius (q.v.). It was first applied to them by a theological opponent, Philoxenus, Monophysite Bishop of Hierapolis, about the year A.D. 500, and although the Nestorians themselves never adopted the title, preferring to be known as Chaldæan or Oriental Christians, it passed into common use and has remained their usual designation. The Nestorians claim an Apostolic origin for their Church, appealing to an ancient tradition according to which the Apostle Thaddæus is said to have carried the Gospel to King Abgar of Edessa, but this story lacks historical confirmation. There is no clear evidence of the presence of Christianity in Persia before about 200, when the Bishop of Antioch held control over that section of the Church. Under the Neo-Persian kingdom of the Sassanidæ (q.v.), in the third century, a new bishopric was established at Seleucia-Ctesiphon, on the Tigris, which in time assumed ecclesiastical leadership. But it was not until the fifth century that the Nestorians began to call the Bishop of Seleucia their 'Catholicus,' or national patriarch, and still longer before his primacy was acknowledged by the other bishops.

The chief causes which gave rise to the separate existence of the Nestorian Church, during the fifth century, were as follows: (1) the reorganization of the Church by a synod of forty bishops, held in Ctesiphon in 410, after a severe persecution; (2) the condemnation of Nestorius, in 431; (3) the expulsion of Nestorius's sympathizers from Edessa by Bishop Rabulas, after the Council of Ephesus; (4) the rise of Nisibis as a centre of Christian learning and theological influence, from 435 onward; and (5) the final closing of the school at Edessa by the Emperor Zeno, in 489, on account of its persistent Nestorian leanings. All these things operated to centralize Persian Christianity, and to separate it from organic connection with the See of Constantinople. The Nestorian leaders succeeded in winning favor with the Persian kings to such an extent as completely to control the ecclesiastical situation. They had been aided in the earlier stages of their growth by the prestige of adherents like Aphraates, in the fourth century, and Ibas, Bishop of Edessa, in the fifth; but their most important leader, in the formative period, was Barsumas, one of those whom Rabulas had driven out of Edessa in 431. Barsumas became Bishop of Nisibis, and for more than half a century (435-489) he guided the fortunes of the Persian Church, wisely administering his See, winning royal favor, and establishing schools of learning (e.g. at Seleucia) to perpetuate the movement to which he had devoted his life.

During the sixth and seventh centuries the Nestorians greatly extended their numbers and influence, reaching out by means of missions into Arabia, Armenia, India, Tartary, Ceylon, and China. An ancient monument, erected in 781 at Si-ngan-fu and discovered by Jesuit missionaries in the seventeenth century, bears testimony to the existence of Nestorian Christianity in China from the year 636, when the mission appears to have been started. In 642, as a consequence of the Arab conquest of the Sassanid kingdom, the Nestorians passed under Mohammedan rule. But the caliphs granted them a considerable degree of religious toleration, and their Catholicus was treated as if he were patriarch of all the Asiatic Christians under Moslem rule. He took up his residence in Bagdad (in 762) and there remained as long as the caliphate endured. In Arabia also the Nestorians met with favor in the eyes of their Mohammedan neighbors. This friendly treatment was possibly due in part to the example of Mohammed himself, who is said once to have come into friendly contact in Arabia with a Nestorian monk, named Sergius, from whom he may have gained some knowledge of Christianity. From a Mohammedan historian of the eleventh century we learn that the Nestorians were then noted for their intellectual acumen, in which they surpassed their orthodox contemporaries. They differed somewhat from Catholic Christians in points of ritual observance, especially those relating to the calendar, and it has been thought possible that they were influenced by the customs and usages of their Jewish neighbors in Babylonia.

Nestorian Christianity culminated in the thirteenth century, when there were twenty-five metropolitans in the hierarchy, no one of whom had fewer than six bishops under his jurisdiction. The Catholicus was almost a pope in the extent of his ecclesiastical domain. But from this time onward their prosperity diminishes. After the fall of Bagdad before the Mongols (1258), the Catholicus was obliged frequently to change his residence, which was in itself a serious administrative disadvantage. In the fourteenth century came the Tatars, under the fierce Timur (q.v.), who made sad havoc of the Nestorians. Internal dissensions split the Church in the sixteenth century, but those who claimed to be the true Nestorians adhered to the hereditary line of Mar Shimun, the family from which the Catholicus has been chosen ever since the fifteenth century. Their patriarch always bears the name of Simeon (Shimun). Some ultimately joined the Roman Catholic Church, admitting the supremacy of the Pope, but retaining special privileges, such as clerical marriage, which was a very ancient custom among them. These constitute the so-called Uniat Chaldæans. The Nestorian hierarchy at the present time consists of only one metropolitan and about ten bishops, in addition to their Catholicus. They number perhaps as many as 50,000 souls, but precise statistics are lacking. Some estimates are much larger than this.

The Nestorians take their stand upon the first two ecumenical councils, rejecting the decisions of Ephesus, and of course taking no part in subsequent councils of the Catholic Church. They have never been persuaded to accept the orthodox view of the Papacy, or of the doctrine of transubstantiation, or of purgatory. Their hierarchical organization culminates in the patriarchate. They have sanctioned clerical marriage ever since the fifth century, although this privilege does not extend to the bishops. Syriac is their official language. Their former generous philanthropy, exemplified in the foundation of asylums, almshouses, etc., has vanished along with their general prosperity as a Church and people, and at present they are themselves the objects of charity and of missionary effort. Friendly negotiations have been carried on with them by representatives of the Church of England, partly in the hope of bringing about ecclesiastical union. Protestant missionaries have been sent to them from America, especially by the American Board (Congregational), with a view to arousing them to new evangelical effort on their own behalf. But thus far these efforts have met with little success. In 1898 the Persian branch of the Nestorian Church, estimated at about 30,000 persons, formally joined the Orthodox Church of Russia, thereby gaining the political protection of the Czar.

The Christians of Saint Thomas, dwelling on the coast of Malabar, India, are historically connected with the Nestorians.

Consult: Assemani, *Bibliotheca Orientalis*, vol. iii. (Rome, 1725-28); Badger, *The Nestorians and Their Ritual* (2 vols., London, 1852); Hefele, *History of the Councils*, vol. iii. (Edinburgh, 1883); Perkins, *A Residence of Eight Years in Persia* (Andover, 1843); Hore, *Student's History of the Greek Church* (London, 1902).

NESTO'RIUS (Lat., from Gk. *Νεστόριος*, *Nestorios*). Bishop of Constantinople, 428-431, and author of the Christological heresy known as Nestorianism. He was a pupil of Theodore of Mopsuestia, one of the leading theological teachers of Antioch, who was greatly revered throughout the Asiatic section of the Eastern Church.

In 428 Nestorius was summoned from his monastic retirement near Antioch to become Bishop of Constantinople, whither his fame as an ascetic and preacher had preceded him. As patriarch, Nestorius immediately declared war upon all heretics, and began persecutions against Arians, Quartodecimanians, Macedonians, etc. The popular theology of Constantinople did not escape. A presbyter named Anastasius, preaching in the cathedral church one day, declared with energy, "Let no man call Mary 'Mother of God,' for Mary was only a woman, and it is impossible that God should be born of a woman." Nestorius hastened to support and reiterate the position his presbyter had taken, which was an open defiance of the Alexandrian party.

A fierce controversy ensued. Cyril, supported by Cœlestine, Bishop of Rome, published twelve anathemas against Nestorius, to which Nestorius replied in kind. The Emperor, Theodosius II., was obliged to convene a general council to settle the disturbance. It met at Ephesus in 431. (See Ephesus, Councils of.) Its stormy proceedings were directed by Cyril, and Nestorius was condemned. John of Antioch, who arrived late, entered an unavailing protest against this verdict. The writings of Nestorius were burned, by Imperial order, and his followers were branded with the opprobrious name of Simonians. Nestorius was allowed to return to his old monastery near Antioch, where he passed four years. He was then banished to Arabia, and afterwards to Egypt, where he endured many hardships, and won the title of martyr among his followers. He wrote a defense of his life and teaching, of which only a few fragments survive (in the works of his opponents). We have a melancholy picture of the closing years of his life in Evagrius's *Ecclesiastical History*, i. 7, which is evidently colored by the author's hostility. The place and date of his death are unknown. The Nestorians (q.v.), although bearing his name, do not cherish his peculiar teaching. An illustration of Monophysite detestation of his memory is found in the grim ceremony of the Jacobites, who once a year assemble and cast stones upon the spot where his body is supposed to have been buried. Consult: Smith and Wace, *Dictionary of Christian Biography*, article "Nestorius;" Harnack, *History of Dogma*, vol. iv. (Eng. trans., London, 1898); Schaff, *History of the Christian Church*, vol. iii. (3d ed., New York, 1889); Du Bose, *The Ecumenical Councils*, chs. 10 and 11 (2d ed., ib., 1897); Bright, *The Age of the Fathers* (London, 1903).

NETH'ERLANDS, The; often called Holland. The country forming, with the coastal region of Belgium, the lowest part of Europe. It is the western continuation of the low plain of North Germany and lies between latitudes 50° 45′ and 53° 30′ N., and longitudes 3° 22′ and 7° 12′ E. It is bounded on the west and north by the North Sea, on the east by Prussia, and on the south by Belgium. With an area of only 12,648 square miles, it is one of the smallest independent States of Europe. Its topography has had a leading part in shaping its history. The country is emphatically a maritime State. Half of its boundaries (465 miles) are formed by the sea, and no place in the kingdom is more than 120 miles from it.

Topography. The northern part of the Netherlands is indented by the Zuyder Zee, which represents in part an ancient lake, the sea having broken through the intervening land in the thirteenth century. There are many considerable islands along the coast, distributed in two groups. Off the north coast are the Frisian Islands, comprising Texel, Vlieland, Ter Schelling, Ameland, and others. In the southwest are the numerous islands of the great Rhine-Meuse-Scheldt Delta, among which are Voorne, Overflakkee, Schouwen Tholen, North Beveland, South Beveland, and Walcheren. The country is the flattest part of the Continent, mainly a region of monotonous stretches of plains, interrupted only by sand dunes and some other undulations and low hills, particularly in the southeast. One-fourth of this region adjoining the sea front lies below the level of the sea, a considerable part of it in North and South Holland as much as 20 feet. Thirteen per cent. lies between sea level and 3 feet above the sea. The mean height of the entire kingdom is only 30 to 33 feet above the sea.

Three features, the dunes, dikes, and polders, characterize the north and south belt nearest to the sea. The dunes stretching along the coast were formed by the winds and sea, which heaped up the ocean sands into rows of hills from 20 to 60 feet apart and from 35 to 200 feet high. Wherever they front the coast they are adequate protection against the sea. These sand ridges and hills are sparsely wooded, but are saved from disintegration by natural or cultivated growths of plants. Few parts of them are tilled, but the sandy regions behind them are carefully cultivated. The dikes are gigantic artificial embankments of earth faced with stone or protected by stakes. They guard the country against the sea at the places where there are no dunes. The largest is the Helder Dike. (See Helder.) There are also smaller dikes, as a precaution against floods, on the banks of the Rhine and other streams. Inside the line of dunes and dikes are great numbers of polders, which are areas of land inclosed by dikes that not only protect them from floods, but also render it possible to pump out the water from within the inclosure. The land thus won with enormous toil is exceedingly fertile and valuable.

The lands reclaimed from the sea along the coast and the basins of the rivers in the south are the most industrial and populous parts of the Netherlands. Here are the richest pastures, where most of the fine breeds of Dutch cattle are reared and the dairy industry thrives. Back of these lowest lands and polders stretch the low plains strewn with the gravel and sand brought down from the north, with swellings of ground caused by deeper accumulations of this material; and in the east are many moors or bogs covered with moss and heather, many of which have been drained, the peat cut away for fuel, and the land reclaimed for cultivation. The country is not quite destitute of important elevations, for there are hills in the extreme southeast, and to some extent in the central east. One of these ranges attains a height of 690 feet, and in the provinces of Drenthe, Gelderland, Overyssel, Utrecht, and Limburg are gravel hills from 150 to over 300 feet in elevation; near Limburg is the highest elevation in the kingdom (1055 feet).

Hydrography. The numerous bogs and marshes testify to the imperfect drainage. There are many small streams, but no large rivers except in the south. These large rivers flow in the direction of the general slope of the country from east to west. They are all international streams, important in the commerce of Western Europe. The Rhine is the great highway between Western Germany and the sea. Entering Holland, it divides into numerous arms, the chief of which are the Waal, the Lek, and the Yssel. Four-fifths of the river trade of Holland is carried on the Rhine and the Waal, making Rotterdam a Rhine harbor. The Meuse (Dutch *Maas*) joins the Waal, thus mingling its waters with those of the Rhine, and is important in the commerce of Eastern Belgium. The Scheldt or Schelde, whose estuary is mainly in the Netherlands, carries ocean vessels to Antwerp, and small boats from the Netherlands ascend the river to the centre of Belgium. Lakes are scattered all over the country. Some of the lakes, such as the large Haarlem Lake, have been drained, and their beds converted into arable land. The stupendous undertaking of draining a great part of the Zuyder Zee is in progress.

CLIMATE. The climate is moist and with small range in temperature. The summers are not very warm, nor are the winters often very cold. With an average annual temperature of 50° F., the mean temperature is 49° in the spring and autumn, 64.4° in July and August, and 35.6° in January. The annual precipitation is about thirty inches, rain falling on about two days in three throughout the year. The fact that most days are misty and damp, a week of bright weather being a rarity, induces the diseases which characterize such conditions. Marsh fevers are also prevalent in the boggy districts; and though on the whole Holland is regarded as having a healthful climate, the annual death rate in the western lowlands is from 30 to 40 per 1000, which is about one-third greater than in other parts of the kingdom.

SOIL AND VEGETATION. The country is poor in vegetable products excepting cultivated plants. The most fertile regions are those with a stiff clay soil on the reclaimed lands of the northern and western provinces and on the fluvial clays along the large rivers. These are the chief agricultural and grazing lands, though the zone of cereals and some other crops also extends over a large part of the diluvial sands and gravels of the central regions. About one-fifth of the area is unproductive. The country is almost destitute of timber, scarcely one-fifteenth of the surface being occupied by woods. Pasturage covers about one-third of the country, and the arable lands, including the areas devoted to kitchen gardening, occupy rather less than a third of the surface.

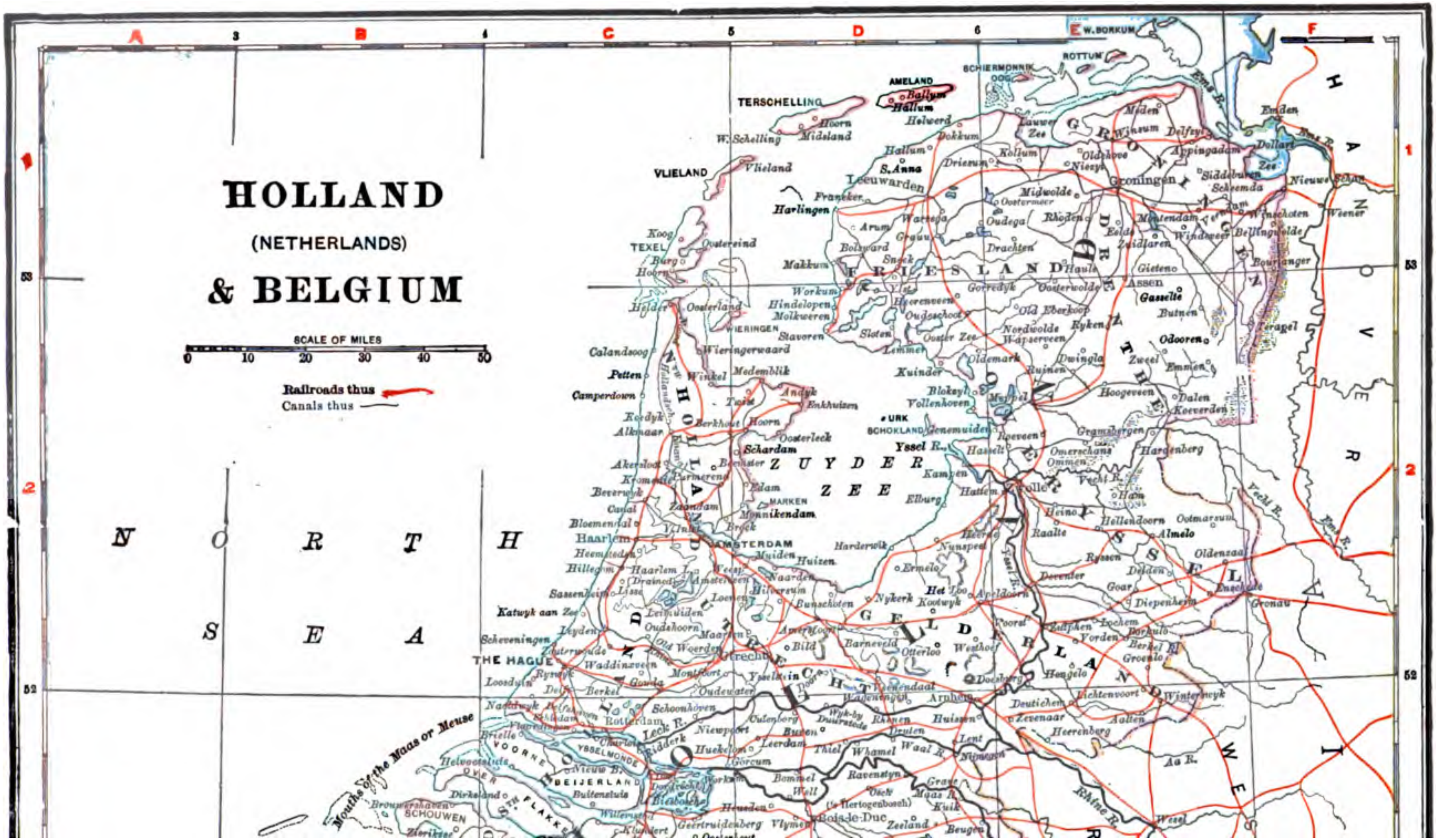
FISHERIES. Fishing is an important source of wealth, the industry being divided into river and coast fishing and the deep-sea fishing. The chief product of the coast fisheries are sprats, which are packed for export, and the oyster, which thrives in the alluvial mud brought down by the rivers and is protected from high seas by the islands along the coast. The herring fishery is the most important branch of deep-sea fishing, the annual catch averaging about 250,000 tons.

GEOLOGY AND MINERAL RESOURCES. Nearly the whole surface is covered by very recent Quaternary formations, diluvium occupying 40 per cent. and alluvium 59 per cent. of the area. The coal measures, chalk, and Tertiary sands and loams occupy only about one per cent. of the surface and are found only in the extreme east and southeast. The diluvium was spread over the country during the Ice Age from Scandinavia in the north, while in a later glacial period the Meuse and Rhine spread coarse sand and grit over the south. The winds, sea, rivers, and vegetation coöperated in the formation of the alluvial strata. Most of the country being composed of water or ice-borne débris, the supply of minerals is very small. Building stone is imported from Norway; the lack of this material has stimulated the production of brick and tile, which are made in abundance, chiefly from the Rhine clays, and are of superior quality. Some coal is mined near Limburg, but there is no iron, except a small quantity of bog iron ore obtained from the bog regions of the east. Turf or peat is cut in very large quantities.

AGRICULTURE. Over 500,000 of the inhabitants are engaged in agriculture, which has reached very high development in the northern and western provinces and along the southern rivers; but scarcely three-tenths of the surface is arable land, and the production fails to meet the home consumption. Rye, buckwheat, and potatoes are the chief products of the sandy soils; hops, sugar beets, tobacco, and wheat, of the clay soils. Rye, vegetables, and beet sugar are the chief agricultural products. The beet farms are in the richer lands of the river valleys, the country ranking sixth in the production of beet sugar. Wheat from the United States supplements the home supply, only a small part of the people eating rye bread, as they prefer a mixture of rye and wheat. The cereal crops, in order of importance, after rye, are oats, wheat, buckwheat, and barley. Beans are also a large crop, and potatoes are the most important product after rye. Large quantities of vegetables are sent to England. The cultivation of flowers has reached a very advanced development, Haarlem being the centre of the flower industry, and exporting bulbs to all quarters of the world. Owing to very careful and scientific methods of tillage, the yield of all crops is large. In 1899 the land in farm crops was 2,139,144 acres; pastures, 2,929,123; gardens and orchards, 153,449; and forests, 624,421. Large areas of timber land were long ago cleared for cultivation, and the country is compelled to import most of its timber supply from various parts of Europe and from America.

STOCK-RAISING. As the moist climate promotes the growth of grass, animal rearing is the most important resource of the country. Cattle-raising has attained a development equaled in few other countries of the world. Cattle thrive best in the coast provinces. Dairy farming is also far advanced near the sea, and hundreds of thousands of the famous Dutch cheeses are sent to foreign markets, butter being also a large product. Horses are bred with great success in Friesland, Gelderland, and North Brabant. Sheep are reared more for their flesh than their wool, chiefly in North Holland and in the south. The poultry yards supply large quantities of eggs to England, and many tons of honey are produced, chiefly among the higher lands of the east.

MANUFACTURES. The country is of inferior importance as an industrial State. Coal and iron, the bases of large manufacturing development, are lacking, with the result that manufactures hardly meet the home demand, and only a few articles are exported. The metal indus-


HOLLAND
(NETHERLANDS)
& BELGIUM
SCALE OF MILES
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10
20
30
40
50
Railroads thus
Canals thus
NORTH
SEA
A
B
C
D
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F
1
2
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53
52
TERSCHELLING
AMELAND
VLIELAND
TEXEL
SCHIERMONNIKOOG
ROTTUM
W. BORKUM
WIERINGEN
URK
SCHOKLAND
MARKEN
Z U Y D E R
Z E E
FRIESLAND
GRONINGEN
DRENTHE
OVERYSSEL
GELDERLAND
UTRECHT
NORTH HOLLAND
SOUTH HOLLAND
HANOVER
WESTPHALIA
Leeuwarden
Harlingen
Franeker
Groningen
Assen
Zwolle
Arnhem
Nimeguen
Utrecht
AMSTERDAM
Haarlem
Leyden
THE HAGUE
Scheveningen
Rotterdam
Delft
Gouda
Dordrecht
Helder
Alkmaar
Hoorn
Enkhuizen
Edam
Zaandam
Monnikendam
Kampen
Deventer
Zutphen
Apeldoorn
Amersfoort
Hilversum
Naarden
Almelo
Oldenzaal
Enschede
Emden
Delfzyl
Winschoten
Meppel
Hoogeveen
Coevorden
Emmen
Sneek
Bolsward
Dokkum
Stavoren
Wieringerwaard
Medemblik
Purmerend
Beverwyk
Katwyk aan Zee
Brielle
Hellevoetsluis
VOORNE
YSSELMONDE
BEIJERLAND
OVERFLAKKEE
SCHOUWEN
Bois-le-Duc
Heusden
Bommel
Tiel
Gorcum
Ems R.
Yssel R.
Vecht R.
Waal R.
Rhine R.
Maas R.
Lek R.
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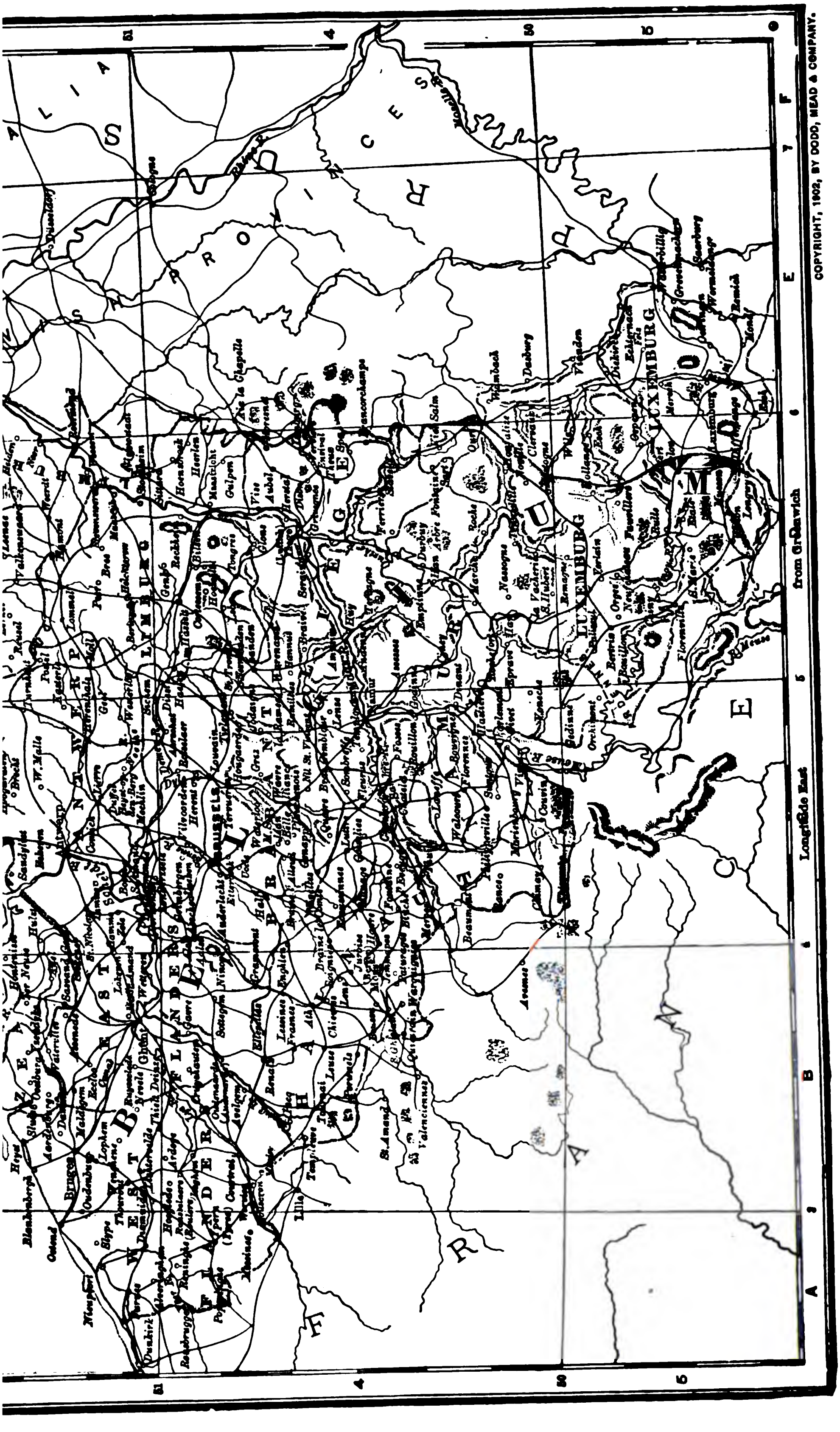

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tries have been little developed, though coal and iron are brought to Amsterdam, Rotterdam, and The Hague for the construction of railroad material, ships, machinery, and hardware. Many of the steel and iron ships owned in Holland are built in England. Tin plate is produced at The Hague, and gold and silverware are manufactured at Amsterdam; but few fancy articles in metals are produced. Textile manufactures have been largely developed since the separation from Belgium in 1830. Calicoes are made in large quantities for the East Indies, Africa, and China trade, representing usually an export value of about $7,000,000 a year. The number of spindles is about 300,000, the leading factories being in Overyssel and North Brabant. Amsterdam, Haarlem, and Leyden have dye works and calico-printing works. Linen is manufactured chiefly in the southeast and North Brabant. The best quality of sailcloth is made in North and South Holland. Tilburg is the leading centre of the woolen industry, and the carpets of Deventer are in much request; but with the growth of the woolen industries in England, France, and Germany, Dutch woolens have declined in importance. Many towns make leather, and the manufacture of earthenware is spread all over the country. Brick and tile works are found in many places; clay pipes are made in South Holland; Delft still produces the glazed earthenware that made the town famous; Maestricht also produces stoneware and glassware. The diamond-cutters of Amsterdam are still famous, though their business is declining on account of the competition of Paris, London, and Antwerp. This industry is entirely in the hands of the Jews. Many industries are connected with the transformation of agricultural products, such as liqueurs, distilled from orange peel and other materials in Amsterdam, Rotterdam, and Schiedam, the same cities also leading in the production of Holland gin, distilled from rye. There were 516 distilleries in 1900, 503 breweries, and 9 vinegar works. Large quantities of cigars and manufactured tobacco from home-grown or East Indies leaf are made, the most extensive factories being at Amsterdam and Utrecht. The sugar refineries, chiefly in Amsterdam and North Brabant, are using every year more raw sugar from beet root and less from sugar cane.

Commerce. The Dutch trade embraces every continent, and is therefore first and chiefly maritime. Most exports of home products go to the neighboring countries of Europe. England, Germany, and Belgium are the largest buyers of the live animals, butter, cheese, and oleomargarine which the country exports. In 1900 the leading exports to neighboring countries of home products were: 49,000 cattle, 6000 calves, 49,000 sheep, 4000 swine, 51,000,000 pounds of butter, 120,000,000 pounds of oleomargarine, 102,000,000 pounds of cheese, and 336,000,000 pounds of sugar, besides eggs, vegetables, flax, and fish.

The exports of colonial products are sold all over the world, and the chief trade of the Netherlands is in the import and re-export of these colonial commodities. The Dutch colonial possessions in the East Indies, extending from Sumatra to New Guinea, are about sixty times as large as the mother country, and have seven times the population. Most of the tea, sugar, coffee, quinine, tin, tobacco, indigo, dyewoods, spices, and gums they export are sent to the Netherlands, chiefly to Rotterdam and also to Amsterdam. Palm oil, rubber, and ivory from the Congo State, and guano and nitrates from South America are also imported. Some of these articles are greatly enhanced in value by manufacture in the Netherlands. Quinine, for example, is prepared for the market in the Netherlands, where also Java raw sugar is refined and Sumatra tobacco is made into cigars. The colonies, on the other hand, buy from the mother country great quantities of cottons and of other goods manufactured for them at home or purchased in other lands and sold by Dutch merchants in the colonies at a large profit. The colonies are the best customers of the Netherlands, excepting Europe.

Most of the imports for home consumption come from Northern Europe and the United States. The United States contributes about one-eighth of these imports, on an average, chiefly wheat, flour, maize, rye, petroleum, tallow, bacon, leaf tobacco, and lumber. Great Britain, Germany, Russia, and Belgium supply nearly all the other imports, consisting chiefly of coal, timber, metals, and manufactures. Most of the home trade, as distinguished from the colonial trade, is with these countries. The rapid growth of the imports for home consumption and the exports of home products may be seen from the following table, which shows the average annual trade:

	1882–86	1892–96	1901
Imports	$448,500,000	$602,500,000	$822,894,000
Exports	342,500,000	490,000,000	700,686,000

The value of the imports and exports of the largest classes of products in 1901 was:

	Imports	Exports
Food products	$230,136,960	$213,021,408
Raw materials	182,478,654	131,392,494
Manufactured products	103,004,460	91,884,336
Miscellaneous	163,701,234	127,290,486

The following table gives the trade with leading countries in 1901:

	Imports	Exports
Belgium	$90,791,200	$70,510,800
Brazil *	8,400,000	
British India *	18,894,000	700,000
France	9,165,600	5,185,800
Great Britain	99,816,600	171,131,400
Prussia	174,387,600	349,297,800
Russia	64,320,000	3,336,600
Spain *	16,400,000	1,300,000
Dutch East Indies	130,047,000	24,723,000
United States	121,846,200	31,838,400

* The figures for Brazil (imports), British India (exports), and Spain (imports and exports) are given for 1899.

The Dutch derive large profit from the forwarding trade. They find the business of carrying freight for other nations a very profitable branch of commerce, and their position at the mouth of the Rhine gives them unsurpassed opportunities to pursue this branch of business. A great deal of the trade of Germany and also of Austria and Switzerland with other countries passes through the Netherlands, and most of it is tributary to Rotterdam, the port of the Rhine mouth and one of the greatest forwarding ports of the world. Amsterdam's connection by river and canal with the Rhine enables that city to take a large though inferior part in the transit trade. The value of the goods carried in this transit business in 1900 was $243,936,000.

Free trade is the Government policy, duties being levied on a few articles only for purposes of revenue. No article pays more than 5 per cent. duty, and grain, iron, wool, cotton, coal, and many other commodities are on the free list. The chief centres of domestic trade are Rotterdam, Amsterdam, Flushing, Dordrecht (timber), Middelburg, Leyden, Utrecht, Alkmaar, and Hoorn (cheese).

Transportation and Communications. The largest routes of trade by water or rail converge on Rotterdam, Amsterdam, and Flushing. Great ship canals have given their preëminence to Rotterdam (318,507 inhabitants in 1900) and Amsterdam (510,900). Rotterdam, near the mouth of the Meuse, was threatened with being cut off from the sea by accumulations of sand in the river; a new waterway was therefore dug across the Hook of Holland through the dunes to the north of the Meuse, by which ships of the heaviest tonnage now reach the town. Fully three-fourths of the sea trade of the Netherlands pertains to Rotterdam, steamers plying between that city and all the largest ports of Western and Northern Europe and to the East Indies and United States. The traffic by sailing ships with the colonies and other distant lands is also very important. Amsterdam is also connected by regular lines of steamers with many ports of Europe, America, and Asia. The two ports command about nine-tenths of the total sea trade; Flushing, Middelburg, and Harlingen also have some importance. The Dutch merchant marine being small (213 steamers and 425 sailing vessels in 1900). a little more than one-half of the sea trade is carried under the British flag. Two ship canals connect Amsterdam with the sea. The older is the North Holland Canal, extending from Amsterdam to Alkmaar and Helder, 52 miles long, completed in 1825. By means of this canal the dangerous passage of the Zuyder Zee was avoided. In recent years, however, the importance of the canal declined, as it is not wide enough for the more modern large ships. The North Sea Canal was therefore built between Amsterdam and the North Sea, 16 miles in length and fully meeting the requirements of modern trade. These are the great ship canals of the Netherlands, but the whole country is a land of canals. All the towns and even the villages are connected with one another by these waterways. The larger canals are over 60 feet broad, 6 to 9 feet deep, and sometimes they lie higher than the fields through which they pass. The domestic traffic of the country is carried on the canals. There is little coasting trade, because commodities are carried from one port to another on the canals. The total extent of the canals is nearly 2000 miles, and the length of navigable waters outside of the canals is about 3000 miles.

The railroads are of more importance for international than for internal commerce. They carry most of the freight that England sends into Central Europe. Flushing, on the Scheldt, and Hook of Holland, near Rotterdam, are ports on the main rail routes between England and Germany. In 1900 the railroads had a length of 1830 miles, of which the State owned about one-half and private companies the remainder. Good wagon roads in all parts of the country, all paved with brick (klinkers), supplement the other excellent means of communication. Their total length is about 3000 miles.

Banking. All banks are private banks, but the Bank of the Netherlands is the only one that is permitted to issue bank notes, the amount of which, in 1901, was 221,869,000 florins, or $89,191,338 in our currency. The money in general circulation, however, is chiefly silver. Two-fifths of the paper money in circulation must be covered. The bank secured the right to issue bank notes in 1863 for twenty-five years; in 1888 the right was prolonged for fifteen years, with a continuation for ten years more unless rescinded by the Government or the bank, two years' notice being given. In accordance with notice given by the Government in 1901, the present arrangement will terminate in November, 1903. The bank of the Netherlands has branches in all important towns, and does the same business as other banks, but provides more guarantees. It is the depository of the State funds and of the cash of the Post-Office Savings Bank. In 1901 the total exchanges of the bank were $194,700,060; stock of gold, $29,868,600; stock of silver, $27,352,080; capital, $8,040,000; reserve fund, $2,211,000. The bank receives 5 per cent. of the profits, the balance being divided between the State and the bank. In 1899 there were 389 private savings banks, with 420,885 depositors and $30,900,534 deposits. The State Postal Savings Bank, in 1900, had 829,131 depositors and $44,048,194 deposits.

Finance. The sources of revenue in 1901 were: excise, $20,211,500; direct taxation, $14,500,872; indirect taxation, $9,027,915; post-office, $4,328,750; export and import duties, $4,007,500; pilot dues, $1,358,335; Government telegraphs, $936,875; State domains, $735,000; State lotteries, $271,250; fisheries, $55,000; railroads, $1,807,560. The expenditures were: national debt, $14,431,070; Department of War, $9,465,180; Department of Public Works, $12,241,695; Department of Finance, $10,461,715; Department of Marine, $6,940,705; Department of Interior, $6,652,815; Department of Justice, $2,645,795; Department of Colonies, $548,840; Department of Foreign Affairs, $355,505; royal household, $333,335; superior State authorities, $283,960; miscellaneous, $20,830. The total revenue was $56,971,100 and the expenditures were $64,481,445. The total debt amounted in 1901 to $482,806,435. About $130,000,000 of the revenue of the past half century has been applied to the reduction of the public debt.

Money, Weights, and Measures. The standard coin is the 10-florin gold piece, containing 6.048 grammes of fine gold. The unit of the silver coinage is the florin, containing 9.45 grammes of fine silver. The country has the gold standard, and gold and the silver coins issued before 1875 are legal tender. The value of the coins has for years been invariable. The principal coins are the guilder or florin of 100 cents, worth 40⅕ cents in our currency, and the gold piece of 10 florins. Metric weights and measures are used.

Population. The population is most dense in the provinces of North and South Holland and Utrecht, which contain almost half of it, although embracing less than one-fourth of the total area. In these provinces are the three largest cities of the country. The annual increase of population averages considerably over

1 per cent. (in 1898, 1.41 per cent.; 1899, 1.28; in 1900, 1.47). The increase is due almost wholly to the excess of births over deaths. The people numbered by the census of 1899 5,103,979. Of the total population in 1900 2,560,239 were males and 2,618,807 were females. There were in 1899 52,625 persons of foreign birth living in the Netherlands, of whom 31,865 were Germans, 14,903 Belgians, 1307 English, and 4550 of other nationalities. The emigration is very small, amounting in 1900 to 1899 persons, nearly all of whom went to the United States.

The table of provinces, with areas and populations, is as follows:

PROVINCES	Area sq. miles	Population Dec. 31, 1899
North Brabant	1,980	553,842
Gelderland	1,965	566,549
South Holland	1,166	1,144,448
North Holland	1,070	968,131
Zeeland	690	216,295
Utrecht	534	251,034
Friesland	1,282	340,262
Overyssel	1,291	333,338
Groningen	790	299,602
Drenthe	1,030	148,544
Limburg	850	281,934
Total	12,648	5,103,979

Education. Attendance at school is not compulsory, and many of the people are illiterate, 14 per cent. of the adults in North Holland being unable to read. No religious instruction is given in the public schools, and a very large number of the youth attend denominational private schools. In 1900 there were 3108 public elementary schools, with 16,639 teachers and 508,276 pupils, and 1461 private elementary schools, with 7683 teachers and 231,534 pupils; 146 public infant schools, with 26,448 pupils, and 916 private infant schools, with 91,633 pupils. The polytechnic school (Delft) had 32 teachers and 714 pupils; 75 middle class schools, 1024 teachers and 10,299 pupils; 11 navigation schools, 71 teachers and 1564 pupils; 137 day and evening schools for working people, 1225 teachers and 18,478 pupils; 29 classical schools, 426 teachers and 2500 pupils. The four public universities at Leyden, Utrecht (qq.v.), Groningen, and Amsterdam have 167 teachers and about 3000 pupils. The Free University of Amsterdam charges no tuition. A number of art schools, museums, and military, music, normal, deaf mute, and technical schools are supported by the Government. Since 1889 public instruction has been diminishing and a larger number of school children have entered the private schools, which are now supported to a great extent by the State. The cost of public primary instruction is borne jointly by the State and the Communes.

Religion. There are numerous creeds and sects, and complete religious freedom. Most of the Protestants belong to the Dutch Reformed Church, and many other sects are represented. The Synod is the source of authority in most of the Protestant churches. The Roman Catholic Church is under an archbishop in Utrecht with the bishoprics of Breda, Haarlem, Bois-le-Duc, and Roermond; and the Old Catholics or Jansenists under an archbishop in Utrecht, and two bishops in Deventer and Haarlem. The Jews fall into two religious societies, the Dutch Israelites and the Portuguese Israelites. The adherents of the different churches in 1899 numbered: Dutch Reformed, 2,471,021; other Protestant, 598,111; Roman Catholic, 1,790,161; Jansenists, 8754; Jews, 103,988; other creeds, 132,102. The larger part of the Catholics live south of the Rhine, and most of the Jews in North and South Holland.

Charitable Institutions. About five per cent. of the population are wholly or in part provided for by charities—about half by Church institutions, and most of the remainder by municipal organizations.

Ethnology. Of the early peoples of the Netherlands little is known, except that portions of the country were inhabited successively by tribes of the Stone, Bronze, and Iron ages. In the time of Cæsar the tribes of the swampy lowlands of the south were of Celtic stock, as the Nervii and Menapii. In the north were the Frisians and in the central portion were the Batavians and Caninefates, of Teutonic stock, speaking Low Dutch. The Batavians belonged to the Chatti, who had moved in from the east, pushing the Celts into the outskirts. During the Roman occupation the Celts of the south were crushed, the Frisians were compelled to pay tribute, and the Batavians were conciliated and later supplied the best of soldiers for the Roman armies. In the fifth century the Roman power was broken by the Germans, and in this period of the swarming of nations those westward-moving tribes overflowed the Netherlands. The Saxons amid these changes occupied the country and crossed over to England. The ethnical components have remained constant in the centuries that have intervened. The home of the Frisians, who in the early part of the Middle Ages dwelt along the coast as far south as the Scheldt, has been contracted to a small area. The anthropological survey of the country shows a preponderance of the long-headed, blond, tall, Teutonic type in the north and east, with cephalic index of from 79 to 80. In North and South Holland there is a large element having Alpine affinity, with cephalic index from 83 to 84. In Zeeland the pure Alpine or Celtic head-form is found with measures of from 85 to 88, dark hair and skin and medium stature, which is 1.655 meters, while that of the Teutonic element, as in Overyssel, is 1.701 meters.

Government. The basis of the present Constitution of the Netherlands is the fundamental law of 1815, as successively revised in 1840, 1848, and 1887. According to this Constitution the State is an hereditary monarchy, having the system of parliamentary or responsible government. The law of succession is lineal primogenial, with preference for males. In default of all legal heirs, the successor is determined by a joint meeting of the two chambers of Parliament (each containing twice the usual number of members). The sovereign attains his or her majority at the age of eighteen.

The legislative power of the Netherlands is vested conjointly in the sovereign and Parliament, or States-General. The Parliament consists of two chambers with considerable inequality of powers in legislation. The Upper Chamber is composed of 50 members elected by the legislatures (provincial councils) of the several provinces into which the kingdom is divided, and from among the highest taxpayers and certain high officials designated by law. Their term is nine years, one-third retiring every three years. Those members not residing at The Hague, the seat of government, are allowed a compensation of about $4.75 per day during the session of the Parliament. The Lower Chamber is composed of 100 members, chosen by districts and by direct suffrage. Those qualified to vote for members of the Lower Chamber include all male citizens twenty-five years of age, who are owners or tenants of houses or boats, or who possess certain evidences of capacity and business ability. At present, but little more than 11 per cent. of the population is qualified to vote under these provisions.

The members of the Lower Chamber serve for a term of four years, one-half retiring every second year. Any Netherlander who has attained the age of thirty years and who is in the full enjoyment of his civil and political rights is eligible to membership in the Lower Chamber. The members receive an annual salary of $850, besides traveling expenses. The sessions of the chambers are public, although each by a majority vote may hold secret sessions. Either may be dissolved by the Crown without the sitting of the other chamber being disturbed, but in case of dissolution new elections must be held within forty days and the chambers convoked within two months. Ordinarily both chambers meet at least once a year, and may be summoned in extraordinary session by the Crown. The presiding officer of each chamber is appointed by the Crown, but minor officers are elected by the chambers respectively. The Upper Chamber has no power of initiating legislative measures, its authority being confined to the simple approval or rejection *in toto* of bills sent to it from the Lower Chamber. The Lower Chamber has the special power of appointing commissions of inquiry; it shares with the Crown the right of initiating legislative measures and may amend the bills presented by the Government; to it the Government must submit the annual budget; and it alone has the right to impeach the ministers before the High Court at The Hague.

The sovereign, who is declared to be inviolable and irresponsible, is required to take an oath to maintain the Constitution, the independence of the country, and the liberties and rights of the citizens, and to execute the laws. The powers of the Crown include the dissolution of the chambers, either jointly or separately; the declaration of war; the superior direction of foreign affairs; the negotiation of treaties with foreign powers subject to the approval of the chambers, when the cession or exchange of territory is involved, or when rights established by law are affected; the command of the army and navy, and the appointment of military officers; the superior direction of the colonies; the general administration of the finances; the granting of pardons (but not amnesties); the fixing of salaries of public officers except in case of the judges; and the decision of administrative conflicts between the provinces. The executive powers of the Crown are exercised through ministers, one of whom must countersign every official act of the sovereign, and who thereby assumes the responsibility for it. The political responsibility of the ministers is to the Parliament, to each house of which they are entitled to have access whether members or not, and to speak, although not to vote unless they be members. Each minister presides over a department of administration, of which there are at present eight. They are the Ministries of Foreign Affairs; Interior; Finance; Justice; Colonies; Marine; War; and Public Works and Commerce. Each minister receives an annual salary of $5000. Besides the Cabinet there is a Council of State, presided over by the sovereign, and consulted by the Crown on a variety of important matters of State administration.

For the purpose of local government the Netherlands are divided into 11 provinces, and these are again subdivided into 1123 communes. The chief executive authority in each province is a commissioner of the sovereign. In each province is also a representative assembly consisting of members elected for a term of six years, one-half of the members retiring every second year. The number of members constituting an assembly varies from 35 to 80, according to the population of the province. The powers of the provincial assemblies are in general those of a local legislative body, and include such duties as the enactment of ordinances and the levy of taxes. All ordinances to be valid must be approved by the Crown. The assemblies exercise a supervisory control over the municipalities and elect the members of the Upper Chamber of the national Parliament. Ordinarily they hold sessions twice a year and are presided over by the commissioner of the sovereign. For the conduct of the provincial administration a deputation of six members is chosen from the body of the provincial assembly and is known as the 'Deputed States.' In each commune is a local council elected for a term of six years by the same electorate as that which chooses the members of the provincial assembly. The number of members varies from 7 to 41, according to the population of the commune, and one-third of the members retire every two years. The powers and duties of the communal council include the enactment of by-laws and ordinances relating to matters of purely local concern. These are all subject to the veto of the sovereign, while the budget and ordinances for the alienation of municipal property require the approval of the Deputed States of the province. The council is presided over by a mayor or burgomaster appointed by the sovereign for a term of six years. He is the chief executive officer in the commune, and is assisted by from one to four aldermen (the number depending upon the population of the commune) elected by the council from its own membership. The mayor exercises a supervisory power over the actions of the council and may suspend its resolutions for a period of thirty days. He also has charge of the municipal police.

The judicial system of the Netherlands consists of one High Court of Cassation, which sits at The Hague, five Courts of Appeal, 23 District Courts, and 106 cantonal tribunals. The High Court of The Hague has original jurisdiction in matters concerning the State, the royal family, and the impeachment of ministers and misdemeanors committed by the higher officials. It has appellate jurisdiction in cases appealed from the provincial courts and the courts in the colonies. All judges are appointed by the Crown for life, except the cantonal judges, whose tenure is limited to five years, and they are irremovable except by resolution of the High Court. Trial by jury does not exist in the Netherlands. Consult:

De Mombynes, *Constitutions européennes* (2 vols., Paris, 1881). For army and navy, see under Armies and Navies.

Defense. There are few fortresses protecting the national boundaries. The chief, most effective defense lies in the ability to open the dikes and flood the region between the Lek and the Zuyder Zee.

Colonies. The Netherlands are one of the important colonial powers. The Dutch colonies form two groups: the Dutch East Indies (q.v.) and the Dutch West Indies. The statistics—totals—are approximately: Area in square miles, Dutch East Indies, 736,400; Dutch West Indies, 50,230; total, 786,630; population in 1897, Dutch East Indies, 34,090,000; Dutch West Indies, 133,300; total, 34,223,300. The Dutch West Indies comprise the colony of Dutch Guiana, or Surinam (see under Guiana), area 49,800 square miles, population 82,000; and the colony of Curaçao (q.v.), including the adjacent islands of Aruba (q.v.), Buen Ayre (q.v.), Eustatius (q.v.), Saba (q.v.), and half of Saint Martin (q.v.), total area 430 square miles, population 51,000.

History. The name Netherlands or Low Countries originally covered the territory included in the present kingdoms of the Netherlands and Belgium, with Luxemburg. This region was inhabited in Roman times by the Frisii in the north, the Batavi in the central portion, and the Belgæ in the south. These tribes were successively subjugated by the Romans—the Belgæ by Cæsar; the Batavi after Claudius Civilis, a Batavian leader, whose native name is unknown, had broken the Roman alliance and attempted to form a united Batavian kingdom (A.D. 69-70); and the Frisii still later after an obstinate resistance. The Low Countries were incorporated in the Empire of Charles the Great and Christianized. Upon the breaking up of the Carolingian Empire the new Frankish kingdom acquired the southern portion, Lotharingia (Lorraine) the central, and the new Germany the northern part. Coincidentally with this division came the rise of feudalism, and duchies like Brabant (originally Lower Lorraine), counties like Artois, Flanders, Holland, and Hainault, and bishoprics like Utrecht and Liège, developed a semi-independent authority in this remote district, where the weakened royal authority of the period reached with difficulty. (See Belgium.) It resulted also from the division of the country that, while the people as a whole retained certain traits due to their environment, the Dutch or northern provinces were distinctly Germanic in language and customs, the Flemings or Central Netherlands showed in both respects a mingling of French and German elements, while the Walloons on the south were as markedly French as the Dutch were German. In the latter part of the Middle Ages the cities of the Netherlands rose through their commerce and manufactures to an extraordinary state of prosperity, and some of them were for a time virtually independent republics. Next to the Italian States they figured most prominently in the revival of art. The cities of Flanders and Brabant were especially flourishing. Bruges, Ghent, and Antwerp had the largest share in this prosperity—Antwerp, at the beginning of the sixteenth century, eclipsing all other cities of Europe in the volume of its trade and its financial transactions. A marriage alliance between the House of Flanders and that of Burgundy (1369) gave the Burgundian dukes, with their unbridled ambition for empire, a foothold in the Netherlands which they used to such purpose as to bring the whole country under their sway. (See Burgundy; Flanders.) The Hapsburg-Burgundian alliance (the marriage of Maximilian of Austria and Mary of Burgundy) in 1477 made the Low Countries an appanage of the House of Hapsburg. Charles V., the grandson of Maximilian, in 1549 formally united this rich inheritance with the Spanish crown. In 1555 he resigned the sovereignty over the Netherlands to his son Philip II. At this time they comprised the four duchies of Brabant, Gelderland, Limburg, and Luxemburg; the seven counties of Artois, Flanders, Hainault, Holland, Namur, Zutphen, and Zeeland; the margraviate of Antwerp, and the seigniories of Friesland, Groningen, Mechlin, Overyssel, and Utrecht. These provinces were very largely independent of each other and prized this independence. The States-General, to which each sent deputies, served to unify them to some extent, and a supreme tribunal had jurisdiction over all; but the States-General was, like similar bodies in that age, politically weak, without power of legislation or taxation. The acquisition of the country by Spain brought into close political conjunction two bitterly antagonistic forces, for all save the Flemish or Southern Netherlands was becoming strongly Protestant, while Spain was the most Catholic country in Europe. Under Charles V. the Netherlands, which were included in the Burgundian Circle of the Holy Roman Empire, had been declared indivisible, and not subject to the Imperial courts. He had subjected the Protestants to severe persecution and had established the Inquisition, but it was reserved for Philip II. to show to what lengths bigotry, cruelty, and bad faith could be carried in the oppression of a people. The Government during the regency of Margaret of Parma was carried on by Cardinal Granvella (q.v.), who began at once to break the royal pledges and to trample upon the liberties of the people. Spanish troops were kept in the country and time-honored privileges and rights were ignored. Protest and resistance soon began under the leadership of William of Orange, Stadtholder of Holland, Zeeland, and Utrecht, Count Egmont, and the Count of Hoorne, which brought about the dismissal of the hated Minister (1564), but effected no change in Philip's policy toward the Netherlands. The league of the Beggars (see Gueux) arose in 1566, and field preaching by proscribed Protestant ministers was carried on under the protection of armed multitudes. Mob violence broke out in many parts of the country and the resentment of the people showed itself in the plundering and desecration of churches and the destruction of images and relics. Philip II. proceeded to summary measures, strengthened by the support of a large peaceful element among the population who viewed with alarm the proceedings of the Beggars. In August, 1567, the Duke of Alva (q.v.) arrived with an army of Spanish veterans and authority to deal with the country as rebellious and conquered territory. Alva's Bloody Council, an irresponsible tribunal, condemned by wholesale Netherlanders guilty of no offense save their religion and love of country, and in February, 1568, the Holy Office of the Inquisition pronounced a death sentence against all the inhabitants of the Netherlands as heretics, with a few named exceptions. Among the notable victims of the tribunal were Counts Egmont and Hoorne. In the spring the Prince of Orange, who had fled the country, raised a small army and with his brother, Count Louis of Nassau, took the field for the liberties of the Netherlands, thus opening a desperate struggle lasting for forty years, during which most of the principal towns endured sieges by the Spaniards and suffered wholesale massacres when taken. In May Louis of Nassau defeated Count Aremberg, the Spanish Governor of Groningen, but he was driven from the field by Alva and fled to Germany with only a remnant of his troops. The first decisive triumph for the national cause was the capture of the fortified seaport of Briel by the 'Beggars of the Sea' under the Count de la Marck in April, 1572. This was followed by the revolt of the principal cities of Holland, Zeeland, and Friesland, and many cities in Gelderland and Overyssel. The Prince of Orange was proclaimed as lawful Stadtholder of the King of Spain. The fortress of Mons, in the south, was taken by Count Louis of Nassau, but the expected reënforcements from France did not arrive and the Massacre of Saint Bartholomew was a severe blow to the Protestant cause in the Netherlands. Mons was retaken by the Spaniards in September, and in rapid succession other places (Mechlin, Zutphen, and Naarden) fell into their hands, their course everywhere being marked by ruthless cruelty. Haarlem was defended by a garrison of 4000 men against an army of 30,000 men under Don Frederick, a son of the Duke of Alva, and after enduring a siege of seven months surrendered only when reduced to the very verge of starvation. The little town of Alkmaar repelled all assaults by the Spanish soldiery, and drove off an army of 16,000 men by cutting the dikes and flooding the country. In 1573 Alva was recalled by Philip II. and succeeded by Requesens.

On sea the Dutch repeatedly defeated the Spanish fleets, but on land they suffered a severe reverse in the battle on the moor of Mook, near Nimeguen (April 15, 1574), in which Louis of Nassau and his brother Henry were slain and their entire army destroyed. Leyden, besieged by an army of 8000 Spaniards under Valdez, held out for five months, and was saved by the cutting of the dikes, which enabled the vessels of the Gueux to bring relief to the town. The death of Requesens in March, 1576, was followed by a mutiny of the Spanish troops (the so-called Spanish Fury). Freed from all discipline and clamorous for their pay, which had long been withheld, they brought a reign of terror on the country. Ghent, Utrecht, Valenciennes, Maestricht, and Antwerp were taken and plundered, and in the last-named city 8000 citizens are reported to have been put to death. The southern provinces turned in terror to William of Orange for aid, and, with the exception of Luxemburg, entered into an alliance with the northern provinces, known as the Pacification of Ghent (November 8, 1576). The authority of Philip was still nominally recognized. The pacification was completed by the Union of Brussels, January, 1577, the object of which was primarily the expulsion of the mutinous Spanish soldiers. The new viceroy, Don John of Austria, the half brother of Philip II., in order to gain time, was compelled on his arrival to grant the demands of the estates, and issued the Perpetual Edict, confirming the terms of the Pacification of Ghent. He won a great victory at Gembloux on January 31, 1578, but died in the same year, and was succeeded by Alexander Farnese, Duke of Parma, one of the ablest men of his day as well as one of the most unscrupulous, who administered affairs with energy until 1592. A shrewd judge of men, he used bribery as well as force to divide and weaken the resistance, and he succeeded in fomenting dissensions between the northern and southern provinces, which had little sympathy save that arising from resistance to common oppression. The southern provinces were in great part won back for Spain, but at Utrecht in January, 1579, the seven northern provinces, Holland, Zeeland, Gelderland, Utrecht, Groningen, Overyssel, and Friesland, entered into a union that was virtually the founding of the Dutch Republic, and on July 26, 1581, at The Hague, the seven provinces constituting the modern kingdom of the Netherlands declared their independence. William of Orange became the ruler of Holland and Zeeland, while the sovereignty over the other provinces was offered to the Duke of Anjou, brother of Henry III. of France. The latter, however, aroused the enmity of the people by his attempt to seize Antwerp, and left the country in 1583. On July 10, 1584, William of Orange was assassinated at Delft by an emissary of the Duke of Parma; but the United Provinces were saved from the full effects of the blow by affairs in France, where the struggle between the monarchy and the Catholic League diverted the attention of the Spanish King and led for a time to the withdrawal of the greater part of the Spanish troops from the Low Countries. In 1585 Antwerp, after a memorable siege of 14 months, was forced to surrender to the Duke of Parma. In 1585 an English army under the Earl of Leicester was sent by Elizabeth to the aid of the Dutch, but the incapacity of their commander made their assistance of little use, and in 1587 Leicester returned to England. The United Provinces nevertheless continued the struggle, guided by the statesmanship of Barneveldt (q.v.), and under the leadership of Maurice of Nassau, the eldest son of William of Orange. Maurice concluded a series of triumphant campaigns with the decisive victory of Nieuport, over the Archduke Albert of Austria, July 2, 1600. On sea the Dutch navies overwhelmed the Spanish forces and made themselves masters of the Spanish-Portuguese possessions in the East Indies. These years of warfare completed the desolation of the Spanish Netherlands. A respite came in 1609 with a twelve years' truce, which was a virtual acknowledgment of the independence of the Dutch Republic. For additional details of the struggle with Spain up to the truce of 1609, see articles on ALVA; EGMONT; FARNESE; GUEUX; JOHN OF AUSTRIA; PHILIP II.; WILLIAM I.; MAURICE (of Nassau).

Political and religious dissensions now arose in the Republic. The Arminian controversy in the Church mingled itself unhappily with the political differences between Prince Maurice, of Nassau, and Barneveldt. Finally Barneveldt was seized, condemned without fair trial, and executed May 13, 1619. See DORT, SYNOD OF; BARNEVELDT; GROTIUS.

In the course of the struggle with Spain the foreign trade of the provinces had undergone a rapid expansion. The Dutch East India Company was organized in 1602. Following the discovery of the Hudson River by Henry Hudson, sailing for the Dutch East India Company in 1609, the Dutch established by degrees a trading colony in New Netherland, the later New York. The New Netherland Company was given a trading charter in 1615, and in 1621 the Dutch West India Company came into existence and began to people the new colony, which remained a Dutch possession until 1664, when it was taken by the English, to be recovered in 1673 for fifteen months, and then finally lost to the Republic.

In 1621, the twelve years' truce having expired and the Dutch refusing to acknowledge allegiance to Spain, the war was renewed by Philip IV. The Dutch, led by Prince Maurice until his death in 1625, and then by his brother Frederick Henry, with the French as allies, carried on a struggle for the possession of Flanders, the incidents of which served to increase the hostile feeling between the Catholic and Protestant parts of the country. In the meantime the religious dissensions in the United Provinces themselves died out and a spirit of toleration arose which made the country the asylum for European Protestant refugees. In 1646 Spain began negotiations for peace with the Republic, and the Dutch, already suspicious of the growing French influence, and themselves weary of the long struggle, made terms which became a part of the general Peace of Westphalia in 1648. The United Provinces were now fully recognized as free and sovereign States. The Scheldt was closed to commerce, and the right of the Dutch to a share in the trade of the Indies was acknowledged. William II., who succeeded Frederick Henry as Stadtholder of the Republic, attempted to become a sovereign with the aid of France, but died at the age of twenty-four, and the danger his ill-advised attempt had shown led the States to hold the stadtholdership in abeyance. Holland, the wealthiest of the provinces, now became the real controlling force, and the executive power in Holland was vested in the Grand Pensionary, an office which from 1650 to 1672 was held by Jan de Witt (q.v.). This was the golden age of the Republic, when its fleets fought successfully against the English (1652-54 and 1665-67), and made it the leading sea power of Europe. The prosperity, wealth, and power of the Republic brought it new enemies in the place of decadent Spain. Having united in 1668 with England and Sweden to hold Louis XIV. in check, the Republic found itself, in 1672, facing both France and England, the former attacking by land, the latter by sea. In this struggle William III., the young Prince of Orange, posthumous son of William II., by his generalship and patriotism won the approval of a large party of the nobles and common people, who demanded the restoration of the stadtholdership. France had demanded the restoration of the House of Orange to its authority, but William had declined to receive a gift forced by the enemies of his country. Jan and Cornelius de Witt, who opposed vesting any further powers in the House of Orange, were murdered by a mob (1672), and the Prince of Orange became once more Stadtholder and the central figure in the United Netherlands. In the shifting European policies of the succeeding years, the Republic found itself sometimes with one ally, sometimes with another, sometimes single-handed, but with the calling of the Stadtholder William to the English throne (1688) it was brought into the large scheme of the Grand Alliance against Louis XIV. William of Orange and Heinsius (q.v.), the Grand Pensionary of Holland, were the soul of the resistance to the schemes of the French King. (See LOUIS XIV.) By the Peace of Utrecht, in 1713, closing the War of the Spanish Succession (see SUCCESSION WARS), the Spanish Netherlands were handed over to Austria. By the Barrier Treaty, concluded with England and Austria in 1715, the Dutch acquired the right of maintaining garrisons in the fortified towns of the Austrian (Belgium) Netherlands.

There was a decline in the prosperity of Holland in the first half of the eighteenth century. The stadtholdership had been again set aside, but it was restored in 1747 and made hereditary in William IV. of Nassau-Dietz. There were forty years of peace with the exception of a brief naval war with England, which broke out at the close of 1780. In 1782 the States-General formally recognized the United States of America as a sovereign and independent nation, being the second Government in Europe so to do. The Stadtholder's Government was essentially aristocratic, and in 1786 the rising democratic tide drove out William V., who, however, was restored in the following year through the intervention of Prussia. The revolutionary movement in France found an echo in the United Provinces, where the democratic party welcomed the conquests of Pichegru (q.v.). The stadtholdership was again overthrown, and the Batavian Republic was organized under French sympathizers and in close alliance with France in 1795. Napoleon made the Batavian Republic into the Kingdom of Holland, with his brother Louis as King (1806), but the latter was too faithful to the country to suit his Imperial brother and master, and he was compelled to abdicate (1810), and the country was annexed to the French Empire. In 1813 the French were expelled and the House of Orange was restored, and the Congress of Vienna (1815) annexed Belgium to Holland and created the new kingdom of the Netherlands under the sovereignty of William I., the son of the last Stadtholder. Luxemburg (q.v.) was at the same time erected into a grand duchy for the King of the Netherlands. In the course of the Napoleonic wars England seized the Dutch colonial possessions, and at their close was allowed to retain Cape Colony, Ceylon, and a great part of Surinam. The Catholics of the Belgian provinces were not content with the union with Holland, and revolted in 1830, and after fruitless attempts by the King to suppress the revolt, the Powers intervened and created the independent Kingdom of Belgium, under a guarantee of neutrality. (See BELGIUM.) A final settlement with Belgium was not effected until 1839, when Limburg and Luxemburg were divided between the countries. William I. abdicated in 1840 in favor of his son, William II., who was better able to enter upon harmonious relations with Belgium.

William II. was succeeded by William III. in 1849. The country for more than half a century has enjoyed a peaceful and prosperous development, untroubled by other problems than those of national finance, internal politics, and colonial administration. The last is a question of much magnitude, as the Dutch control over 35,000,000 more or less barbarous subjects, their colonial possessions embracing in the Western Hemisphere, Dutch Guiana and Curaçao, and in the Eastern, Java, part of Borneo, Sumatra, Timor, the Moluccas, Celebes, and the western half of New Guinea. These are run as commercial ventures and are kept under rigid Government control. Slavery existed in the Western Dutch colonies until 1862 and a system of obligatory labor under official supervision still obtains in the Dutch East Indies. The Constitution, which had been much liberalized under the revolutionary influence of 1848, was further modified in 1887, when the suffrage was extended, the Upper House of the States-General, elected by the provincial estates, was enlarged to fifty, and the succession to the throne defined. King William III. died November 23, 1890, and was succeeded by his daughter, Wilhelmina Helene Pauline Maria (q.v.), who was born August 31, 1880, and was enthroned on her eighteenth birthday. She married Prince Henry of Mecklenberg-Schwerin, February 7, 1901. In 1898 the International Peace Conference, called at the suggestion of the Czar of Russia, was held at The Hague, which was made the seat of the international arbitration tribunal established by the conference. (See Hague Peace Conference.) See Political Parties, section *Netherlands*.

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NETHERLANDS SCHOOLS OF PAINTING. Under this title may best be grouped Flemish and Dutch schools, which possess in common certain distinctive qualities and have had a similar development. The Flemish school may be said to begin with Huybecht and Jan van Eyck (died 1440), whose remarkable improvement of oil painting revolutionized the art. The chief characteristics of the early Flemish school are a pronounced realism, highly detailed finish, and the use of landscape background; its best painters had a good sense of color, perspective, atmosphere, light and shade. Jan van Eyck founded the school of Bruges, the chief centre in Flanders; and his follower or rival, Roger van der Weyden (died 1464), founded the school of Brabant, with a centre at Brussels, which was more emotional and dramatic in character. In the sixteenth century the chief seat of the Flemish school was at Antwerp, where Quentin Massys (died 1530) founded a school, which in the seventeenth century found its culmination in Rubens (1577-1640) and his pupils, Van Dyck and Jordaens. The productions of the later Flemish school are characterized by brilliant line and color, though they are materialistic and lack beauty of face and tenderness of feeling. Although Flemish as regards its characteristic realism, it was much influenced by Italian painting, especially in color. Contemporary with Rubens and his followers were a number of important genre painters, who were thoroughly Flemish, untouched by Italian influence. The chief representatives were Teniers the Younger, Brouwer, and Gonzales Coques. In the eighteenth century Flemish painting declined, and was of little importance.

The painting of the early Dutch school resembles that of the Flemish, and was much influenced by the Van Eycks. Haarlem is recorded as being the chief centre, but none of the works of the reputed founder of the school, Aelbert Ouwater (fifteenth century), survive. Its chief masters were Dierick Bouts (died 1475) and Lucas van Leyden (1494-1533). The sixteenth century was a period of Italian influence and unimportant productions, but the seventeenth was the golden age of Dutch painting. Haarlem remained the chief centre, and there was an important school at Amsterdam. With an entire absence of Italian influence, there arose an art more realistic, more distinctly national than the Flemish. The overthrow of Spain and Catholicism did away with the demand for religious paintings, which were superseded by portrait, genre, landscape, and animal subjects. In these the Dutch achieved perfection alike in color and design, but they seldom attempted larger compositions, in which they were indifferently successful. Among the Dutch artists in the seventeenth century, the chief masters in portraiture are Frans Hals and Rembrandt; the latter was equally great in landscape, and introduced light effects, which have not yet ceased to influence painting. In genre painting the most important were Adriaen van Ostade for peasant scenes, and Gerard Terburg for more refined subjects, besides Gerard Dou, Jan Steen, Pieter de Hooghe, and Jan van der Meer. The Dutch were the first to practice landscape and animal painting for its own sake; their greatest landscapists were Ruysdael and Hobbema, while in animal painting Wouverman, Paul Potter, Adriaen van de Velde, and Aelbert Cuyp are preëminent. In marines the greatest names are Willem van de Velde the Younger and Backhuisen; and in all the branches of still-life painting the Dutch excelled predecessors and contemporaries. In the nineteenth century a new school, distinctly Dutch, arose, including important artists like Israels, the peasant painter, the brothers Maris in landscape, Mesdag in marines, and Mauve in animal subjects.

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NETH'ERSOLE, Olga (1870—). An English actress, born in London, January 18, 1870. She appeared on the London stage in 1888 at the Royal Adelphi Theatre, having begun her career at Brighton the year before. She was soon a member of John Hare's company at the Garrick, where one of her early successes was in *The Profligate.* In 1890 she made a tour to Australia. Late in 1894 she first came to America, where she soon became well known in *Camille, Carmen, Sapho,* and other characters, one of her best being Paula in A. W. Pinero's *The Second Mrs. Tanqueray,* in which she appeared in New York in 1899. Consult Strang, *Famous Actresses of the Day in America* (Boston, 1899).

NETHINIM, nĕ'thē-nēm' (Heb., given [to God], from *nāthan,* to give). The lowest order of ministers of the Temple at Jerusalem, mentioned only in Chronicles and Ezra-Nehemiah. They are distinguished from the Levites, but were of sufficient importance to make Ezra solicitous for a large following of them with his mission to Jerusalem (Ezra viii. 17-20). They enjoyed the immunities of the priesthood (ib. vii. 24), possessed a distinct quarter on the Temple hill, along with allotments in the towns (Neh. iii. 31; Ezra ii. 70), and shared in the civic life of Israel (Neh. x. 28). Their name, along with their subordinate position, shows that the caste originally consisted of slaves piously devoted to the sanctuary, like the Greek hierodules, to perform its menial duties. The tradition is preserved that David and his princes 'gave' these servants (Ezra viii. 20), one division of them being associated with Solomon (ib. ii. 55). The large number of foreign names among the Nethinim suggests that they were largely drafted from prisoners of war (cf. Joshua ix. 23). But time broke down the racial distinction, and their voluntary return after the Exile seems to have obliterated all degradation. The Talmud, with its often abstract view of history, outlaws them as heathen, but this view is contradicted by the Bible. Consult: Baudissin, *Die Geschichte des alttestamentlichen Priesterthums untersucht,* p. 142 (Leipzig, 1889); Ryle, "Nehemiah," in the *Cambridge Bible for Schools and Colleges* (Cambridge, 1893); Joseph Jacobs, *Studies in Biblical Archæology* (London, 1894).

NÉTHOU, nā'tōō', Pic de. The highest peak of the Pyrenees. It is situated in the Spanish Province of Huesca, immediately south of the French boundary, 40 miles west of Andorra. Its height is 11,169 feet, and it forms with the neighboring Pic de la Maladetta (10,867 feet) and Pic du Milieu (11,010 feet) the Maladetta group, a steep and jagged granite mass. On its northern slope lies an extensive glacier. The summit is often ascended for the splendid view which it affords.

NETS (AS. *net,* Goth. *nati,* OHG. *nezzi,* Ger. *Netz,* net, of doubtful etymology; possibly connected with Lat. *nassa,* weel). Open fabrics of cotton, linen, hemp, silk, or other material, whose threads usually cross each other at right angles, leaving a comparatively large open space between them. The open spaces in nets are called *meshes.* The threads may be tied at their intersection, thus constituting a true netting, or they may be simply crossed by the process of weaving. The art of net-making has been practiced from the earliest times. Even where the art of weaving was quite unknown, as in some of the South Sea Islands when first discovered, that of netting was well understood; hence we find among savage tribes, almost universally, nets are used not only for fishing, but also for entrapping land animals. Numerous illustrations of the use of nets for both purposes are found in the bas-reliefs of Assyria, Greece, and Rome, and in the mural paintings of Egypt.

A great variety of nets are in use among fishermen, but the principal are the *seine* and the *trawl.* The *seine* is a very long but not very wide net, one side of which is loaded with pieces of lead, and consequently sinks; the other, or upper side, is buoyed with pieces of cork, and consequently is kept up to the surface. When stretched out they constitute walls of net-work in the water, and are made to inclose schools of fish. The *trawl* is dragged along the bottom by the fishing-boat. It is a large net, often 50 feet wide and 100 feet deep, narrowing into a fine-meshed *purse* at the extremity, with pockets at the sides to retain the entangled fish. Sometimes the mouth is stretched apart by an iron beam, which rests upon supports shaped like runners, holding the distended net up about three feet from the sea bottom, while the belly of the net, held in front by the ground rope, drags along the bottom. Such nets, called *beam-trawls,* are operated in deep water by large fishing smacks.

Various kinds of nets are used in bird-catching, and also in catching quadrupeds, chiefly for the purpose of inclosing spaces within which they are, but sometimes also for throwing upon them to confuse and entangle them. Nets are used by gardeners to protect crops from birds; also to protect the blossoms of trees from frost.

Other fabrics for various uses, with wide, open meshes are also called nets, as *hair-nets*, *mosquito nets*, etc. See also Lace; Bobbinet; Brussels Net; Knitting.

NETSCHER, nĕt′shĕr, Kaspar (1639-84). A Dutch genre and portrait painter, born at Heidelberg. He was the pupil of Koster at Arnheim, but belongs to the school of Terburg and Metsu. On a proposed journey to Italy he got as far as Bordeaux, and although he paid a second visit to France, he afterwards lived at The Hague, and was free of the guild in 1663. His best work is in portraiture on a small scale, and in small genre subjects. His earlier and middle works are superior to his later painting, in which his colors are often harsh and unpleasing. In his best period, Netscher is distinguished for the elegance and grace of his figures, especially of children—his mellow, golden tone, and his fondness for and skill in treating draperies and accessories. The Dresden Gallery is rich in good pictures by him. They include: "Gentleman with Guitar" (1665), "Lady with a Spaniel," "Lady at the Piano," and "Woman Singing," and two portraits of Madame de Montespan. The National Gallery, London, has his "Lady at a Spinning Wheel" and "Children Blowing Bubbles;" the Louvre, his "Singing Lesson" and "Violoncello Lesson;" the Metropolitan Museum, New York City, the "Portrait of a Dutch Lady;" and the Historical Society, "Madame de Montespan as Saint Cecilia." Several of his best works are in private collections in England. He also painted historical subjects, but with less success. His son and pupil Constantyn (1668-1722), born at The Hague, was a genre and portrait painter in the same style. Another son, Theodorus (1661-1732), born at Bordeaux, also a portrait and genre painter, lived in England for some time, and was esteemed there for his portraits.

NETSUKÉ, nĕt′s′-kā′ (from Jap. *ne*, wood, root + *tsuké*, to suspend). A button of wood, crystal, or porcelain, but usually of ivory, by which the Japanese smoker suspends his outfit of tobacco, flint and steel, pipe, etc., from his girdle. Often the netsuké is elaborately carved, and is among the most characteristic products of native skill. The best specimens, which have engraved on them the mark of the carver, are very costly, and are valued by both native and foreign collectors, as objects of art.

NETTEMENT, nĕt′mäN′, Alfred François (1805-69). A French journalist and historian, born in Paris. He early began to contribute to the magazines, and was a consistent Catholic in religion and legitimist in politics. In 1848 he founded the review *L'Opinion Publique*, and in it expressed his own opinions so forcibly that, after the coup d'état of 1851, the paper was suppressed and Nettement imprisoned. Among his works are: *Histoire de la Révolution de juillet* (1833); *Histoire de la littérature française sous la Restauration* (1852); *Histoire de la littérature française sous la royauté de juillet* (1854); *Histoire de la Restauration* (1860-68); *Etudes critiques sur le feuilleton roman* (1845-46); and *Vie de madame la marquise de la Rochejacquelin* (1858).

NET′TER, Thomas, also called Waldensis, from his birthplace, Saffron Walden, Essex (c.1375-1430). An English Carmelite monk. He studied at Oxford, and rose to eminence as a man of learning and business capacity. He was elected provincial prior of the English Carmelites in 1414, and was confessor to Henry V. and to Henry VI. He died at Rouen, France, November 2, 1430. He threw himself with great ardor into the lists against the Lollards, and so won the sobriquet of 'Prince of Controversialists.' His chief writings against them are *Doctrinale Fidei Ecclesiæ Catholicæ contra Wiclevistas et Hussitas*, and, especially valuable for its documents, *Fasciculi Zizaniorum Johannis Wyclif* (ed. by Shirley, London, 1858).

NETTLE (AS. *netele*, *netle*, OHG. *nezzila*, *nezila*, diminutive of *nazza*, nettle, Ger. *Nessel*, Ir. *nenaid*, nettle, probably connected with OPrus. *noatis*, Lith. *noterė̃*, Lett. *nâtres*, Gk. ἀδίκη, *adikē*, nettle). A common name of Urtica, a genus of plants of the natural order Urticaceæ having unisexual flowers. The species are annual or perennial herbs with occasionally shrubby bases, many of them covered with stinging hairs, which emit an acid juice and pierce the skin when touched, often causing much inflammation and pain; when grasped in such a way as to press the hairs to the stem, no stinging ensues. The species of a number of distinct genera were formerly included in the genus, especially those having stinging hairs, as Laportea, Pipturus, and Pouzolzia. Some of these are shrubs or even trees, the giant nettle tree of Australia attaining great size. The sting of East Indian species is much more severe than that of European and American species. *Urtica crenulata* or *Laportea crenulata* is said to produce a sensation similar to the continual application of a hot iron, and even after the lapse of several days this may return upon the application of cold water, a sensation more or less pronounced with other species. The roots of nettles, boiled in alum, afford a yellow dye; and the juice of the stalk and leaves has been used to dye woolen stuffs a beautiful and permanent green. The small nettle (*Urtica urens*) and the great nettle (*Urtica dioica*), introduced European species, are abundant in America. Whatever gives nettles their stinging power is dissipated by boiling. The high value of nettles as food for swine, poultry, and particularly for turkeys, is well known to the peasantry of many countries; the great nettle is cultivated in Sweden for fodder. The seeds are nutritious to poultry, and it is claimed are given to horses by jockeys, in order to make them lively when they are to be offered for sale. The stalks and leaves of nettles are employed in some parts of England for the manufacture of a light kind of beer, called nettle beer. The bast fibre of nettles is used for textile purposes. Yarn and cloth, both of the coarsest and finest descriptions, can be made of it. The fibre of *Urtica dioica*, used by the ancient Egyptians, is still employed in Piedmont and other countries. When wanted for fibre, the plant is cut in midsummer, and treated like hemp. The names nettle yarn and nettle cloth are, however, now commonly given in most parts of Europe to particular linen and cotton fabrics. The fibre of *Urtica* *cannabina*, a native of the south of Siberia and other middle parts of Asia, is much used; and from other species both fine lace and strong ropes can be manufactured. The fibre of *Urtica japonica*, or *Pouzolzia viminea*, is much used in Japan, and also that of *Urtica argentea* (or *Pipturus argenteus*) in the South Sea Islands, and of *Urtica gracilis* in Canada. *Urtica tuberosa*, or *Pouzolzia tuberosa*, produces nutritious tubers, which are eaten in India raw, boiled, or roasted. Australia produces a magnificent tree-nettle, *Laportea Gigas*, abundant in some parts of New South Wales, which sometimes reaches a height of 140 feet with a trunk of great thickness, and very large green leaves, which, when young, sting violently. In some places it forms scrub forests, and its stinging leaves form a great impediment to the traveler. The common nettle tree of the United States is a species of Celtis (see Hackberry); the name dead nettle is given to certain species of Lamium, a genus of the order Labiatæ. *Bœhmeria nivea*, often called false nettle, supplies China grass or ramie (q.v.).

NETTLE-BUTTERFLY. Any of several species of butterflies, whose eggs are laid upon the leaves of nettles, namely *Pyrameis Atalanta, Pyrameis cardui*, and *Vanessa urticæ*, the last, as its scientific name shows, being an especial frequenter of these plants. The two former are cosmopolitan, while the Vanessa is European.

NETTLE FAMILY. A natural order of plants. See Urticaceæ.

NETTLE RASH. An affection of the skin of nervous origin, due to the poison of the nettle, and consisting of wheals of red color, extremely tender and also itching. The slightest contact with the hair or spine of the nettle will cause an efflorescence of the eruption, which first appears as white elevations, but rapidly turns red. The true primary cause of the eruption is the special susceptibility of the vaso-motor nervous system. Hence for a few people the saying is true: "Grasp the nettle and it will not sting you." See Urticaria.

NET'TLESHIP, Henry (1839-93). An English classical scholar, born in Kettering, Northamptonshire, England, May 5, 1839. He was educated at the Cathedral School, Durham, Charterhouse, and Oxford, where he was elected Fellow of Lincoln, and gained the Chancellor's Latin Essay Prize. From 1868 to 1873 he was assistant master at Harrow. In 1870 he married the eldest daughter of Rev. T. H. Steel, his colleague at Harrow. In 1873 he was appointed fellow and tutor of Corpus Christi College and classical lecturer at Christ Church, Oxford, which appointments he resigned on being made Corpus professor of Latin literature in the University of Oxford, 1878. He published and edited many classical works, among them a commentary on *Æneid* x. and xii.; a revised edition of Conington's *Vergil* (London, 1883); *Lectures and Essays on Subjects Connected with Latin Literature and Scholarship* (Oxford, 1885; second series, edited by Haverfield, Oxford, 1895); and *Contributions to Latin Lexicography* (Oxford, 1889).

NETTLESHIP, John Trivett (1841-1902). An English animal painter and author, born at Kettering. He was a pupil at Heatherley's and at the Slade School, under Poynter, and studied animal life at the Zoölogical Gardens. His favorite subjects were lions, bears, and tigers. His drawing is accurate, and his treatment broad and masculine. He began to exhibit in 1874. His pictures include: "The Destroyer" (1889); "A Death Grip" (1892); "Rich Spoil" (1893); "A Big Drink" (1893); "The Blood Trail" (1895); "The Honey Stealer" (1896); "Into the Silent Sea" (1900); "Wandering" (1902). He also wrote *Robert Browning: Essays and Thoughts* (1890), a valuable and illuminative work, and *George Morland, and the Evolution from Him of Some Later Painters* (1898).

NET'TLETON, Alfred Bayard (1838—). An American soldier and journalist, born at Berlin, Delaware County, Ohio. He studied at Oberlin College, but at the outbreak of the Civil War enlisted as a private in the Federal army, and before the conclusion of peace rose to the rank of colonel of the Second Ohio Cavalry and brevet brigadier-general. He then studied law, but afterwards did newspaper work in Sandusky, Ohio, Chicago, Philadelphia, and Minneapolis. From 1870 to 1875 he was actively interested in the construction of the Northern Pacific Railroad, and for the next five years in various mining and manufacturing enterprises. He was Assistant Secretary of the United States Treasury from 1890 to 1893, and for a short time after Secretary Windom's death served as Secretary.

NETTLE TREE. Various American ornamental trees and shrubs of the natural order Urticaceæ, known by sundry popular names, as hackberry (q.v.).

NEUBAUER, noi'bou-ẽr, Adolf (1832—). An English Semitic scholar, born in Hungary, and educated at Prague, Munich, and Paris. He was sub-librarian of the Bodleian Library at Oxford in 1873-99, and reader of Rabbinical literature to the university in 1886-1900. Neubauer published *Mediæval Jewish Chronicles and Chronological Notes* in the Semitic Series of the "Anecdota Oxoniensia;" *Histoire de la lexicographie hébraïque* (1861-62); *Géographie du Talmud* (1868); *The Book of Hebrew Roots* (1875); *The Book of Tobit* (1878); *Catalogue of Hebrew Manuscripts in the Bodleian Library* (1886); and *On the Dialects Spoken in Palestine at the Time of Christ* (1888).

NEUBER, noi'bẽr, Friederike Karoline (1697-1760). A German actress. She was born in Reichenbach, and her maiden name was Weissenborn. From the undue restraint of her father's house, she fled in 1718 with her lover, Neuber, to Weissenfels, where they joined some strolling comedians. Seven years afterwards, with another company which she had entirely reorganized, she appeared at Leipzig. Meeting Gottsched, she became a convert to his gospel of French classical methods. In 1737 she presented the play *Vertreibung und Tod des Hanswurst.* A short tour to Saint Petersburg (1740) seems to have been the turning point in her career. She quarreled with Gottsched on her return, lost her company twice, and she failed in her attempt to rehabilitate her fortunes as an actress. Consult the biography by Von Reden-Esbeck (Leipzig, 1881).

NEUBRANDENBURG, noi-brän'den-bōōrk. A town in the Grand Duchy of Mecklenburg-Strelitz, Germany, near Lake Tollense, about 18 miles northeast of Neustrelitz (Map: Germany, E 2). Its old walls, still standing, and its four

Handsome Gothic gates give the town a mediæval appearance. The Gothic Marienkirche dates from the thirteenth century. Near by is the grand ducal pleasure palace of Belvedere. There are manufactures of machines, pianos, paper, and brandy. Population, in 1900, 10,560. Neubrandenburg was founded in 1248.

NEUCHÂTEL, nĕ'shȧ'tĕl', or **NEUFCHÂTEL**. The capital of the canton of the same name in Switzerland, situated on the Lake of Neuchâtel, about 25 miles west of Bern (Map: Switzerland, A 2). It is a well-built town, with a picturesque location and fine public buildings. A beautiful avenue extends along the waterfront, and one of the squares is adorned with a statue of the Neuchâtel merchant, David de Purry, to whose generosity the town owes many of its institutions. The twelfth century abbey church contains a fine monument, erected in 1372, to the counts of Neuchâtel. The old château is now the seat of the cantonal government. Neuchâtel is well provided with educational institutions, which include a Latin college with a valuable natural history collection, an academy with four faculties, a gymnasium, a museum of natural history, an historical and ethnographical museum, a museum of fine arts, and a library of 100,000 volumes. There are a number of private boarding-schools, attended mostly by foreigners. Near the town is the cantonal observatory. The industries of Neuchâtel include the manufacturing of watches, electrical apparatus, and jewelry. The trade is of some importance. Population, in 1900, 20,843, chiefly French Protestants. For history, see the article on the Canton of Neuchâtel. Consult Bachelin, *Neuenburg und Umgebung* (Zurich, 1883).

NEUCHÂTEL, or **NEUFCHÂTEL**, nĕ'shȧ'tĕl' (Ger. *Neuenburg*). A western canton of Switzerland, bounded on the north by the Canton of Bern, on the east by the Canton of Bern and the Lake of Neuchâtel, on the south by the Canton of Vaud, and on the west by the French Department of Doubs. Area, 312 square miles (Map: Switzerland, A 2). The whole country belongs to the region of the Jura, and is generally divided into three parts: the region along the lake, ranging in altitude from about 1400 to over 2000 feet, and famous for its wine; the central portion, with an average altitude of over 2700 feet and producing principally cereals; and the forest region of the west, devoted chiefly to pastoral purposes. Hydrographically the canton belongs partly to the Aare and partly to the Doubs. The principal minerals are asphalt, cement, and building stones. Besides agriculture, viticulture, and stock-raising, the fundamental industries of the canton, the inhabitants are engaged in watch-making, distilling, and in manufacturing cables, electrical apparatus, paper, and chocolate. The Constitution of the canton, originally adopted in 1858, provides for a grand council elected directly for three years at the rate of one member to every 1000 inhabitants. The five members of the executive council are appointed by the grand council for three years. The referendum was adopted in 1879, and the initiative in 1882. For the administration of justice there are a number of justices of the peace, several industrial arbitration courts, and a court of appeals at Neuchâtel. The canton is represented by five members in the National Council. For administrative purposes Neuchâtel is divided into six districts. Population, in 1890, 108,153; in 1900, 126,279. Most of the inhabitants are Protestants and speak French. Capital, Neuchâtel (q.v.).

The mediæval countship of Neuchâtel passed in 1504 to the House of Orléans-Longueville. In 1707, on the extinction of the Neuchâtel branch of the latter family, 15 claimants came forward, among them Frederick I., of Prussia, whose mother was a princess of the House of Orange, which was connected by descent with the House of Châlons, to whose overlordship Rudolph of Hapsburg had subjected Neuchâtel in 1288. Frederick I. was the successful candidate; and from his time Neuchâtel continued associated with Prussia till 1806, when Napoleon bestowed it upon General Berthier. In 1814 it was restored to the House of Brandenburg, and in the same year became a member of the Swiss Confederacy. It became a republic in 1848. Its connection with the Prussian monarchy has been dissolved since 1857.

Consult: Grandpierre, *Histoire du canton de Neuchâtel sous les rois de Prusse* (Leipzig, 1889); Quartier-la-Tente, *Le canton de Neuchâtel. Revue historique et monographique* (Neuchâtel, 1897).

NEUCHÂTEL, Lake of (Ger. *Neuenburger See*). A lake in the western part of Switzerland lying along the eastern base of the Jura range, 19 miles north of the Lake of Geneva (Map: Switzerland, A 2). It is 24 miles long and from 2 to 5 miles wide, being the third largest lake of Switzerland. Its shores, which are very little indented, are partly low and marshy, partly hilly, and covered with forests or vineyards. The lake may be considered as an expansion of the River Thièle, which enters at the southern end, and leaves it at the north on its way to the Aare. It was an important commercial route until railroads were built along its banks, and is traversed by regular lines of steamers between the towns of Neuchâtel and Estavayer.

NEUDÖRFER, noi'dĕr-fĕr, Johann (1497-1563). A German writing-master and calligrapher, born at Nuremberg. He became the foremost representative of his profession, which, despite the invention of printing, was still widely and skillfully practiced, and highly esteemed. His manuscripts were beautifully decorated with gold and other colors, but his chief attention was directed toward an elegant formation of the letters of the German alphabet. He thus developed the German Gothic characters to their perfection, and secured their general use. Of his autographs there are known to exist only the signatures to the Gärtner copies of Dürer's two paintings, "The Temperaments" (in the Germanic Museum, Nuremberg), and a letter of June 7, 1556 (in the municipial archives of Nuremberg.) He also wrote in 1547 the *Nachrichten von nürnbergischen Künstlern und Werkleuten*, whose 79 brief notices are important sources regarding the history of Nuremberg of the early sixteenth century.

NEUENDORFF, noi'en-dôrf, Adolf (1843-97). A German-American musician, conductor, and operatic impresario. He was born in Hamburg, Germany, but at the age of twelve years came to America, where he completed his musical education. He first came before the public in 1859 as a concert pianist, and in 1860 became the solo violin in the Stadt Theater orchestra of New York. The following year he toured Brazil, and on his return was appointed musical director of the German Theatre in Milwaukee, Wis. To him is due the credit of introducing Wagner's *Lohengrin* into the United States, at the Stadt Theater, New York. He also introduced Wachtel (the famous tenor), and the following year (1872) conducted the season of grand opera at the Academy of Music (New York). *Die Walküre* also received its first presentation in this country at his hands (1877), and in 1878 he was appointed conductor of the New York Philharmonic Society. From 1884 to 1889 he was a concert director in Boston, after which he became associated with the management of several successful opera companies. His wife, Georgine von Januschowsky, was prima donna of the Imperial Opera, Vienna, in which city he spent two years (1893-95), returning in 1896 to become musical director of the Hebrew Temple Emanu-El. In 1897 he conducted the Metropolitan Orchestra. He was the composer of operas, symphonies, overtures, and many songs, which enjoyed considerable success. He died in New York.

NEUENKIRCHEN, noi′*e*n-kêrK′*e*n. A town of Austria. See NEUNKIRCHEN.

NEUFCHÂTEAU, nẽ′shȧ′tō′, FRANÇOIS DE. See FRANÇOIS DE NEUFCHÂTEAU.

NEUFCHÂTEL, nẽ′shȧ′tĕl′. A canton and a city of Switzerland. See NEUCHÂTEL.

NEUHAUS, noi′hous. A town of Bohemia situated 70 miles southeast of Prague (Map: Austria, D 2). It contains a mediæval castle and a college, and manufactures cloth and woolen goods. Population, in 1900, 9316.

NEUHÄUSEL, noi′hoi-z*e*l (Hung. *Ersekújvár*). A town of Hungary, situated on the Neutra, 55 miles northwest of Budapest (Map: Hungary, F 3). It has a fine church, a Franciscan monastery, and a gymnasium. Prior to 1724 it was a strong fortress and played a prominent part in the Turkish wars. Population, in 1900, 13,385, mostly Catholic Magyars.

NEUHOF, noi′hôf, THEODOR STEPHAN VON, Baron (c.1686-1756). A German adventurer and King of Corsica. He was born in Metz, the son of a Westphalian nobleman in the French service, and became page to the Duchess of Orleans. He then enlisted in the French army and later in the army of Sweden, where the Minister Goertz discovered him, and employed him on secret diplomatic missions. In 1719 Neuhof was in Spain, enjoying the protection of Ripperda. There he married a daughter of Lord Kilmallock and ran away with her diamonds to France. Beggared by Law, he lived in misery till 1732, when the Emperor Charles VI. made him chargé d'affaires at Florence. In Florence Neuhof rendered some service to several Corsican patriots, who in return invited him to become King of Corsica and fight its battles against Genoa. He landed in Corsica in March, 1736, was proclaimed King as Theodore I., and with help obtained from the Dey of Algiers defeated the Genoese. He left the island soon to seek assistance abroad, and came back in 1738 with reënforcements from Holland. But the French had come to the aid of the Genoese and Neuhof fled. He made one more attempt on Corsica in 1743, when the islanders displayed remarkable devotion to his cause, but failed, and after long wandering went to England in 1749. There he was thrown into prison by his creditors and was released through the intercessions of Horace Walpole only a few months before his death. Neuhof's son published his life in *Mémoires pour servir à l'histoire de Corse* (1768). Consult Fitzgerald, *King Theodore of Corsica* (London, 1890).

NEUILLY, nẽ′yē′. A suburban municipality of Paris, in the Department of Seine, on the right bank of the river Seine, and bordering on the city wall to the north of the Bois de Boulogne (Map: Paris and vicinity). It is a favorite residential section of Parisian merchants, and has sanatoriums, hospitals, and five parks, and in connection with Parisian houses, establishments manufacturing patent leather, chemicals, and starch, and preserving meat. In a large and beautiful park along the Seine formerly stood the Château de Neuilly, built by Louis XV., and the favorite residence of Louis Philippe, who after his deposition assumed the title of Count of Neuilly. The château was destroyed in the Revolution of 1848; and the park, afterwards divided into lots for sale, became an elegant residential quarter. Population, in 1900, 37,493.

NEUKOMM, noi′kôm, SIGISMUND VON (1778-1858). An Austrian composer and orchestra leader, born at Salzburg. He studied under Weissauer the organist, and Michael and Joseph Haydn, the latter of whom was devoted to his protégé's interests, and was mainly instrumental (in 1804) in securing for Neukomm the leadership of the German opera at Saint Petersburg. In 1809 he went to Paris, where he gained the friendship of Grétry, Cherubini, and Talleyrand, and in 1815 received the Cross of the Legion of Honor. In 1816 he went to Rio de Janeiro and was appointed music teacher to the Crown Prince Dom Pedro. He returned in 1821, and lived at Talleyrand's house in Paris. He was a prolific composer and has nearly 300 compositions to his credit, ranging from opera to simple ballad. His sacred music alone survives, the oratorios *Mount Sinai* (1831) and *David* (1834) being still popular in England and Germany. He died in Paris.

NEUMANN, noi′mân, FRANZ ERNST (1798-1895). A German physicist, born at Joachimsthal, near Berlin. He took part in the War of 1815, and afterwards studied at the universities of Jena and Berlin. He received his doctor's degree in 1826, and in 1828 he was made professor of physics and mineralogy in the University of Königsberg. His researches were chiefly along the line of mathematical physics, and he contributed to the theories of the reflection and refraction of light, and of double refraction, to the study of crystals of double axes, and to the methods of determining the specific heat of bodies. His chief publications (published by his pupils) are: *Vorlesungen über die Theorie des Magnetismus* (1881); *Einleitung in die theoretische Physik* (1883); *Vorlesungen über elektrische Ströme* (1884); *Vorlesungen über theoretische Optik* (1885); *Vorlesungen über Theorie des Potentials* (1887); *Ueber ein allgemeines Princip der mathematischen Theorie inducirter elektrischer Ströme* (1892). About a hundred of his memoirs appeared in the *Annalen*, *Crelle's Journal*, and the *Astronomische Nachrichten*. Consult Volkmann, *Franz Neumann* (Leipzig, 1896).

NEUMANN, Johann Balthasar (1687-1753). A German architect, born at Eger, Bohemia. In 1711 he entered the artillery service at Würzburg, and through the patronage of Prince-bishop Johann Philipp von Schönborn, was enabled to travel in Italy, France, and the Netherlands, as a result of which he developed into one of the foremost architects of the Rococo style of his time. He built the magnificent episcopal palace at Würzburg (1720-42), whose imposing staircase is its most notable feature. Even more original, though on a smaller scale, is the palace at Bruchsal. Regarding other structures by him, consult Keller, *Balthasar Neumann* (Würzburg, 1896).

NEUMANN, Karl Friedrich (1793-1870). A German Orientalist, born at Reichmannsdorf, Bavaria. He was educated at the universities of Heidelberg, Munich, and Göttingen, in 1821-25 was an instructor in the gymnasium at Speyer; and later, at the Mechitarist cloister and academy on the island of San Lazzaro, Venice, made a study of the Armenian language and literature, some results of which appeared in his *Geschichte der armenischen Litteratur* (1836). He also made several translations into English of Armenian chronicles for the Oriental Translation Fund of London. During a visit to China he acquired an extensive knowledge of the Chinese tongue and a library of 12,000 printed books, which he presented to the Bavarian Government. In 1833 he was appointed at Munich professor of the Armenian and Chinese languages, but in 1852 was retired because of his expression of liberal political views. He further wrote a *Geschichte des englischen Reichs in Asien* (1857), and a *Geschichte der Vereinigten Staaten von Amerika* (1863-66).

NEUMANN, Karl Gottfried (1832—). A German mathematician, son of Franz Ernst Neumann, the physicist. He was born and educated in Königsberg, was professor at Halle, Basel, and Tübingen, and in 1868 became professor at Leipzig, founding in the same year the *Mathematische Annalen.* He devoted himself mainly to the theory of functions, and to mathematical physics, and may be considered the founder of the theory of logarithmic potential. Neumann edited various papers written by his father and published: *Theorie der Besselschen Funktionen* (1867); *Ueber die elektrischen Kräfte* (1873 and 1898); *Vorlesungen über die mechanische Theorie der Wärme* (1875); *Untersuchungen über das logarithmische und Newtonsche Potential* (1877); *Hydrodynamische Untersuchungen* (1883); *Vorlesungen über Riemanns Theorie der Abelschen Integrale* (1884); and *Allgemeine Untersuchungen über das Newtonsche Princip der Fernwirkungen* (1896).

NEUMANN-SPALLART, späl'lärt, Franz Xaver von (1837-88). An Austrian political economist, born and educated in Vienna. He was professor of economics there in the Commercial Academy (1864-68), at the Military Academy (1868-71), and at the university and the Agricultural College. With Bodio he was one of those most influential in forming the International Statistical Institute; and he was long connected with the Austrian Central Commission on Statistics. As an economist he was a zealous worker in the interest of free trade in Austria, and founded the Association for Economic Progress. Neumann published: *Oesterreichs Handelspolitik* (1864); *Volkswirtschaftslehre mit besonderer Anwendung auf Heerwesen und Militärverwaltung* (1873); and the valuable year-book *Uebersichten in der Weltwirtschaft* (1878-89), continued by Juraschek.

NEUMARK, noi'märk, Georg (1621-81). A German poet. He was born at Langensalza and studied at Königsberg. At Kiel, where he was engaged as a tutor, he wrote his famous song "Wer nur den lieben Gott lässt walten." Neumark was a member of the poetical guild called the *Palmenorden,* and he wrote its history, *Der neusprossenden deutschen Palmbaum* (1668). Consult Knauth, *Georg Neumark nach Leben und Dichten* (Langensalza, 1881).

NEUMAYER, noi'mī-ẽr, Georg (1826—). A German meteorologist and hydrographer. He was born at Kirchheimbolanden, Bavaria, was educated at the Polytechnic and the University of Munich, and in 1857 was sent by Maximilian II. to Australia to make magnetic observations. At Melbourne Neumayer founded Flagstaff Observatory. He returned to Germany in 1864, interested himself in the formation of expeditions to the North and South Poles, and in founding the German African Company, and, after a long connection with the hydrographic bureau at Berlin, in 1876 became director of the German Marine Observatory at Hamburg. He was prominent in behalf of the international polar expedition planned in 1882, and in arranging for the German Antarctic expedition of 1901. Neumayer wrote: *Results of the Observations at the Flagstaff Observatory* (1858-63) and *Results of the Magnetic Survey of Victoria*(1869); *Beobachtungsergebnisse der deutschen Stationen im Systeme der internationalen Polarforschung* (with Börgen, 1886); *Die deutsche Expedition und ihre Ergebnisse* (1890-91); *Atlas des Erdmagnetismus* (1891); *Anemometer-Studien* (1897); and *Auf zum Südpol!* (1901).

NEUMAYR, noi'mīr, Melchior (1845-90). An Austrian geologist. He was born in Munich, studied there and at Heidelberg, where, after four years in the Imperial Geological Institute at Vienna, he became docent in 1872. He soon returned to Vienna and became full professor of geology and paleontology in 1880. Neumayr traveled widely in Southern Europe, making an especial study of the life and coördination of the Jurassic formations, the results of which appeared in the German geological magazines. He coöperated on *Geologische Studien in den Küstenländern des griechischen Archipels* (1880); and wrote *Die Stämme des Tierreichs. Wirbellose Tiere* (1890), and a general work on geology entitled *Erdgeschichte* (1885-87; 2d ed. 1895). The last-named work, while written in a popular style, may be commended for its comprehensiveness and scientific accuracy.

NEUMEISTER, noi'mīs-tẽr, Erdmann (1671-1756). A German hymn-writer, born at Uechteritz, near Weissenfels, and educated at the University of Leipzig. He is chiefly remembered for his hymns, some of which are of great merit and are still in use, such as "Jesus nimmt die Sünder an," "Will ich sagen," and "Lass irdische Geschäfte stehn," which have been translated into English. He also published a *Specimen Dissertationis Historico-criticæ de Poetis Germanicis* (1695). His poetical works include *Fortgesetzte*

Fünffache Kirchenandachten (1716-17) and *Zugang zum Gnadenstuhle* (1705).

NEUMES, nūmz (OF. *neume*, from ML. *neuma, pneuma*, song, musical sign, from Gk. **πνεῦμα**, *pneuma*, breath, from **πνεῖν**, *pnein*, to breathe). In Gregorian music, melodic ornaments, especially series of notes sung to one syllable. Also characters in a peculiar system of musical notation which was in use from the eighth or ninth to the eleventh century. The oldest preserved manuscript written in this notation is the Antiphonary of Saint Gall (ninth century). No staff was used. The notes were represented by a system of dots and hooks and their respective pitch by the height at which they were placed above the syllables of the text. A single long note was indicated by the *virga* (›), two notes on one syllable by the *birirga* (››), three by the *trivirga* (›››), etc. A shorter note was indicated by the *punctus* (•). two by the *bipunctus* (••), etc. The rising and falling of the voice was marked by a corresponding higher or lower position of the signs. In order to obviate the difficulty of determining the exact pitch of the various tones, a red line was drawn horizontally across the parchment (tenth century), and the signs were written above and below this line. Any sign upon the line denoted F. Before another century a second line was drawn above the red one. This was yellow and the note upon it was C. But in the plainer manuscripts the distinction of color was soon abandoned, and two black lines were drawn with the letters F and C placed at the beginning. In the course of time these letters underwent a series of conventional modifications, until they finally assumed the shape in which they are used to-day as clef-signatures (𝄢, 𝄡). The G clef, which was added later, underwent a similar change (𝄞). See MENSURABLE MUSIC; MUSICAL NOTATION; PLAIN CHANT.

NEUMÜNSTER, noi'mụn-stẽr. A manufacturing town in the Province of Schleswig-Holstein, Prussia, on the Schwale, 36 miles north of Hamburg (Map: Prussia, D 1). The principal industrial establishments are woolen and linen mills, tanneries, paper-mills, dye-works, machine and railway shops. Population, in 1890, 17,539; in 1900, 27,335.

NEUNKIRCHEN, noin'kērĸ-en, or **NEUENKIRCHEN.** A town in the Austrian Crownland of Lower Austria, on a branch of the Danube, 39 miles south-southwest of Vienna. It has a large iron foundry, metal and textile industries, boiler works, and soap factories, and lies in an important coal-mining district. Population, in 1900, 10,831.

NEUQUEN, nā'ōō-kān'. A territory of Argentina, situated on the western frontier of the Republic, and bounded by Chile on the west, the Province of Mendoza on the north, and the Territory of Rio Negro on the east and south (Map: Argentina, D 11). Its area is about 42,000 square miles. The greater part of the territory is covered by the ramifications of the Andes, which are drained by the headwaters of the Rio Negro. On the southern boundary is Lake Nahuel-Huapi (q.v.). The population in 1895 was 14,517, mostly Indians, though many Chileans have settled in the territory since the Indians were subjugated in 1884. The capital is the village of Chosmalal.

NEURALGIA (Neo-Lat., from Gk. **νεῦρον**, *neuron*, nerve + **ἄλγος**, *algos*, pain). A sensory neurosis classed as functional and characterized by pain in the course of a nerve or of nerves. Neuralgias are divided into (1) symptomatic, as when they are due to a toxin or a reflex irritation, and (2) idiopathic, when developing from organic disease of the nerve at the site of the pain. But the latter are cases of neuritis in reality, and should not be classed with the neuralgias. Neuralgias are also divided into classes named from their causes, as gouty, traumatic, hysterical, etc., as well as from their anatomical location, as trigeminal, lumbar, crural, sciatic, gastric, renal, visceral, cervico-occipital, brachial, and intercostal. The trigeminal, or facial, neuralgia is the most frequent, and the sciatic ranks next in frequency.

Among the causes are anæmia, gout, rheumatism, diabetes, carious teeth, toxic agents, infections, exposure to cold, malaria, fatigue, mental shock, and injuries. Children never suffer from neuralgia. It is most frequent between the ages of fifteen and twenty-five. It is rare in old age. Women are oftener victims of neuralgia than men, in the proportion of five to three.

The most prominent symptom is pain, which is of a sharp, lancinating character, or of a dull aching variety. Generally it appears in twinges of short duration, though of great intensity. Though principally following the course of the nerves, neuralgic pain pervades adjacent structures. Heat as well as cold generally increases it, as well as a light touch. Firm pressure sometimes relieves. In many cases painful points, generally corresponding to the places of exit of nerves from a bony structure, are found by testing with pressure. Numbness may accompany the pain, as well as muscular spasm in rare cases. The pain of neuralgia is usually increased at night. It may return at regular intervals during the day, especially if dependent upon neuritis.

The treatment of neuralgia includes the use of rest, catharsis, the analgesics, hypodermic exhibition of morphia, the use of cocaine by the galvanic cathode, as well as the local use of menthol, camphor, mustard, chloride of ethyl, chloroform, etc. Excision of a part of the affected nerve or removal of a ganglion of the sympathetic may effect a cure. In all cases hygiene, diet, regimen, and tissue-building are necessary, as well as the discovery and removal of any peripheral irritant, thereby stopping all nerve leaks. See NEURITIS.

NEURASTHE'NIA (Neo-Lat., from Gk. **νεῦρον**, *neuron*, nerve + **ἀσθένεια**, *astheneia*, weakness), nerve weakness. Perhaps the most frequent of the acquired neuroses. The symptom group making up this clinical entity was first familiarized by Beard of New York in 1869, and it is sometimes called the American disease, though now recognized as a world-wide malady. As a rule all forms of nervous energy are reduced and fatigue quickly appears upon the exercise of any motor, mental, or organic activity. It is essentially a disorder of the productive period of life, but does occur in neurotic children and in nervous adults of advanced years. The sexes are about equally affected. Hebrews, Scandinavians, and Slavs show a special susceptibility, and those of neuropathic heredity and the offspring of the physically defective are prone to develop it.

High altitudes, extremes of climatic conditions, wasting diseases, vicious habits, physical illness, injury, shock, and fright, or protracted anxiety, grief, worry, and excitement are competent causes. Excesses of all varieties, and finally and most important of all, overwork, must be added to the list. The only essential element in the causation of neurasthenia is overstrain, and this is a quantity relative to the inherent capacities of the individual and often correlated with hereditary tendencies or defects.

The major symptoms of the disorder are headache, backache, gastro-intestinal disturbances, neuro-muscular weakness, mental depression, irritability, and insomnia. To these in varying number and of inconstant appearance are added tremor, twitchings, startings, sensations of general fatigue, pressure headaches, drawing feelings in the back of the neck and spine, tenderness at various points along the spine, particularly at its two extremities and at the waist, neuralgic pains, and various paræsthesiæ described as prickling, tightness, burning, numbness, stiffness, heat, cold, heaviness, soreness, and vague discomforts referred to the body viscera. Use of the eyes commonly intensifies the headache, and causes prompt fatigue with increase in all the subjective complaints. Sometimes patients shun the light continuously. Nervous indigestion, gaseous fermentation, alternating diarrhœa and constipation, cardiac palpitation, feebleness of the circulation, and vascular storms are commonly presented. The activity of the functions of the genito-urinary tract is reduced. On the mental side there is loss of concentration and consequently memory is enfeebled. Continuous application is impossible. Courage fails, introspection becomes habitual, and many apprehensions and distinct phobias of a hypochondriacal cast add to the patient's misery. The natural affections are diminished and depressed emotions are continuous. The sleep, disturbed by troubled dreams, is broken and unrefreshing. The early morning hours are particularly gloomy. The patient's general bodily condition is unsatisfactory. Anæmia and loss of flesh are commonly encountered, though exceptionally the general nutrition is excellent. The great majority of these symptoms it will be noticed are subjective, not demonstrable physically and capable of misrepresentation. For this reason such patients are misunderstood by their friends, who either foster the condition by misguided solicitude or give it scant sympathy. A careful examination proves that the nerve force is actually diminished and strength exhausted with undue ease. This is demonstrated by the contraction of the visual fields under appropriate tests, the initial exaggeration and progressive reduction of the tendon reflexes, the inability to maintain dynamographic records, the tendency to rapid heart, the digestive inadequacy, etc. Any one or even very many of the enumerated symptoms may be found in other ailments, but it is their systematic grouping and the exclusion of other competent morbid states that enables a diagnosis of neurasthenia to be made.

When the brain functions are principally disordered the term cerebral neurasthenia is sometimes employed. In the same way spinal and sexual neurasthenia are mentioned, but in neurasthenia no function escapes, though there may be a varying preponderance of certain classes of symptoms. All functions are marked by an irritable weakness. Often this nervous disorder is associated with hysteria, particularly in the traumatic cases. Not seldom it is secondary to an initial bodily disease, which may or may not be present at the same time.

Neurasthenia is essentially chronic. Its causation is commonly of long standing, its onset insidious, its course protracted, its recession halting and marked by relapses, its tendency to recurrence pronounced. It is often associated with organic and inorganic diseases, and is encountered as an initial stage in the development of hypochondriasis, melancholia, mania, and general paresis. When uncomplicated by organic diseases its prognosis is usually fairly good, provided the causal conditions can be removed and sufficient adequate rest and upbuilding secured. As it often arises out of the necessities of human existence and social conditions, its proper treatment is frequently impossible. The keynote is rest, and in proportion as this can be made complete both mentally and physically success results. The full rest cure plan of Mitchell, especially with women, often secures brilliant results. In a modified form in mild cases it is also efficient. It implies the expenditure of much time and money. When this is not possible, change of scene, of occupation, of preëxisting influences must otherwise be obtained. The burden of work, the fretting, and carking cares must be minimized, and the physical health and stamina raised to the highest possible level. If such patients can be fattened success is almost assured. Drugs play an entirely secondary part in the treatment of neurasthenia, merely meeting incidental physical requirements. Any underlying physical disease of which neurasthenia may be the superficial manifestation must of course receive major care. To the mental perturbation, however, constant attention must be directed. The patient's fears must be allayed, his hopefulness encouraged, his introspection diverted, and refreshing sleep secured. In proportion as the physician grasps the mental side of the disease, secures the patient's confidence, and meets the requirements of his biased views, in that ratio is he successful and helpful in managing the neurosis.

A number of more or less speculative theories regarding the essence of neurasthenia are current. Hodge and others have proven by interesting laboratory experiments that under conditions of ordinary use the protoplasm of the motor cells is morphologically modified and probably more or less exhausted functionally; that during rest and repose it regains its former appearance and potential force. Some conceive that in neurasthenia the rest periods have been so inadequate that the recuperative powers are belittled, and there is reason to suppose that in some instances this may reach an irreparable degenerative degree. Certain alleged peculiarities of the blood and the general disturbance of assimilation are looked upon by others as arguing a general toxic state which gives rise to the neurasthenic manifestations. These findings are as likely to be effect as cause, but doubtless might operate in a vicious circle to protract the nervous disorder.

NEUREUTHER, noi′roi-tĕr, Eugen Napoleon (1806-82). A German painter, etcher, and illustrator, born in Munich, son of the painter Ludwig Neureuther (1775-1830), by whom he was first instructed at Bamberg, before studying at the Munich Academy under Wilhelm von Kobell. His talent developed, however, chiefly under the influence of Cornelius, who employed him on the frescoes in the Glyptothek and in the Arcades of the Royal Garden. His success in this work of ornamental character suggested to him the idea of illustrating Goethe's romances and ballads with marginal drawings. Published in 1829-39, the drawings were universally admired and made the artist's reputation. In 1830 Neureuther visited Paris, where his illustrations of the scenes of the July Revolution appeared under the title "Souvenir du 27, 28, 29 juillet" (1831). After his return, he published "Marginal Drawings to German Poets" (1832-35), and in 1838 completed his illustrations to Herder's *Cid*. From a visit to Rome in the same year he returned with a rich collection of studies, utilized subsequently in various works. In 1835 he had first tried his hand at etching, in which line he produced his most pleasing and valuable compositions, notably the large plate of "Dornröschen" (1839), his best effort with the needle. As a painter he may be judged by the fine specimens in the Schack Gallery at Munich, which contains "Cornelius Among His Pupils and Fellow Artists," "The Dying Nun," and others.

NEUREUTHER, Gottfried von (1811-87). A German architect, born at Mannheim, brother of Eugen Neureuther. First instructed by his father, he studied afterwards in Munich at the university and academy, and extended his knowledge by traveling through Germany, France, Italy (which he visited four times), Greece, and Turkey. He became most widely known through the Polytechnicum (1866-70) and the new Academy of Arts (1873-85) in Munich, handsome edifices in the Italian Renaissance style, of which he was a prominent exponent.

NEURI′TIS (Neo-Lat., from Gk. νεῦρον, *neuron*, nerve). A disease of a nerve or of nerves, accompanied by inflammation. Neuritis is either single or multiple; interstitial or diffuse; toxic or infective. It is caused by injury to the nerve involved, or infection such as from typhoid fever, or tuberculosis or leprosy; or by toxic action of alcohol, arsenic, lead, etc.

The symptoms of localized neuritis are severe pain, somewhat relieved when the part is at rest and kept warm, some numbness, reduction of the sense of touch, loss of power in the muscles, and eventual atrophy. There may be some contracting of the muscles, with rosy color of the skin, and a peculiar glossiness.

Multiple neuritis is very frequent. It is caused by the toxins of several infectious diseases, as diphtheria, typhoid fever, smallpox, and scarlet fever, as well as those of alcohol, mercury, lead, gout, diabetes, cancer, and tuberculosis. In this form of neuritis the invasion is usually acute, with fever, pain in head, back, and legs, loss of power in arms and legs so that the patient can scarcely climb the stairs, drop-wrist and drop-foot, muscular wasting, tenderness in the muscles, tremor, and sensory disturbances . Fever is rare, and the invasion of the disease is slow. When alcohol is the cause, delirium and convulsions may occur, with hallucinations, somewhat resembling *delirium tremens*. Multiple neuritis is very frequent in other countries, under various names. It is called *beri-beri* or *kakké* in Japan, China, New Zealand, India, Brazil, and the West Indies, in which countries it is endemic. Its course is similar to that of alcoholic multiple neuritis. Its mortality varies from 3 to 50 per cent. The mortality of alcoholic neuritis is not much smaller. Of those who continue the use of alcohol, 50 per cent. die of alcoholism, pneumonia, or tuberculosis. The treatment of multiple neuritis consists of elimination of the cause, rest in bed, phenacetin, sodium salicylate, strychnia, nitrate of silver, and chloride of ammonium under a physician's directions.

NEUROL′OGY (from Gk. νεῦρον, *neuron*, nerve + -λογία, *-logia*, account, from λέγειν, *legein*, to say). The branch of science concerned with the anatomy, physiology, disorders, and diseases of the nervous system. Brain functions associated with mentality are somewhat arbitrarily placed in the field of psychology, and their disorders furnish the topics grouped under the head of psychiatry. Neurological conditions are also studied in the lower animals, giving a subdivision of the subject, comparative neurology, which with embryology furnishes important facts which aid in understanding the human nervous apparatus. In the more limited medical sense, neurology embraces a study of the human nervous system, its diseases (except insanities) and their treatment.

Nervous diseases are: first, morbid manifestations of demonstrably disturbed nerve elements, and, second, so-called functional disorders in which actual changes in the physical properties of the nervous system have not yet been discovered. The latter are commonly called neuroses and are steadily tending to enter the former category under improved methods of research. In many nervous diseases heredity is a marked feature and in the acquired diseases of the nervous system heredity may play a predisposing part.

There is a general and probably well-founded belief that nervous diseases are increasing in frequency. Absolute statements, however, are impossible, as many causative conditions are changing and other newly recognized nervous diseases are being added to the known list. For instance, the infectious diseases, such as smallpox, typhoid, diphtheria, and malaria, are all capable of producing organic and functional nervous diseases. Their control by preventive medicine and hygiene correspondingly reduces that liability. Civilization, on the other hand, by conserving the unfit and prolonging the life of the feeble and neurotic, entails additional nervous disturbances and susceptibilities. There can be no doubt that modern urban conditions favor the development of nervous instability and at the same time bring to bear the additional highly competent noxious influences of vice, particularly through alcoholic and drug habits and venereal diseases. The monotony and hardships of farm life, however, are also a factor of morbidity and are particularly active among the women so situated. Some occupations bear either a direct or predisposing relation to nervous ailments. Writer's cramp and the entire group of occupation neuroses of which it is a type show this feature. Workers in metal, especially lead, phosphorus, mercury, arsenic, those subjected to inhalation of various gases, and those whose occupation tempts them to indulge in liquors, are liable to nervous disorders. Work entailing exposure to cold or wet or increased atmospheric pressure, and that attended by great mental strain or monotony, furnishes predisposing factors.

The question of heredity in relation to nervous diseases is one of decided importance. The neurologist is not content to trace the identical nervous disorder in successive generations, or to note its appearance in blood relations. He properly concerns himself with all the facts which tend to furnish a neuropathic liability. This is indicated with more or less force by the occurrence of any sort of nervous and mental disease in the antecedents of a given individual. An hysterical mother may have an epileptic child and an idiotic grandchild. Even a very highly wrought nervous organization in mother and father may eventuate in unstable children. The transmission of nervous disease may be direct, the identical malady reappearing, or, what is more common, the defect may show itself by transformation into some allied malady. Atavistic tendencies, through which an intermediate generation escapes, are also frequently noted. Tuberculosis, rheumatism, gout, diabetes, and Bright's disease are so commonly found in neurotic families that the association is morbidly significant. All debilitating diseases and exhausting conditions in parents may be reflected in nervously unstable offspring. Consanguinity in the parents does not operate detrimentally as far as nervous diseases are concerned, unless, as is often the case, it brings together individuals of neurotic tendencies, which are naturally intensified in the children.

NEUROP'TERA (Neo-Lat. nom. pl., from Gk. *νεῦρον*, *neuron*, nerve + *πτερόν*, *pteron*, wing). A Linnæan order of insects which has recently been restricted by separating out the orders Mecoptera, Corrodentia, Isoptera, Odonata, Ephemerida, Plecoptera, and Trichoptera, which together for a time were known as the Pseudoneuroptera. At present the Neuroptera includes those forms belonging to the old group of net-winged insects which possess a complete metamorphosis. The mouth-parts are formed for biting; the wings are four in number, membranous, and furnished with numerous veins, usually with many cross veins. Practically all forms are carnivorous, and feed upon other insects. Some of them are aquatic, but the majority live on land and wherever their prey abounds. The order is divided into seven large families:

(1) The Sialidæ, including the dobson or hellgrammite fly (see CORYDALIS), the alder-flies (Sialis), and the fish-flies (Chauliodes).

(2) The Raphidiidæ, or snake-flies (q.v.).

(3) The Mantispidæ, including the false rearhorses, or mantis-like Neuroptera. These insects, rare in the United States, have a long neck and grasping front legs, and are predatory in habits; their transformations are especially interesting.

(4) The Conropterygidæ, including the dusty-wings, which are the smallest of the Neuroptera and have wings covered with whitish powder. They are very few in number, and prey, in the larval stage, upon scale insects, plant-lice, and red spiders.

(5) The Myrmeleonidæ, or ant-lions (q.v.).

(6) The Hemerobiidæ, or aphis-lions (q.v.).

(7) The Chrysopidæ, or golden-eyed lace-winged flies. See LACEWING.

Nearly all the families of Neuropteran insects are represented by fossil remains in the Tertiary rocks; and some, such as the dragon-flies, caddice-flies, May-flies, and white ants, appear in the still earlier Mesozoic formations.

Consult: Comstock, *Manual for the Study of Insects* (Ithaca, 1895); Sharp, *Cambridge Natural History*, vol. v. (London, 1895); Howard, *The Insect Book* (New York, 1902).

NEUROP'TERIS (Neo-Lat., from Gk. *νεῦρον*, *neuron*, nerve + *πτερίς*, *pteris*, fern). An important genus of fossil ferns common in the coal measure shales and sandstones of Carboniferous age in North America and Europe. See FERN; and CARBONIFEROUS SYSTEM.

NEURO'SIS (Neo-Lat., from Gk. *νεῦρον*, *neuron*, nerve). A morbid nervous state, either functional (due to reflex disturbance from a lesion or a condition in another part of the body) or organic (due to local conditions). Neuroses are classed as *kinesio-neuroses*, or disorders of motion; *æsthesio-neuroses*, or sensory disorders; *tropho-neuroses*, or disorders of nutrition; *thermo-neuroses*, or disorders of heat perception; *vasomotor neuroses* or *angio-neuroses*, or disorders of circulation; *secretory neuroses;* and *mixed neuroses*. Among the latter are the *acro-neuroses*, certain disorders affecting the extremities, such as acro-paræsthesia and erythromelalgia; *sexual neuroses*, affecting the functions of the sexual organs; and *psycho-neuroses*, in which there is a combination of mental and physical symptoms due to a complex condition. Dana classifies conveniently the functional nervous diseases that are termed neuroses as follows: (1) Degenerative neuroses, including epilepsy, hysteria, the spasmodic tics, paramyoclonus, Thomsen's disease, paramyotonia, and akinesia algera. (2) Acquired neuroses, including chorea, tetanus, tetany, neurasthenia, sexual neuroses, traumatic neuroses, exophthalmic goitre, and the occupation neuroses. (3) Late degenerative neuroses, including paralysis agitans. (4) Trophic and vasomotor neuroses, including facial hemiatrophy, acromegaly, and angioneurotic œdema. Many of these functional neuroses are considered under their proper titles.

The occupation neuroses are functional disorders consisting of numbness, tingling, partial loss of muscular power, involuntary contractions or spasms, tremor and disability, which combine to prevent the use of certain groups of muscles which have been used habitually by the patient in his occupation or professional labors. An occupation neurosis is really a condition of muscle-fatigue occurring in a neurasthenic, with subsequent neuritis in a few cases. The most common neurosis of this class is *writers' cramp*, or scriveners' palsy. This disease has been known since about 1820, when the steel pen superseded the quill. Men, aged about twenty-five to forty years, are the most numerous victims. Worry, intemperance, and other undermining influences are predisposing causes, as well as preëxisting neurasthenia, as already noted. Excessive writing, under mental pressure, is the exciting cause, especially if the writing is done with the hand in a cramped position. It is a chronic disease. Many sufferers learn to write with the left hand, but this also soon becomes affected. The use of gold pens has brought some relief, and has controlled the increase of the affection among writers. But the great refuge and preventive is the typewriter. All who use the pen to a great extent should use large cork penholders and gold pens. Writing under cerebral strain should be avoided.

Telegraphers' cramp is frequent among the manipulators of the Morse instrument. About one in 200 operators suffer from 'loss of the grip.' The symptoms are much the same as in writers' cramp. Among the other occupation neuroses are *musicians' cramp*, among pianists, violinists, flutists, and others; *sewing spasm*, among tailors, seamstresses, and shoemakers; *milkers' spasm*, which is very rare; *ballet-dancers' cramp*, and many others.

In the treatment of occupation neuroses, rest or change of occupation, massage of nerve and muscle, electricity, douches, and the cautery have proved useful. Drugs are generally useless, except such as relieve the neurasthenia of the patient. Consult Dana, *Text-book of Nervous Diseases* (New York, 1892).

NEUROT'IC (Neo-Lat. *neuroticum*, from *neurosis*). A word formerly used in medicine to specify such a drug as tends to affect principally and specifically the brain centres that govern intellect, sensibility, and motor activity. Alcohol, ether, chloral, opium, potassium bromide, amyl-nitrite, strychnine, quinine, aconite, and digitalis are examples of drugs to which this name may be applied.

The term neurotics is more often used to denote individuals who suffer from nervous disease, such as neurasthenia or hysteria, or who are of pronounced nervous temperament.

NEURUPPIN, noi′rụp-pēn′. A town of the Province of Brandenburg, Prussia, on the small lake of Ruppin, connected with the Elbe, 38 miles northwest of Berlin (Map: Prussia, E 2). It has a gymnasium and a seminary for teachers. Its industries are brewing, spinning, and the manufacture of linen and woolen cloths, starch, brushes, machinery, and trimmed lumber. There is also considerable trade in cattle and cereals. Neuruppin became a town in 1256. Population, in 1890, 14,584; in 1900, 17,100.

NEUSALZ, noi′zälts. A town in the Province of Silesia, Prussia, on the Oder, 75 miles northwest of Breslau (Map: Prussia, F 3). The principal industries are flax-spinning, iron-working, shipbuilding, and the manufacture of linen thread, cartridges, and enamel. Population, in 1900, 12,586.

NEU-SANDEC, noi-zän′dĕts. A town of the Crownland of Galicia, Austria, situated on the Dunajec, about 45 miles southeast of Cracow (Map: Austria, G 2). It has a Roman Catholic church of the fifteenth century, an Evangelical church of the seventeenth century, an old castle, a gymnasium, a Jesuit college, and a hospital. The chief industrial establishments are the extensive railway shops, and in the vicinity of the town are petroleum wells. Population, in 1890, 12,722; in 1900, 15,724, mostly Poles and Jews.

NEUSATZ, noi′zäts (Hung. *Újvidék*). A royal free town of Hungary, situated on the left bank of the Danube opposite the town of Peterwardein and at the mouth of the Franz-Josefs Canal (Map: Hungary, F 4). It is a town of recent origin, having been practically rebuilt since its destruction in 1849. It is the seat of the Greek Oriental Bishop of Bács, and has a higher gymnasium and a commercial school. Its products are chiefly agricultural, and the river trade is important. Neusatz is the seat of the *Matica Srpska*, the chief literary and scientific organization of the Serbs in Southern Hungary. Population, in 1900, 29,296, mostly Serbs and Magyars.

NEUSE, nūs. A river of North Carolina, rising in Person County in the northern part of the State, and flowing southeast into Pamlico Sound (Map: North Carolina, F 3). It is about 300 miles long, and navigable by steamers for over 100 miles. At Newbern, 30 miles from its mouth, it widens into a broad estuary.

NEUSIEDLER SEE, noi′zēd-lẽr zā (Hung. *Fertö-Tava*). A lake in Northwestern Hungary, 30 miles southeast of Vienna (Map: Hungary, E 3). It is about 23 miles long, from 4 to 9 miles wide, and covers an area of 126 square miles. On the eastern shore is the large swamp of Hanság, but the land on the west shore consists of vine-clad hills, with several thriving towns. The water is salty, and unfit to drink. The lake has dried up on several occasions, notably in 1865, when farms were laid out in its bed; but in 1870 it filled up again, destroying all improvements. It is now connected with the Rabnitz River by a canal which, in case of a flood, drains off the surplus water.

NEUSOHL, noi′zōl (Hung. *Beszterczebanya*). The capital of the Province of Sohl, Hungary, at the confluence of the Gran and Bistritz, 13½ miles by rail north of Altsohl (Map: Austria-Hungary, F 2). It has a cathedral noted for its fine fourteenth-century altar, besides other interesting ecclesiastical structures. The old castle is used as a garrison station. There are manufactures of hardware, firearms, and a silver foundry. Four and a half miles to the north are the Herrengrund silver and copper mines. Population, in 1900, 9264.

NEUSS, nois. A town in the Rhine Province, Prussia, near the Rhine, with which it is connected by a canal, 4 miles west of Düsseldorf (Map: Prussia, B 3). The Catholic Church of Saint Quirinus, a beautiful edifice, and a noble specimen of the transition from the round to the pointed style, was begun in 1209. The late Gothic Rathaus is interesting for its collection of paintings by Janssen. Neuss produces a large amount of rape oil. There are manufactures of paper, machinery, ironware, leather, and woolens; there is a trade in grain, cattle, and coal. Population, in 1890, 22,635; in 1900, 28,484. The town is supposed to be the *Novesium* of the Romans. It came under the Archbishop of Cologne in 1074. In 1474 it suffered a long siege by Charles the Bold, and a century later was almost totally destroyed by Alexander of Parma.

NEUSTADT, noi′stȧt. A city in Upper Silesia, Prussia, 29 miles southwest of Oppeln (Map: Prussia, G 3). It has two monasteries, a gymnasium, and several trade schools. There are manufactures of woolen and linen fabrics, carpets, shoes, dyes, and yeast. Population, in 1890, 17,577; in 1900, 20,139.

NEUSTADT, WIENER. A town of Austria. See WIENER-NEUSTADT.

NEUSTADT-ON-THE-HARDT, härt. A town in the Rhine-Palatinate, Bavaria, situated in the Hardt Mountains, about 15 miles west-northwest of Speyer (Map: Bavaria, C 4). The abbey church (1356) contains a number of tombs of the Counts Palatine. The educational institutions include a gymnasium, a *Realschule*, and a Latin school founded in 1579. Neustadt manufactures cloth, paper, tobacco, etc. In the vicinity are extensive vineyards. Population, in 1890, 15,016; in 1900, 17,800, chiefly Protestants.

NEUSTETTIN, noi′stĕt-tēn′. The capital of a circle in the Province of Pomerania, Prussia, 92 miles southwest of Danzig (Map: Prussia, G 2). There are manufactures of machinery, ironware, and dyes. Population, in 1900, 10,026.

NEUSTRELITZ, noi-strā′lĭts. The capital of the Grand Duchy of Mecklenburg-Strelitz, Germany, situated 62 miles by rail north by west of Berlin (Map: Germany, E 2). It is laid out with remarkable regularity, its wide, straight streets radiating in eight directions from the market-place, which is adorned with a statue of the Grand Duke George. The principal buildings are the grand ducal palace, situated in a beautiful park and containing a fine library of 80,000 volumes and collections, the theatre, and the Rathaus. There are also a gymnasium, a *Realschule*, and a fine hospital. The principal manufactures are machinery, woolens, trimmed lumber, cloth, vinegar, flour, etc. The trade is mostly in agricultural products and flour. Neustrelitz was built in 1726 on the site of an old fortress. Population, in 1900, 11,344.

NEUSTRIA, nūs′trĭ-ȧ (Lat. *Francia occidentalis*, West France). The name given in the times of the Merovingians to the western portion of the Frankish Empire, in contrast to Austrasia (q.v.). Later it was used for various territorial divisions; in the eleventh century, and later, it was often used as synonymous with Normandy. Consult Longnon, *Atlas historique de la France* (Paris, 1889). See FRANKS.

NEUTITSCHEIN, noi′tĭt-shīn. A town in the Crownland of Moravia, Austria, on the Titsch, 70 miles northeast of Brünn (Map: Austria, F 2). It has a Byzantine church and an old castle, a higher *Realschule*, and schools of agriculture and forestry. There are manufactures of tobacco, carriages, hats, and cloth. Population, in 1900, 11,891, chiefly of German descent.

NEUTRAL AXIS (Lat *neutralis*, from *neuter*, neuter, from *ne-*, not + *uter*, either). An imaginary line of a body which is subjected to a transverse strain, and is so situated as to separate the forces of extension from those of compression. If the ratio of the resistance to extension and compression were the same for all substances, and depended merely upon the form of the body, then in all bodies of the same shape the neutral axis would have a definite geometric position. But this ratio has a separate value for every substance. In a rectangular wooden beam supported at both ends, the neutral axis passes longitudinally through the centre of the beam, while in cast iron, in which the resistance to compression is greater than that to extension, it is a little above the centre, and in wrought iron, in which the contrary is the case, it is a little below the centre.

NEUTRALITY (in International Law). The complete abstention of a State from giving material aid or encouragement to either belligerent in an existing war. Legally a neutral State is a friend to both belligerents and endeavors to maintain peaceful relations with each. The doctrine of neutrality as now understood is of comparatively recent growth, it having had almost no place in the rules of ancient warfare. As a result of the imperfect notions of neutral duty, several grades of neutrality were formerly recognized. Thus, the obligation of neutrality might be *qualified* by a previous agreement with one of the belligerents by which the neutral stipulated to furnish troops or ships of war or other material upon the outbreak of hostilities. Such a position would be regarded as an act of war according to modern international law, which recognizes only *strict* neutrality—that is, total abstinence from participation in the war either by assistance or countenance. The status of *permanent neutrality* may be created by the agreement of a State to observe perpetual neutrality toward certain other States in consideration of having its own neutrality respected, or the neutrality of a State may be guaranteed by the collective action of other nations. Such is the position of Switzerland and Belgium. The status of *armed neutrality* arises from the alliance of several neutral powers for the purpose of maintaining certain views of neutral duty or for preventing the armed aggression of a belligerent upon neutral commerce. Such were the armed neutralities of the Baltic Powers formed in 1780 (see ARMED NEUTRALITY, THE) and 1800 for enforcing the doctrine that "free ships make free goods" which the Powers concerned had adopted by treaties among themselves. It is the usual custom upon the outbreak of war for neutral governments to issue proclamations of neutrality, announcing the course which they purpose to follow in their intercourse with belligerents during the continuance of hostilities, sometimes giving notice to belligerents of what will be permitted and what forbidden in neutral waters, and formally notifying their own subjects or citizens of the existence of war and warning them of the penalties imposed for the violation of its neutrality laws. As the doctrine of neutrality is now understood it is the duty of neutrals to treat both belligerents as friends, neither granting nor withholding any privilege from one which is not granted or withheld equally from the other. Any deviation from this rule which results in an injury to one of the belligerents is a clear violation of neutral obligations and may be a justification for reprisal on the part of the injured belligerent. Among the positive obligations of a neutral may be mentioned the duty of treating the soldiers of each belligerent humanely, as where a ship of war in distress seeks to enter a neutral port or fugitive troops ask for asylum from the pursuit of a victorious army. Among the obligations of a negative character resting upon neutrals may be mentioned the duty of abstaining from furnishing money, ships, troops, or munitions to either belligerent. However, it is legitimate for neutrals in their own country to sell to belligerents whatever they may wish to buy so long as both are treated equally. So, too, they may transport any article of commerce, except contraband of war, to belligerent ports for the purpose of sale unless with the intention of violating a blockade. But it is forbidden to neutrals to allow their ports or territorial waters to be used by either belligerent as a base of hostile operations against the other.

Not only are neutrals subject to certain duties, but international law clothes them with certain rights and immunities which belligerents are bound to respect. Thus a neutral State has a right to insist that its territory shall be inviolable from acts of war committed by either belligerent. An armed vessel, therefore, has no right to pursue an enemy into neutral waters or to effect a capture there. Nor has a belligerent any right to move troops through the territory of a neutral State or commit acts of belligerency therein. These are violations of the sovereignty of the neutral and may be resisted by force. The act of a public vessel, however, in passing through the territorial waters of a neutral State is not a violation of its neutrality.

As a means of enforcing the obligations of neutrality it is customary for States to pass statutes defining the duty of their subjects in relation to other nations at war and imposing penalties for their violation. These statutes are popularly known as *neutrality laws*. They do not affect the international responsibility of the State, however, and their inefficiency cannot be pleaded in extenuation of a failure to fulfill neutral obligations.

The neutrality laws of the United States are contained chiefly in the acts of 1794, 1818, and 1838. They declare it to be a misdemeanor for any citizen to accept or exercise a commission for the purpose of serving a foreign Power in war with a State at peace with the United States, or to enlist or induce another person to enlist or engage him to go abroad to enlist in the foreign service of such a State; or to fix out, arm, equip, or augment the force of any armed vessel with the intent that it shall be employed in the service of a Power at war with a friendly State; or to institute within the territory of the United States any military expedition against any such Power. The President of the United States is empowered to compel any foreign vessel which ought not to remain in the territorial waters of the United States to depart therefrom and to enforce the observance of the neutrality laws in general. One of the chief purposes of this legislation is to prevent organized efforts to secure the enlistment of troops by belligerents in neutral territory. Neutral governments, however, cannot be held responsible for the unorganized and unauthorized departure of individual citizens for the purpose of enlisting in a foreign army. The manufacture and sale of contraband of war except in the case of ships fitted for warfare is not expressly prohibited by the neutrality laws of either Great Britain or the United States. See INTERNATIONAL LAW, and the authorities there cited; also ALABAMA CLAIMS; CONTRABAND OF WAR; DECLARATION OF PARIS; WAR.

NEUTRAL NATION. An Iroquoian tribe formerly holding the territory along the north shore of Lake Erie in the Province of Ontario, and extending eastward as far as the Genesee River in New York. Their proper name is unknown. They were known to the Huron (see WYANDOT) as *Atiwendaron*, implying a people speaking a language slightly different (from Huron), and to the Seneca as *Gagwage-ono*. The French called them the 'Neutral Nation,' on account of their taking a neutral stand during the long wars between the Iroquois and the Huron. This did not save them, however, for on the final conquest and dispersion of the Huron people the Iroquois invaded the Neutral country with the result that in 1651 the tribe was utterly destroyed, the remnant being incorporated with the conquerors or dispersed in small parties among the Western or Southern tribes. The war was carried on chiefly by the Seneca, according to whose tradition the immediate cause of dispute was a ball-play contest in which the Seneca were the victors. The final battle occurred at a fortified Neutral town about six miles south of the present Buffalo. The majority of the captives were incorporated by the Seneca, who also took possession of the conquered territory as far west as Lake Erie.

NEUVILLE, nẽ'vêl', ALPHONSE DE (1836-85). A French military painter and illustrator. He was born at Saint-Omer (Pas-de-Calais), May 31, 1836. His father, who was wealthy, wished his son to prepare for an official position, but the boy preferred a military life and attended the naval school at Lorient, where he spent much time sketching. To please his family, he studied law for three years, but then determined to become a painter. He took a studio of his own, studying a short time with Picot, but was more influenced by the art and advice of Delacroix. His first exhibited picture, "Batterie Gervais, Malakoff," an episode from the Crimean War, achieved some success. Not being equally successful with later works, as a means of livelihood, De Neuville designed a large number of illustrations for periodicals and books. His great success came after the Franco-Prussian war of 1870-71, in which he served as an officer of engineers. He became the most popular painter of that war, his pictures being greeted with great applause. From a purely artistic point of view they are open to criticism. His colors are often dull, and sometimes ill-chosen, wherefore his drawings in black and white are considered better than his paintings. He excels in portraying vividly and vigorously an intensely dramatic incident, and depicts soldiers in the thick of the fight with accuracy and sentiment that make the pictures national in spirit.

His early paintings include: "Capture of Naples by Garibaldi" (1860); "Chasseurs of the Guard" (1861); and "Attack in the Streets at Magenta" (1864)—all in the Saint-Omer Museum; "Chasseurs Crossing the Tchernaia" (1868), Lille Museum. Among his later and more famous pictures, many of which are in the United States, are: "Bivouac Before Le Bourget" (1872), Dijon Museum; "The Last Cartridge" (1873); "Defense of Le Bourget" (1879), and "Surprise in Environs of Metz in 1870" (1877), in the W. H. Vanderbilt collection, New York; "The Adieu," John Jacob Astor, New York; "Attack at Dawn," John G. Johnson, Philadelphia, Pa.; "The Destruction of the Telegraph Line" (1884), David C. Lyall, New York. In 1881 he, in company with Detaille, painted the celebrated circular panorama, "The Battle of Champigny." He died in Paris, May 20, 1885. Consult De Lostalot, in *Gazette des Beaux-Arts*, xxiv. (1885).

NEUVILLE, JEAN GUILLAUME, Baron Hyde de (1776-1857). A French statesman, born at

La Charité-sur-Loire. He displayed great loyalty to Louis XVI. and Marie Antoinette, was one of the most active agents in the 'emigration' from France, took part in the Royalist uprising of 1796, and after the 18th Brumaire attempted to persuade Bonaparte to recall the Bourbons. Being accused of having taken a part in the plot of the 'infernal machine,' he fled to Switzerland, and later went to the United States. Upon the restoration of the Bourbons, he returned to France, was Minister to the United States from 1816 to 1821, and was then Minister to Portugal. He was a member of the Chamber of Deputies from 1822 to 1830, and held the portfolio of the Marine in the Ministry of Martignac. After the Revolution of July, 1830, he withdrew into private life. His *Mémoires* were published in 1888.

NEUWIED, noi′vêt. The capital of a circle in the Rhine Province, Prussia, on the Rhine, seven miles northwest of Coblenz (Map: Prussia, B 3). The castle, residence of the Prince of Wied, stands in a beautiful park, and has collections of Roman antiquities. The town has many educational institutions, including a gymnasium and two seminaries for teachers. Wool and cotton goods, soap, tobacco, starch, chicory, and ironware are manufactured. Population, in 1900, 11,003. Neuwied was founded in 1653 by the Prince of Wied, as a refuge for religious exiles, and many religious denominations are represented by its present inhabitants.

NEVA, nĕ′vȧ, *Russ. pron.* nyĕ-vä′. The outlet of Lake Ladoga (q.v.) in Northwestern Russia (Map: Russia, D 2). It leaves the lake at its southwestern end and flows westward for 45 miles, emptying through several mouths into the Gulf of Finland. The city of Saint Petersburg is built on the islands of its delta. It is the last link in the great waterway which through the Volga River and the Ladoga Canal system connects the Caspian Sea with the Baltic. Though the volume of water flowing through the Neva is very great, and the river is in places more than half a mile wide, its navigation has been made possible only by extensive engineering works, and an artificial channel, running through the shallow Bay of Neva, connects its mouth with the harbor of Kronstadt. During continued west winds the waters of the bay are piled up in the delta of the river, causing destructive inundations.

NEVADA, nê-vä′dȧ, popularly the 'Sagebrush State.' A Western State of the United States. The 42d parallel of north latitude separates it from Oregon and Idaho on the north, the 114th meridian west of Greenwich from Utah and Arizona on the east, the Arizona boundary being continued on the southeast by the Colorado River as far as the 35th parallel, while a straight line running from the latter point northwest to Lake Tahoe in latitude 39° N., and thence along the 120th meridian, separates Nevada from California on the southwest and west. Nevada ranks fourth in size among the States of the Union. It has an extreme length from north to south of 483 miles, and an extreme breadth of 320 miles. Its area is 110.700 square miles, of which 960 square miles consist of water.

Topography. The greater part of Nevada lies in the Great American Basin included between the Sierra Nevada on the west and the Wahsatch Mountains on the east, and bounded by cross ranges on the southwest and, less definitely, on the north. Neither of the main boundary ranges comes within this State, the crest of the Sierra lying wholly in California, and the Wahsatch running through the centre of Utah. This great basin forms a plateau whose floor lies 4000 to 6000 feet above the sea, though in the extreme southwest it is somewhat lower. From this floor rise a uniform series of parallel ranges from 10 to 25 miles apart, and running north and south through the length of the State, but broken here and there by passes and branch valleys. In the southwestern portion they are almost worn away, leaving isolated knobs scattered over the plain. Some of these ranges rise above 9000 feet, while most of them are over 7000 feet high. The highest point in the State is Wheeler Peak, near the centre of the eastern boundary, with an altitude of 13,058 feet.

Hydrography. Since the surface of Nevada is a basin surrounded by mountains, a very small part of it drains into the ocean. In the extreme north rises the Owyhee, a tributary of the Columbia River system, and the extreme southeastern portion drains into the Colorado, which flows on the southeastern boundary. A large part of the State, especially the south-central and southwestern portion, is without any rivers at all, the small streams running down the mountain slopes during the wet season being lost in the plains where the water evaporates. The principal river is the Humboldt, which rises in the northeastern corner and flows across the State to Humboldt Lake or Sink. Several rivers rise in the Sierra Nevada and flow into lakes and sinks in the west-central part of the State. Among these are Walker River, flowing into Walker Lake, Carson River, disappearing in Carson Sink, and the Truckee River, flowing from Lake Tahoe into Pyramid Lake. The last is the largest lake in the State and measures 35 miles in length by 10 miles in width. Lake Tahoe lies on the western boundary at an altitude of over 6000 feet. It is 21 miles long and 11 miles wide and of great depth. In the rainy season some of the level plains are covered for hundreds of square miles with water from a few inches to two feet deep, leaving in the dry season hardened mud flats sometimes covered with a coating of alkaline salts.

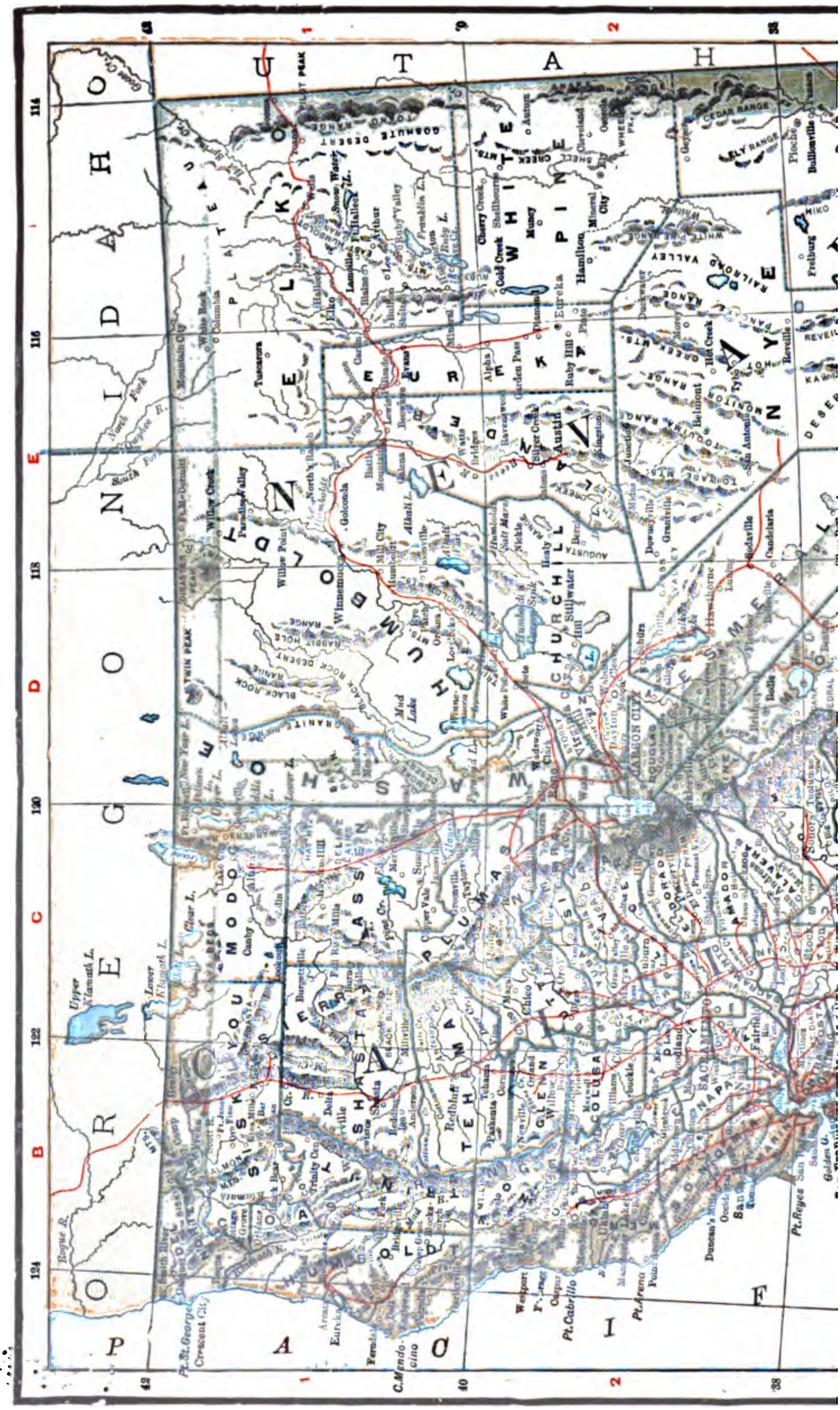
Climate. The climate is very dry and in general pleasant and healthful. The winters are not severe, and snow is confined chiefly to the mountains, where in some places it remains throughout the year. The mean temperature for January is 28°, and for July 71°. The maximum may rise above 110° and the minimum is about 30° below zero, though in the valleys it seldom falls more than 16° below. The winters are generally calm; violent winds are rare at any season. The average annual rainfall is about ten inches. This is very unevenly distributed both in regard to season and locality. Five-sixths of the total precipitation falls from December to May, and the greater part of it falls in high altitudes, the mountainous parts of Washoe County receiving 23 inches, while some valley districts are absolutely rainless.

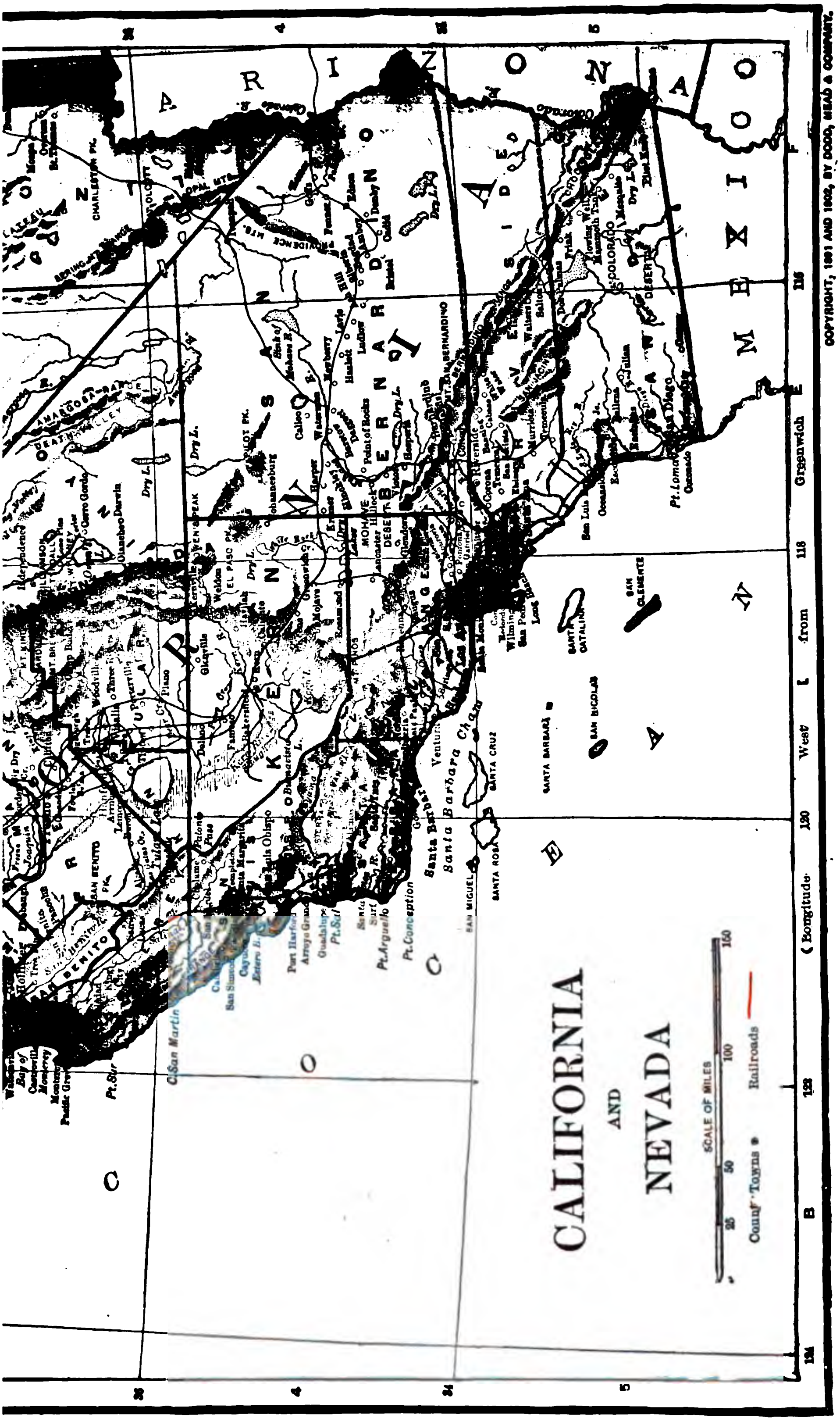
For Flora and Fauna, see paragraphs on these topics under Rocky Mountains and United States.

Geology. The mountains of Nevada are originally due to extensive foldings and faultings of

AREA AND POPULATION OF CALIFORNIA BY COUNTIES.

County.	Map Index.	County Seat.	Area in square miles.	Population.	
				1890.	1900.
Alameda	C 3	Oakland	764	93,864	130,197
Alpine	D 2	Markleeville	710	667	509
Amador	C 2	Jackson	632	10,320	11,116
Butte	C 2	Oroville	1,660	17,939	17,117
Calaveras	C 2	San Andreas	1,080	8,882	11,200
Colusa	B 2	Colusa	1,088	14,640	7,364
Contra Costa	B 3	Martinez	728	13.515	18,046
Del Norte	B 1	Crescent City	992	2,592	2,408
Eldorado	C 2	Placerville	1,796	9,232	8,986
Fresno	C 3	Fresno	6,152	32,026	37,862
Glenn	B 2	Willow	1,270	......	5.150
Humboldt	B 1	Eureka	3,496	23,469	27,104
Inyo	E 3	Independence	10,294	3,544	4,377
Kern	D 4	Bakersfield	8,050	9,808	16,480
Kings	D 3	Hanford	984	......	9,871
Lake	B 2	Lakeport	1,328	7,101	6,017
Lassen	C 1	Susanville	4,520	4,239	4.511
Los Angeles	D 4	Los Angeles	4,202	101,454	170,298
Madera	D 3	Madera	2,062	......	6,364
Marin	B 2	San Rafael	549	13,072	15,702
Mariposa	C 3	Mariposa	1,510	3,787	4,720
Mendocino	B 2	Ukiah	3,626	17,612	20,465
Merced	C 3	Merced	1,982	8,085	9,215
Modoc	C 1	Alturas	3,741	4,986	5,076
Mono	D 3	Bridgeport	3,020	2,002	2,167
Monterey	C 3	Salinas	3,340	18,637	19,380
Napa	B 2	Napa	780	16,411	16,451
Nevada	C 2	Nevada City	972	17,369	17,789
Orange	D 5	Santa Ana	750	13,589	19,696
Placer	C 2	Auburn	1,365	15,101	15,786
Plumas	C 1	Quincy	2,694	4,933	4,657
Riverside	E 5	Riverside	7,323	......	17,897
Sacramento	B 2	Sacramento	1,000	40,339	45,915
San Benito	C 3	Hollister	1,388	6,412	6,633
San Bernardino	E 4	San Bernardino	19,947	25,497	27,929
San Diego	F 5	San Diego	8,478	34,987	35,090
San Francisco	B 3	San Francisco	47	298,997	342,782
San Joaquin	C 3	Stockton	1,396	28,629	35,452
San Luis Obispo	C 4	San Luis Obispo	3,310	16,072	16,637
San Mateo	B 3	Redwood City	434	10,087	12,094
Santa Barbara	C 4	Santa Barbara	2,632	15,754	18,934
Santa Clara	C 3	San José	1,286	48,005	60,216
Santa Cruz	B 3	Santa Cruz	424	19,270	21,512
Shasta	B 1	Redding	3,876	12,133	17,318
Sierra	C 1	Downieville	960	5,051	4,017
Siskiyou	B 1	Yreka	5,991	12,163	16,962
Solano	C 2	Fairfield	900	20.946	24,143
Sonoma	B 2	Santa Rosa	1,620	32,721	38,480
Stanislaus	C 3	Modesto	1,456	10,040	9,550
Sutter	C 2	Yuba City	622	5.469	5,886
Tehama	B 1	Redbluff	3.008	9,916	10,996
Trinity	B 1	Weaverville	3,282	3,719	4,383
Tulare	D 3	Visalia	4,952	24,574	18,375
Tuolumne	C 2	Sonora	2,208	6,082	11,166
Ventura	D 4	Ventura	1,721	10,071	14,367
Yolo	C 2	Woodland	996	12,684	13,618
Yuba	C 2	Marysville	636	9.636	8,620


OREGON
IDAHO
UTAH
NEVADA
CALIFORNIA
PACIFIC OCEAN
ELKO
HUMBOLDT
WHITE PINE
EUREKA
LANDER
CHURCHILL
WASHOE
ORMSBY
DOUGLAS
ESMERALDA
NYE
LINCOLN
MODOC
SISKIYOU
SHASTA
LASSEN
PLUMAS
TEHAMA
TRINITY
HUMBOLDT
MENDOCINO
GLENN
COLUSA
BUTTE
SIERRA
NEVADA
PLACER
EL DORADO
AMADOR
CALAVERAS
SACRAMENTO
YOLO
NAPA
SONOMA
MARIN
LAKE
Carson City
Virginia City
Reno
Winnemucca
Elko
Eureka
Austin
Hamilton
Tuscarora
Pioche
Sacramento
Chico
Red Bluff
Redding
Eureka
Crescent City
Upper Klamath L.
Lower Klamath L.
Pyramid L.
Walker L.
Goose L.
Honey L.
Pt. St. George
C. Mendocino
Pt. Arena
Pt. Reyes
Golden G.
114
116
118
120
122
124
42
40
38
1
2
B
C
D
E



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AREA AND POPULATION OF NEVADA BY COUNTIES.

County.	Map Index.	County Seat.	Area in square miles.	Population.	
				1890.	1900.
Churchill	D 2	Stillwater	4,816	703	830
Douglas	D 2	Genoa	878	1,551	1,534
Elko	F 1	Elko	16,939	4,794	5,688
Esmeralda	D 2	Hawthorne	8,776	2,148	1,972
Eureka	F 7	Eureka	4,111	3,275	1,954
Humboldt	D 1	Winnemucca	16.126	3,434	4,463
Lander	E 2	Austin	5,307	2,266	1,534
Lincoln	F 3	Pioche	19,437	2,466	3,284
Lyon	D 2	Dayton	1,267	1,987	2,268
Nye	F 2	Belmont	17,376	1,290	1,140
Ormsby	D 2	Carson City	120	4,883	2,893
Storey	D 2	Virginia City	263	8,806	3,673
Washoe	D 1	Reno	5,612	6,437	9,141
White Pine	F 2	Ely	8,712	1,721	1,961

the strata during the Jurassic Age, which brought to the surface rocks ranging from the Jurassic down to the Archæan system. Some are composed of granite, syenite, porphyry, and slate, while in others limestone and calcareous spar predominate. Although some recent uplifts in the northwest are still almost unmodified, the topography of the majority of the ranges is probably due more to erosion than to the original fractures and folds. The valleys are filled with deep layers of Quaternary detritus. Volcanic rocks occur as intrusions in various places, and in the northwestern part of the State there are extensive lava fields, while other evidences of volcanic action, such as hot springs and sulphur deposits, also exist.

Besides silver and gold (see paragraph *Mining*) the minerals found within the State include antimony, lead, copper, mercury, and nickel, as well as sulphur, gypsum, and extensive deposits of salt and borax, the last found on the alkali flats and in beds of dry lakes.

MINING. Nevada owed her early development to mining. Immensely rich lodes of silver and gold were discovered, one of which—the Comstock lode (q.v.)—produced as high as $38,000,000 worth of bullion in one year. With the apparent exhaustion of the Comstock lode, the industry decreased considerably. The output of silver continued to decrease until 1899, when the product was valued at $1,090,457. Gold, however, revived during the last decade, the output for 1899 being valued at $2,219,000—more than double that of 1893. Copper, lead, and iron ore are also mined. No coal has been mined since 1894. The rich mineral resources of the State afford a valuable field for future development.

AGRICULTURE. Agriculture is less developed in Nevada than in any other State. It is the most arid of the States and at the same time contains the most meagre sources for an artificial water supply. The lack of transportation facilities and of local markets retards the development of such possibilities as exist. In 1899, 504,168 acres, or 88 per cent. of the total improved area, were irrigated. The most extensive irrigated areas are along the Humboldt River and in the west-central part of the State. There are altogether 2,565,647 acres, or 3.7 per cent. of the State's area, included in farms. The industry centres about stock-grazing, the tilling of the soil being a mere adjunct to it. The animal products, together with the hay and forage and other products fed to live stock, comprise 80.6 per cent. of the total value of farm products. During the last decade of the century there was a large increase in all varieties of domestic animals. Cattle and sheep are of the greatest importance. Stock-raising being so prominent, hay and forage are naturally the most important of the crops grown. In 1899 there were 292,134 acres devoted to them, or 71.6 per cent. of the total crop area. Alfalfa constituted about one-third of this acreage. In the same year there were 18,537 acres devoted to wheat, 7043 to barley, 4786 to oats, and 2235 to potatoes. The wheat area increased five fold during the decade.

The soil is of great fertility and produces abundantly when sufficiently watered. The following table shows the relative importance and increase of the different varieties of domestic animals for the decade 1890-1900:

	1900	1890
Dairy cows	13,606	9,273
Neat cattle	371,586	201,627
Horses	80,295	56,788
Mules and asses	3,048	1,723
Sheep	568,251	273,469
Swine	15,174	7,373

MANUFACTURING. The manufacturing establishments are chiefly of a domestic nature, producing and repairing articles for local consumption. Car repair shops and flour and grist milling employ the greatest capital. The total capital of all manufacturing industries is less than $1,500,000.

TRANSPORTATION. There has been little inducement to railroad construction in Nevada. For several years the mileage has been about 920 miles. In proportion to the area of the State the mileage is less than that of any other State. The principal line is the Southern Pacific, running from east to west through the State. There are no navigable streams.

BANKS. A national bank was organized in 1866, but soon closed. The First National Bank of Winnemucca, organized in 1886, is the only national bank in the State at present. In 1902 its capital was $82,000; surplus, $10,000; deposits aggregated $511,000 and loans $378,000. In 1902 there were two State banks. The State banking law of 1891 is very lax. The two State banks had a capital of $300,000; surplus, $100,000; cash, $127,000; deposits, $1,579,000; and loans, $1,007,000. Most of the banking is done by agencies of California banks.

FINANCES. On admission to Statehood, in 1864, Nevada had a public debt of $400,000, which in the following decade grew to $738,528. This debt was in 9 and even 10 per cent. bonds, and was caused by the extravagant salaries paid to officials. The income of the State was derived partly from a tax on property, partly from a special tax on the proceeds of the silver mines. The income from this special tax grew rapidly with the output of the mines; in 1874 it amounted to 28 per cent. of the total receipts of the State treasury, and in 1878 to 50 per cent., or about $250,000. The output of the mines rapidly declined in the eighties, and with it the income of the treasury. The total debt in 1900 was $676,709, out of which $380,000 are irredeemable, and only the payment of interest obligatory. The State held in trust for the educational funds $1,529,652, which cannot be applied to payment of debts. The receipts in 1900 were $510,608, half of which came from a general property tax, and 30 per cent. from payments on land and interest on land payment. The expenditures were $533,402, 25 per cent. of which was for school purposes, and 25 per cent. for purchase of bonds for the school fund.

POPULATION. The falling off in the mining industry of the State, and failure to develop in other directions, have resulted in a diminution of the population. It now has the fewest inhabitants of any State, and is the only one in which a decrease is taking place. The following are the figures by decades: 1860, 6857; 1870, 42,491; 1880, 62,266; 1890, 45,761; 1900, 42,335. The largest towns are: Reno, population, in 1890, 3563; in 1900, 4500; Virginia City, population, in 1890, 8511; in 1900, 2695; Carson City, the capital, population, in 1890, 3950; in 1900, 2100.

The State has one representative in the National House of Representatives.

Religion. The churches do not show a strong numerical representation in Nevada. The Catholics, with a membership of about 4000, outnumber all the other churches combined. The Protestant Episcopal, Mormon, Methodist Episcopal, and Presbyterian churches are represented.

Education. The State expends a large per capita sum for educational purposes, and maintains a school term of more than seven months in length. The total expenditure for 1900 was $224,622. The number of children of school age (five to eighteen years) was 9260; number enrolled, 6676; average daily attendance, 4698. Education is compulsory, but the law is not strictly enforced. There are about 400 pupils in the high schools of the State and over 300 in the State University—a coeducational institution located at Reno, in connection with which the Federal Government has established an agricultural experiment station. There are no normal schools. The national Government maintains a boarding school for Indian children.

Charitable and Penal. The State supports an orphan's home, at Carson; a hospital for mental diseases, at Reno; and a State prison at Carson.

Government. Nevada has had but one constitution, which was adopted by popular vote in 1864. A proposed amendment may originate in either House and must receive the approval of a majority of the members elected to each House at two consecutively elected legislatures, after which it must receive a majority vote of the people. A constitutional convention may be called if approved by two-thirds of the members elected to each House and a majority of the popular vote. Suffrage is restricted to sane male citizens, twenty-one years of age, who have resided in the State six months and the district or county thirty days; the Legislature, however, has the power to make the payment of a poll tax a conditional right for voting. Carson City is the capital.

Legislative. The aggregate number of members of both branches of the Legislature cannot exceed 75, and the Senators must not number less than one-third or more than one-half the Assemblymen. Assemblymen serve two years and Senators four years. Both are elected on the Tuesday after the first Monday in November of even years, and the sessions of the Legislature convene on the third Monday of January of odd years and cannot exceed 60 days in length.

Executive. The Governor, Lieutenant-Governor, Secretary, Treasurer, Controller, Surveyor-General, and Attorney-General are elected at the same time as are the members of the Legislature, and serve for four years.

Judicial. There are a supreme court, district courts, and justices of the peace and such city and town courts as the Legislature may establish.

Local Government. A uniform system of county and township government is established by the Legislature, which system must provide for a board of county commissioners in each county.

Militia. The militia numbers 138 men.

History. The territory from which Nevada was formed was acquired from Mexico by the Treaty of Guadalupe Hidalgo, February 2, 1848, and later formed part of Utah Territory. The first European known certainly to have entered the region was Francisco Garcés, a Franciscan friar, on his way to California from Sonora in 1775. Other friars followed him, but no settlements were made. In 1825 Peter S. Ogden, in the employ of the Hudson's Bay Company, worked inland with a small party and came upon the Humboldt River, sometimes called the Ogden River after himself, or the Mary River, after his Indian wife. Other trappers came within the next five years, though they suffered from the attacks of the Blackfeet and Shoshone Indians. In 1826 Jedediah S. Smith crossed the entire breadth of the present State from west to east. Frémont passed through in 1843-45, and possibly occasional emigrants bound for Oregon or California settled here and there. In 1849 the Mormons founded a trading post in the valley of the Carson River, near the present town of Genoa, to supply gold-seekers on their way to California. When Utah Territory was formed, September 9, 1850, the western boundary was fixed as the summit of the Sierra Nevada Mountains and so included much of the present State, but the Territorial organization did not extend at once to the extreme west, and the inhabitants organized a government of their own. In 1853, and again in 1856, the inhabitants of the Carson Valley petitioned to be annexed to California, claiming that the Government of Utah did not protect them, and had even withdrawn the county government, so tardily given. A petition for Territorial government was sent to Congress in August, 1857, and in 1858 a provisional government was formed at Carson City with Isaac Roop as Governor. In 1860 another petition was sent to Congress and the Territorial Delegate applied for admission. Meanwhile the Comstock Lode had been discovered in June, 1859, and miners flocked thither from every direction. The new Territory was separated from Utah, March 2, 1861, being bounded on the east, however, by the 116th meridian. Another degree was cut from Utah, July 14, 1862, and on May 5, 1866, the eastern boundary was extended to the 114th meridian and that part of the State lying below 37° was taken from Arizona. In September, 1863, an election was held for delegates to form a State constitution, but the instrument submitted was defeated in January, 1864. However, the political situation made two additional Republican votes in the United States Senate exceedingly desirable, and Congress in March, 1864, again passed an enabling act; in July the Constitution was accepted, and the State was admitted October 31st. Politically the State is swayed largely by local interests. It was Republican in national elections until 1892, when it was carried by the People's Party. In 1896 and 1900 it voted for the free-silver candidate, William Jennings Bryan.

The Governors of Nevada have been as follows:

TERRITORIAL		
James W. Nye		1861-64
STATE		
Henry G. Blasdell	Republican	1864-70
Louis R. Bradley	Democrat	1870-79
John H. Kinkead	Republican	1879-83
Jewett W. Adams	Democrat	1883-87
Christopher C. Stevenson	Republican	1887-90
Frank Bell	"	1890-91
Roswell K. Colcord	"	1891-95
John E. Jones	Silver	1895-96
Reinhold Sadler	"	1896-1903
John Sparks	Silver-Democrat	1903 —

Consult: Angel, *History of Nevada* (Oakland, 1881); Bancroft, *Nevada, Colorado, and Wyoming* (San Francisco, 1890); *Nevada and Her Resources* (Carson City, 1894).

NEVADA. A city and the county-seat of Story County, Iowa, 32 miles north by east of Des Moines; on the Chicago and Northwestern and other railroads (Map: Iowa, D 3). It is the centre of a farming and cattle-raising district, and has a large cold storage plant for butter and eggs, and some manufactures, the chief products being tile and flour. There is a public library of 5000 volumes. Population, in 1890, 1662; in 1900, 2472.

NEVADA. A city and the county-seat of Vernon County, Mo., 100 miles south of Kansas City; on the Missouri Pacific and the Missouri, Kansas and Texas railroads (Map: Missouri, B 4). It has a Roman Catholic convent school, and is the seat of a State lunatic asylum and of Cottey College for Young Ladies (Methodist Episcopal, South), opened in 1884. A prominent feature of the city is Lake Park, named from a beautiful lake within the municipal limits. Nevada controls considerable trade in the products of the agricultural and stock-raising district of which it is the centre, and has large zinc smelters, a foundry and iron works, and saw, planing, flour, and feed mills. Nevada became the county-seat in 1858, and was incorporated in 1870. It is governed, under a charter of 1880, by a mayor, elected every two years, and a unicameral council. Population, in 1890, 7262; in 1900, 7461.

NEVADA, Emma (Emma Wixom) (1861—). An American dramatic soprano, born in Austin, Nev. She studied under Marchesi in Vienna and afterwards in Italy. She first appeared in opera in London (1880) with Marie Van Zandt and subsequently sustained leading parts in Triest, Pesth, Prague, Milan, Rome, Naples, and Paris, making her first professional tour of the United States in 1884-85. She had a wide repertoire, but perhaps her most successful rôle was Mignon, which part she sang for an entire year in Paris.

NEVADA CITY. A town and the county-sea of Nevada County, Cal., 166 miles northeast of San Francisco; the terminus of the Nevada County Narrow Gauge Railroad (Map: California, C 2). It is a popular health and summer resort, being esteemed for its equable climate and for its fine site, at an elevation of 2500 feet in a mountainous region. There are valuable gold mines near by, which supply the city's quartz mills. The leading occupations are mining, the cultivation of fruit and vines, and wine-making. Under a charter of 1885, the government is vested in a president and board of trustees elected on a general ticket. The town owns and operates the water-works. Nevada City was first settled in 1849, and in 1850-51 was the most important mining town in the State. It was incorporated in 1875. Disastrous fires occurred in 1851, 1856, 1858, and 1863. Population, in 1890, 2524; in 1900, 3250.

NEVADA STATE UNIVERSITY. The head of the educational system of the State of Nevada and the only institution of collegiate grade within the State. It was founded at Elko in 1873 and was removed to Reno in 1885 and formally reopened in 1886. The university comprises the college of agriculture, including departments of dairying and domestic arts and sciences, the college of arts and science, the college of applied science, with departments of mining and metallurgy and mechanical and civil engineering, a normal department, and the University High School. Military instruction forms part of the curriculum and a uniform is worn by the students. The degrees conferred are those of B.A., B.S., M.A., M.S., and mining, mechanical, and civil engineer. In 1902 the faculty numbered 18 and the attendance was 310, including 90 preparatory students. The library contained 4000 volumes. The university campus covers about 40 acres and with its buildings was valued at $200,000. The value of the college property was $225,000, and the income $62,000.

NÉVÉ, nâ'vâ'. See Glacier.

NEVERS, ne-vâr'. The capital of the Department of Nièvre, France, and formerly of the Province of Nivernais, situated on a hill in the midst of fertile plains at the confluence of the Loire and the Nièvre, 140 miles southeast of Paris (Map: France, K 5). It is an important railway junction. The old portion of the town is ill-built, with narrow, crooked streets, but the modern portion has wide streets and a fine park. A gateway containing a Gallo-Roman museum, and two towers, are preserved remains of the mediæval fortifications. The feudal ducal castle is utilized for the Palace of Justice and also contains a museum. The chief ecclesiastical buildings are the Romanesque eleventh century Church of Saint Etienne, and the recently restored Cathedral of Saint Cyr, built in the thirteenth century on the site of a prior church, the west portion of which is incorporated in the present building; the cathedral is noted for its double apse and fine sculptures and paintings. The town possesses a public library, and numerous educational, scientific, and benevolent institutions. It has manufactures of iron and copper ware, chemicals, porcelain and cloth, an engine-fitting factory, formerly a famous naval cannon foundry, and oil mills. Nevers is the ancient Noviodunum, an important town of the Ædui. It has been an episcopal see since the sixth century, when it was called Nivernum. The town became the seat of the counts of Nevers in the tenth century and was created a dukedom by Francis I. in 1538. The dukedom of Nevers passed by marriage to a member of the family of Gonzaga, the ducal house of Mantua. On the extinction of the Gonzaga line in Mantua in 1627, Charles, Duke of Nevers, claimed the duchy. He was supported by France, and opposed by Spain and Austria. The War of the Mantuan Succession which ensued ended in the recognition of the claim of Charles of Nevers in 1630. The population of Nevers in 1900 was 27,673.

NEVERSINK HIGHLANDS, A range of hills in New Jersey. See Navesink Highlands.

NEVIANSKII-ZAVOD, nĕv-yän'skė zȧ-vôd'. A mining settlement in the Government of Perm, Russia, situated on the Neiva, in the Ural Mountains, 62 miles north of Ekaterinburg (Map: Russia, K 3). It is the centre of an important mining district and contains extensive iron works, steel mills, and gold washeries. The settlement was founded in 1699. Population, in 1897, 16,066.

NEV'ILLE, Richard, Earl of Warwick. An English political leader known as the 'king-maker.' See Warwick, Richard Neville, Earl of.

NEVILLE'S CROSS, Battle of. A battle between the Scotch and the English, fought on October 17, 1346. During the Hundred Years' War (q.v.) the Scotch were the firm allies of the French, and when Edward III. invaded France, King David II. of Scotland prepared to harass England. He was met, however, at Neville's Cross, near Durham, by the English under Henry Percy and Ralph Neville. The English, owing to their archers, were completely victorious, and David himself was captured. See Bruce, David.

NEV'IN, Ethelbert (1862-1901). An American composer, born at Edgeworth, Pa. After thorough preparation under local music teachers, he went to Berlin (1884) and became a pupil of Von Bülow and Karl Klindworth, the former of whom particularly encouraged his natural gift for composition. He returned to Boston in 1887 and settled there, devoting himself largely to composition, but after 1893 he spent much of his time in Europe, mostly in Paris, the south of France, Italy, and Algiers. He returned to America in 1900, and became associated with H. N. Parker in the department of music at Yale University. Of his compositions, which are almost entirely in the smaller forms, *Narcissus*, a piano number, published in a group entitled *Water Sketches*, and the song *The Rosary*, were perhaps the most popular. He was the composer of many songs, instrumental pieces and waltzes, almost all of which are marked by the delicate daintiness and originality which was characteristic of his work. He died at New Haven, Conn.

NEVIN, John Williamson (1803-86). An American clergyman. He was born in Franklin County, Pa., graduated from Union College in 1821, studied theology at Princeton, and taught Hebrew there from 1826 to 1828. From 1829 to 1840 he was professor of Hebrew and biblical literature in the Western Theological Seminary at Allegheny, Pa. From here he went to the theological seminary of the Reformed (German) Church at Mercersburg, where he taught theology until 1851. He was president of Marshall College, Mercersburg, from 1841 to 1853. After this institution had united with Franklin College at Lancaster under the name of Franklin and Marshall, he served as president from 1866 to 1876. He was one of the founders of the 'Mercersburg theology' (q.v.). He was the editor of and principal contributor to *The Mercersburg Review* from 1849 to 1853. He published: *Biblical Antiquities* (2 vols., 1828; revised ed. 1849); *The Anxious Bench* (1842); *The Mystical Presence* (1846); *History and Genius of the Heidelberg Catechism* (1847); *Anti-Christ; or, the Spirit of Sect and Schism* (1848). Consult his biography by Appel (Philadelphia, 1889).

NEVIS, nĕv'ĭs. One of the Leeward Islands in the West Indies, belonging to Great Britain. It lies two miles southeast of Saint Christopher, with which it is administratively connected (Map: West Indies, Q 6). Area, 50 square miles. It consists largely of an extinct volcano, 3596 feet high and wooded at the summit. The lower slopes are fertile and well cultivated, producing sugar-cane and some limes and oranges. The population in 1891 was 13,087, and in 1901, 12,774. The chief town is Charlestown, with a good roadstead and a population (1901) of 1383. The island was discovered by Columbus in 1498. It was colonized by the English in 1628. In 1899 it suffered from a disastrous hurricane.

NEVIS, Ben. See Ben Nevis.

NEVOME, ne-vō'mȧ. A Mexican Indian tribe of Piman stock, numbering about 8000.

NEVSKI (nyĕf'skė) **PROSPEKT'.** The chief street of Saint Petersburg, extending for about three miles in a straight line, and faced by some of the finest shops and public buildings of the city. It is 150 feet in width, and in winter presents a scene of great animation.

NEW, John Chalfant (1831—). An American politician, born at Vernon, Ind. He graduated at Bethany College, (West) Virginia, in 1851, and settled in Indianapolis, where he was admitted to the bar in 1852. In 1861 he was appointed quartermaster-general of Indiana, a post which he held throughout the Civil War. In 1862 he was a member of the Indiana State Senate. After the war he engaged for several years in banking, and in 1875 was appointed by President Grant, Treasurer of the United States. In 1882 President Arthur appointed him Assistant Secretary of the Treasury. He was active in securing the nomination and election of Benjamin Harrison in 1888 to the Presidency, and as a reward for his services was appointed United States Consul-General at London, England, which position he held until 1892.

NEW ACADEMY. A school of Greek philosophers, the successors and expositors of Plato. The various schools classed under the name of the Academy are differently divided by modern historians. The third school, headed by Carneades (q.v.), is sometimes referred to as the New Academy, though it is perhaps more often classed, with the second, under the name of Middle, the New beginning a little later with Philo of Larissa, who founded the fourth school.

NEW ALBANY. A city and the county-seat of Floyd County, Ind.; on the north bank of the Ohio River, two miles below the falls, and opposite Louisville, Ky., with which it is connected by a long railroad bridge, and on the Louisville, Evansville and Saint Louis, the Louisville, New Albany and Chicago, the Baltimore and Ohio Southwestern, and the Pittsburg, Cincinnati, Chicago and Saint Louis railroads (Map: Indiana, D 4). It has a fine city hall and court house, post office and custom house, large fair grounds, De Pauw College for women, and a public library. In the suburbs there is a national cemetery which contains 2908 graves, 676 of unknown dead. The city controls large commercial interests, and is an important manufacturing centre, having tanneries, woolen mills, furniture factories, engine and boiler works, rolling, planing, and flour mills, iron foundries, plate glass works, and pork-packing establishments. New Albany was laid out in 1813 and incorporated as a city in 1839, the charter of that year being still in operation and providing for a mayor, chosen every four years, and a unicameral council, which elects subordinate municipal officers. Population, in 1890, 21,059; in 1900, 20,628.

NEW AMSTERDAM. The name of New York City (q.v.) under the Dutch.

NEW ARCHAN'GEL. The former name of Sitka (q.v.).

NEWARK, nū′ẽrk, or **NEWARK-UPON-TRENT.** A municipal borough and market-town of Nottinghamshire, England, on a navigable branch of the Trent, 16 miles southwest of Lincoln (Map: England, F 3). Newark is one of the most important malting towns in England, and has flour mills, breweries, manufactories of agricultural implements and boilers, gypsum and limestone quarries, and a trade in corn, malt, and flour. The corn market is one of the largest in the kingdom. The parish church, a large and elegant edifice, though often rebuilt, still shows traces of its original Norman character. The grammar and song school was founded in 1529. Newark was incorporated in the reign of Edward VI. and received further charters from Charles I. and Charles II. The town owns the water-works and markets, and maintains a free library and public baths. It dates from the Roman occupation. The castle, now in ruins, was built early in the twelfth century. King John died in it in 1216. From its position and great strength it was called 'the Key of the North,' and during the Civil War sustained three sieges for Charles I., finally surrendering at his request to the Scots in 1646. Population, in 1891, 14,450; in 1901, 15,000. Consult Cornelius Brown, *Annals of Newark-upon-Trent* (London, 1879).

NEWARK, nū′ärk. A town in Newcastle County, Del., 12 miles west by south of Wilmington; on the Baltimore and Ohio and the Philadelphia, Baltimore and Washington railroads (Map: Delaware, O 2). It is the seat of Delaware (State) College (q.v.), and of Newark Academy. There are extensive paper manufactures, also wall-paper mills, fibre works, machine shops, etc. The water-works and electric light plant are owned and operated by the municipality. Population, in 1890, 1191; in 1900, 1213.

NEWARK, nū′ẽrk. The largest city of New Jersey, a port of entry, and the county-seat of Essex County, eight miles west of New York; on the west bank of the Passaic River, which empties into Newark Bay three miles below the city proper, and on the Pennsylvania, the Lehigh Valley, the Lackawanna, the Erie, and the Central of New Jersey railroads (Map: New Jersey, D 2).

The city occupies an area of about 18½ square miles on a generally level plain. Toward the west, however, the ground rises, affording the beautiful sites of a popular residential district. Though Newark contains the homes of many business men of New York, it has distinct individuality as a manufacturing city, and many members of its industrial and commercial community find homes in the beautiful surrounding suburbs of the Oranges, Montclair, Caldwell, Irvington, and other places with which the city is connected by a network of electric railways. The streets are regularly laid out, and the main avenues are broad and well paved with granite or asphalt, 137 miles of the total street mileage (231) being paved. Broad Street, the principal thoroughfare and business street, having a width which justifies its name, presents a handsome appearance, enhanced by the stately elm-trees in the parks that border it for a considerable distance. There are many public parks—Branch Brook, Military (formerly the old training ground), Washington, Lincoln, East Side, and West Side; and statues of General Philip Kearny, Frederick T. Frelinghuysen, and Seth Boyden, the inventor, a bronze bust of Abraham Coles, and a bronze Indian group. The finest edifices include the Federal building, accommodating the custom house and post office; the Public Library, which cost $350,000; the Prudential Life Insurance building, the high school, and the Peddie Memorial Church. The City Hospital, the German, Saint Michael's, Saint Barnabas, and Saint James hospitals, and the Essex County Hospital for the Insane are among the more prominent charitable institutions. There are in the city nine public hospitals, fourteen public homes, and four orphan asylums. Newark has the Newark Academy, a well-known classical school of long standing, Saint Benedict's College, and the Newark Technical School, a city institution. The Public Library contains 80,000 volumes. Other libraries are the Board of Trade, Young Men's Catholic Association, County Law, High School, and State Historical Society. The last-named institution has also an interesting collection of relics.

Newark is essentially an industrial centre, having long been noted for the extent and variety of its products, which, according to the census of 1900, were valued at $126,954,000. The more important manufactures include leather, machinery, foundry and machine-shop products, jewelry, saddlery, hardware, celluloid, spool cotton, boots and shoes, carriages, hats and caps, clothing, trunks, paper, varnish, chemicals, rubber, beer, and ale. The water frontage of the city extends along the Passaic River and Newark Bay for a distance of 10½ miles, and there is a large trade by river, as well as by rail.

The government is vested in a mayor, elected every two years, a unicameral council, and subordinate administrative officials appointed or elected as follows: By the mayor—city counsel, attorney and assistant, excise and assessment commissioners, trustees of the public library, and police justices; by the mayor with the consent of the council—police, fire, and health commissioners, city comptroller, auditor, and tax commisioners; by the council—treasurer, tax receiver, city clerk, and building inspector, and assistants; by popular vote—board of education, and board of street and water commissioners. The annual expenditures for maintenance and operation are about $4,875,000, the principal items being $900,000 for schools, $425,000 for the police department (including amounts for police courts, jails, reformatories, etc.), $410,000 for interest on debt, $340,000 for the water-works, $300,000 for the fire department, $215,000 for municipal lighting, $205,000 for charitable institutions, and $125,000 for street expenditures. The water-works, built at a cost of $6,000,000, are owned and operated by the municipality, the entire system now comprising about 300 miles of mains. There are nearly 180 miles of sewers. Newark has (1902) a bonded debt of $17,585,000, and an assessed property valuation (real and personal) of about $160,000,000.

Population, in 1810, 8008; 1830, 10,953; 1850, 38,894; 1860, 71,941; 1870, 105,059; 1880, 136,508; 1890, 181,830; 1900, 246,070, including 71,400 persons of foreign birth and 6700 of negro descent.

Newark was settled in 1666 by a party of thirty from Milford, Conn., led by Robert Treat. In 1667 a company from Guilford and Branford, dissatisfied with the union of New Haven and

Connecticut, came here under the leadership of Abraham Pierson. The settlement was strictly religious, the rights of full citizenship being restricted to members of the Congregational Church. At first called Milford, it was renamed in 1667 after Pierson's English home, Newark-upon-Trent. It originally included a large part of the present Essex County, in which the towns of Belleville, Bloomfield, Clinton, Montclair, and the Oranges later grew up. In 1745-46 the English grantees of East Jersey attempted to invalidate the Indian titles of the settlers, claiming that they alone could grant land. Riots ensued which were repressed with difficulty. Newark was chartered as a town in 1712; in 1777 it was occupied first by Washington, and then, along with all that section of New Jersey, by the British, who plundered the inhabitants and destroyed much property. The College of New Jersey, later Princeton University (q.v.), was located here from 1748 to 1756. In 1798 Newark received a second town charter, and in 1836 was incorporated as a city. In 1836 occurred the most destructive fire in the city's history, and in 1837 the wide-spread business panic caused much distress. Consult: Atkinson, *The History of Newark, N. J.* (Newark, 1878); and *Records of the Town of Newark, 1666-1836* (Newark, 1864).

NEWARK. A village in Wayne County, N. Y., 32 miles east by south of Rochester; on the Erie Canal, and on the New York Central, the West Shore, and the Northern Central railroads (Map: New York, C 2). It has a public library of 3000 volumes and is the seat of the State Custodial Asylum for Feeble-Minded Women. The surrounding country is a productive agricultural section; and the chief industries of the village include the distillation of peppermint oil, fruit-preserving, the growing of roses and nursery stock, and the manufacture of cut glass, tinware, boxes, flour, foundry products, etc. Population, in 1890, 3698; in 1900, 4578.

NEWARK. A city and the county-seat of Licking County, Ohio, 33 miles east of the State capital, Columbus; at the junction of the forks of the Licking River, and on the Pennsylvania and the Baltimore and Ohio railroads (Map: Ohio, F 5). It has also good interurban electric railway service. Situated in a plain surrounded by hills, Newark is attractively laid out, twelve miles of its streets being paved with vitrified brick. The Auditorium, a memorial to the soldiers and sailors who died in the Civil War, is one of the finest theatres in the State. Two of the most extensive earthworks of the mound-builders are here, comprising a circular embankment, one mile in circumference, and a larger series of fortifications, called the Octagon Fort. Tributary to the city are fertile agricultural sections, and areas of natural gas, coal, and sandstone. The manufacturing interests are very important, the establishments including electric car works, table glassware and bottle works, locomotive shops of the Baltimore and Ohio, stove foundries, bent-wood works, rope-halter factory, hardwood sawmill, cigar factory, engine and machine works, and iron foundry, agricultural implement works, flouring mills, carriage factory, chemical laboratory, etc. Newark was settled in 1801, and was laid out as a town in the following year. Population, in 1890, 14,270; in 1900, 18,157.

NEWARK SERIES. The name given to the Triassic system in the eastern part of North America. Along the Atlantic coast from Nova Scotia to South Carolina there are many isolated areas of thick bedded red sandstones, conglomerates, and breccias, which throughout their extent exhibit marked uniformity of characteristics. The sedimentary rocks are accompanied by dikes and sheets of basalt indicating intense volcanic activity at the time of their formation. Fossils are rare and mostly of fresh-water or land types, the commonest being land plants and foot-prints of animals. The micaceous and feldspathic nature of the sandstone shows that it was derived from the waste of crystalline rocks. In North Carolina and Virginia the series contains workable coal seams; it also yields a good quality of building stone—the brown sandstone of Connecticut and New Jersey. See Triassic System.

NEW ATLAN′TIS, The. The name given by Lord Bacon, in his allegory bearing the same title, to an island supposed to lie in the Southern Atlantic, on which the author is shipwrecked. There he finds an organized association for natural science and the arts. See Atlantis.

NEWAYGO, nê-wā′gô. A village and the county-seat of Newaygo County, Mich., 37 miles north of Grand Rapids; on the Muskegon River, and on the Pere Marquette Railroad (Map: Michigan, H 5). It is situated in a region that has attained considerable popularity as a place of resort, being noted particularly for its hunting and fishing. The village, especially known for its cement works, is engaged in manufacturing also furniture, flour, and lumber products. Population, in 1890, 1330; in 1900, 1172.

NEW BED′FORD. A port of entry and one of the county seats of Bristol County, Mass., 56 miles south of Boston; the terminus of a division of the New York, New Haven and Hartford Railroad (Map: Massachusetts, F 4). It is situated near the mouth of the Acushnet River, which expands into a fine, spacious harbor leading into Buzzard's Bay. Fort Rodman, on Clark Point, with a garrison of 120 men, defends the harbor's entrance. A drive, over four miles in length, extends around the point and to the city, commanding splendid marine views. New Bedford, in area about 19⅓ square miles, is regularly laid out, and its streets are paved chiefly with gravel and macadam. Among the prominent structures are the city hall, the county court house, the post office, the Public Library, Masonic and Odd Fellows' buildings, Saint Luke's and Saint Joseph's hospitals, Saint Mary's Home, the Textile School, and the Merchants' National Bank. A State armory is (1903) in course of construction. The Public Library (73,000 volumes) is one of the oldest free public libraries in the United States, having been opened in 1853. The library was founded, however, some fifty years before it became a municipal institution. The corner-stone of the present building was laid in 1856. The public parks, aggregating 255 acres, are: the Common, Brooklawn, Buttonwood, Hazelwood, and Grove. The New Bedford and Fairhaven bridge, which spans the harbor, cost $1,500,000, and is one of the features of the city.

New Bedford, once noted for its extensive whaling interests, is now distinctively a manufacturing centre, known particularly for the production of fine cotton goods and cotton yarns. According to the census of 1900, capital to the amount of $29,073,000 was invested in the various industries, which had an annual output valued at $25,682,000, $16,749,000 representing the value of cotton goods alone. The cotton mills in 1900 contained 1,369,380 spindles; the cotton cloth mills had 23,351 looms. There are also foundries and machine shops, oil manufactories, cordage works, carriage and wagon shops, paint works, lumber mills, etc. The trade of the city is considerable, the leading commodities being coal, of which 560,000 tons are received annually, cotton, lumber, fish, and general merchandise.

Under the revised charter of 1896, the government is vested in a mayor, chosen annually; a bicameral council, the aldermen being elected on a general ticket; and administrative officers chosen as follows: Board of health, license commission, and park commission, appointed by the mayor and confirmed by the board of aldermen; water board, fire department, and overseers of the poor, elected by the city council; school committee, chosen by popular vote. The waterworks are owned and operated by the municipality. The system, which cost about $3,100,000, comprises two sources of supply, the first works having been built in 1865-69 and the new works in 1895-99. The original supply is held wholly for emergency purposes. There are now ninety-nine miles of mains. New Bedford spends annually in maintenance and operation over $1,000,000, the principal expenditures being: for schools, $235,000; for interest on debt, $155,000; for the police department, $115,000; for the fire department, $80,000; for streets, $70,000; for hospitals, asylums, and other charitable institutions, $70,000; for lighting, $50,000. The assessed valuation of property (real and personal) was (1902) $65,000,000; the bonded debt, $3,903,000. Population, 1790, 3313; 1850, 16,443; 1880, 26,845; 1890, 40,733; 1900, 62,442, including 25,529 persons of foreign birth and 1685 of negro descent.

New Bedford formed part of Dartmouth until 1787 and was not incorporated as a city until 1847. For many years, and especially between 1818 and 1857, it was a centre of the American whale-fishing industry. During the Revolution New Bedford sent out many privateers, and, from its convenient location, became the storehouse of captured prizes. On September 5, 1778, an English fleet of thirty-two vessels and an army under General Gray attacked the town, captured it, and reduced the greater part of it to ashes, the damage amounting to about $450,000. Consult: Ricketson, *History of New Bedford* (New Bedford, 1858); *Centennial in New Bedford* (New Bedford, 1876).

NEWBERN. A city, port of entry of the Pamlico district, and the county-seat of Craven County, N. C., 107 miles southeast of Raleigh; on the Neuse River at its confluence with the Trent, and on the Atlantic and North Carolina and the Atlantic Coast Line railroads (Map: North Carolina, E 2). It is connected by steamships with New York, Baltimore, and Norfolk, passing through inland water routes, and exports fish, cotton, lumber, and vegetables. It has hosiery and knitting mills, cottonseed oil and lumber mills, machine shops, canning, barrel, carriage, fertilizer, and cigar factories, and extensive fish and oyster and truck-gardening interests. The most prominent architectural features of the city are the Government building, the county court house, and two bridges over the Neuse and Trent rivers, both affording fine views of river scenery. The government, under a charter of 1899, is administered by a mayor, elected every two years, and a unicameral council. The water-works and electric light plant are owned and operated by the municipality. Newbern was settled by Swiss in 1710, was for a time the capital of the Province of North Carolina, and for many years was its most important seaport. It was strongly fortified during the Civil War, but was captured by General Burnside, March 14, 1862, after a severe engagement three miles from the city, the Union loss being about 100 killed and 500 wounded. Population, in 1890, 7843; in 1900, 9090.

NEW'BERRY. A town and the county-seat of Newberry County, S. C., 43 miles west-northwest of Columbia; on the Southern and the Atlantic Coast Line railroads (Map: South Carolina, C 2). It has a fine city hall and court house, and Newberry College (Lutheran), which was opened in 1858. The centre of a productive cotton-growing section, Newberry carries on a considerable trade, and manufactures cotton goods, cottonseed oil, fertilizers, coffins, etc. The government is administered, under a charter of 1894, by an annually elected mayor and a unicameral council. The water-works and electric light plant are owned and operated by the municipality. Population, in 1890, 3020; in 1900, 4607.

NEWBERRY, JOHN STRONG (1822-92). An American geologist, born in Windsor, Conn. He spent most of his early life in the Western Reserve of Ohio, and received his college education at the Western Reserve University, at Hudson, Ohio, from which he graduated in 1846, and then entered the Cleveland Medical School, where he received the degree of M.D. in 1848. Going to Europe, he spent two years in Paris in post-graduate work in medicine and paleontology. On his return to the United States, in 1851, he took up the practice of medicine in Cleveland, but in 1855 he joined an exploring expedition under Lieutenant Williamson, sent out by the War Department to examine the country between San Francisco and the Columbia River. His geological investigations were published as a separate volume of the *Reports of Explorations and Surveys to Ascertain the Most Practical and Economic Route for a Railroad from the Mississippi River to the Pacific Coast, Made in 1855-56* (Washington, 1857). In 1857-58 he acted as geologist to an expedition headed by Lieutenant Ives, sent out to explore the Colorado River. Newberry's paper relating to the geology, physiography, and Indian tribes, undoubtedly forms the most valuable and interesting part of the *Report on the Colorado River of the West, Explored in 1857-58* (Washington, 1861). The next year Newberry again went into the field, this time as naturalist of an expedition under Captain Macombe, which explored southwestern Colorado and adjacent parts of Utah, Arizona, and New Mexico. The results of this appeared in 1876 under the title of *Reports of the Exploring Expedition from Santa Fé to the Junction of the Grande and Green Rivers* (Washington, 1876.)

MANUFACTURING AND COMMERCE. Dominion, provincial, and municipal aid has greatly facilitated the construction of railways; the mileage for all lines aggregated 1438 miles in 1900. The Canadian Pacific connects the province with the railroad systems west by running west from Saint John and crossing the State of Maine. The Intercolonial enters the province from Quebec on the north and traverses the east side of the province, one branch connecting with Saint John. The position of New Brunswick on the Atlantic coast, and the large number of excellent harbors, greatly favor its commercial advantage. The foreign trade of the province passes through the port of Saint John. Regular ship lines connect this port with Atlantic coast points to the south, and with European countries. In 1900 the merchant marine consisted of 122 steamers and 805 sailing vessels, the total net tonnage being 78,700. Lumber is the chief article of export. The manufacture of lumber and of lumber products lead the manufacturing industries. Shipbuilding, which was formerly important, has been all but discontinued. The manufacture of wood-pulp, on the other hand, is assuming large proportions, and the future of the industry is assured, because the supply of spruce—the wood used for this purpose—is practically inexhaustible. In 1900 the creameries in the province numbered 33 and the cheese factories 54.

In 1900 there were 43 savings banks, with 7062 depositors and an average deposit of $353.46. In the same year there were five Government savings banks, having 15,887 depositors, with an average deposit of $396.20.

GOVERNMENT AND FINANCE. The administration of the Government is in the hands of a Lieutenant-Governor and his council of six paid members and from one to four honorary members. The legislative body is called the House of Assembly, its forty-six members being elected for a term of four years. The legislative council was abolished in 1892. In striking contrast to some other Canadian provinces, there are no local municipal councils, the municipal affairs being managed by a county council. In this council each parish has two representatives, who serve without emolument (except in the County of Carleton), the term of office being one year. The various parish officers receive their appointments from the county council. The net debt of the province in 1900 was $2,751,000, or $8.56 per head of the population. The expenditures for the same year amounted to $794,000, and the receipts to $758,000. Over half the receipts came from the Dominion subsidy, the timber licenses being next in importance. Taxes are levied by the province upon telegraph, telephone, and insurance companies and banks. There is also a succession duty upon estates. Local expenditures are met by taxes collected upon real and personal property, income, and polls. Property is rated at its full value. The capital of New Brunswick is Fredericton.

POPULATION. There is a high birth-rate in the province, but also a rather large emigration. The censuses for 1891 and for 1901 gave, respectively, 321,263 and 331,120. There is a small French element. The great bulk of the population is of British origin, the Irish especially being well represented. Saint John has a population of 40,700 (1901), and Moncton 9000.

RELIGION. The Catholics number a little over one-third of the total religious membership of New Brunswick. Among the Protestants the Baptists are strongest, followed by the Anglicans, Presbyterians, and Methodists, in the order named.

EDUCATION AND CHARITIES. Educational affairs are in the hands of a superintendent of education and an educational council. Unlike Quebec and Ontario, the province does not provide for separate denominational schools. There is uniformity of methods, text-books, etc., throughout the province. One in every 5.22 of the population is enrolled in the public schools, the proportion between the grammar and the elementary enrollment being one to sixty. The province also maintains normal schools and provides for higher education at the University of Fredericton. The different religious sects maintain seminaries and universities, of which Mount Allison University (Methodist) is the largest. The expenditure per capita of the total population shows a steady increase from $1.26 in 1888 to $1.88 in 1900. Of this amount, 67.94 per cent. is raised by local assessment.

Of the charitable institutions, the asylums for the insane constitute the greatest item of expenditure. The province supports also, in whole or part, a general hospital (at Saint John), a boys' industrial home, and deaf and dumb institutions. Private and sectarian interests are well represented in charitable work. Convicts sentenced to penal life are sent to the Dominion penitentiary at Dorchester.

HISTORY. The first European settlement was made on the Bay of Chaleurs by Frenchmen in 1639, and in 1672 further settlements were made on the Miramichi River and along the coast. With Nova Scotia, New Brunswick formed the original French colony of Acadia or New France, which was taken by the English in 1654, restored to France in 1667, but re-ceded to the English in 1713 by the Treaty of Utrecht, although disputes as to the boundaries lasted until the Treaty of Paris in 1763 finally settled the question in favor of the British. The first British settlements were made by Scotch agriculturists and laborers along the Miramichi in 1764. In 1783 over 5000 United Empire Loyalists from the United States settled in the colony. In 1784 Nova Scotia and New Brunswick separated to form distinct colonies, and in January, 1786, the first legislative assembly of New Brunswick met at Saint John. In 1867 New Brunswick united with Ontario, Quebec, and Nova Scotia and thus became one of the original provinces of the Dominion of Canada.

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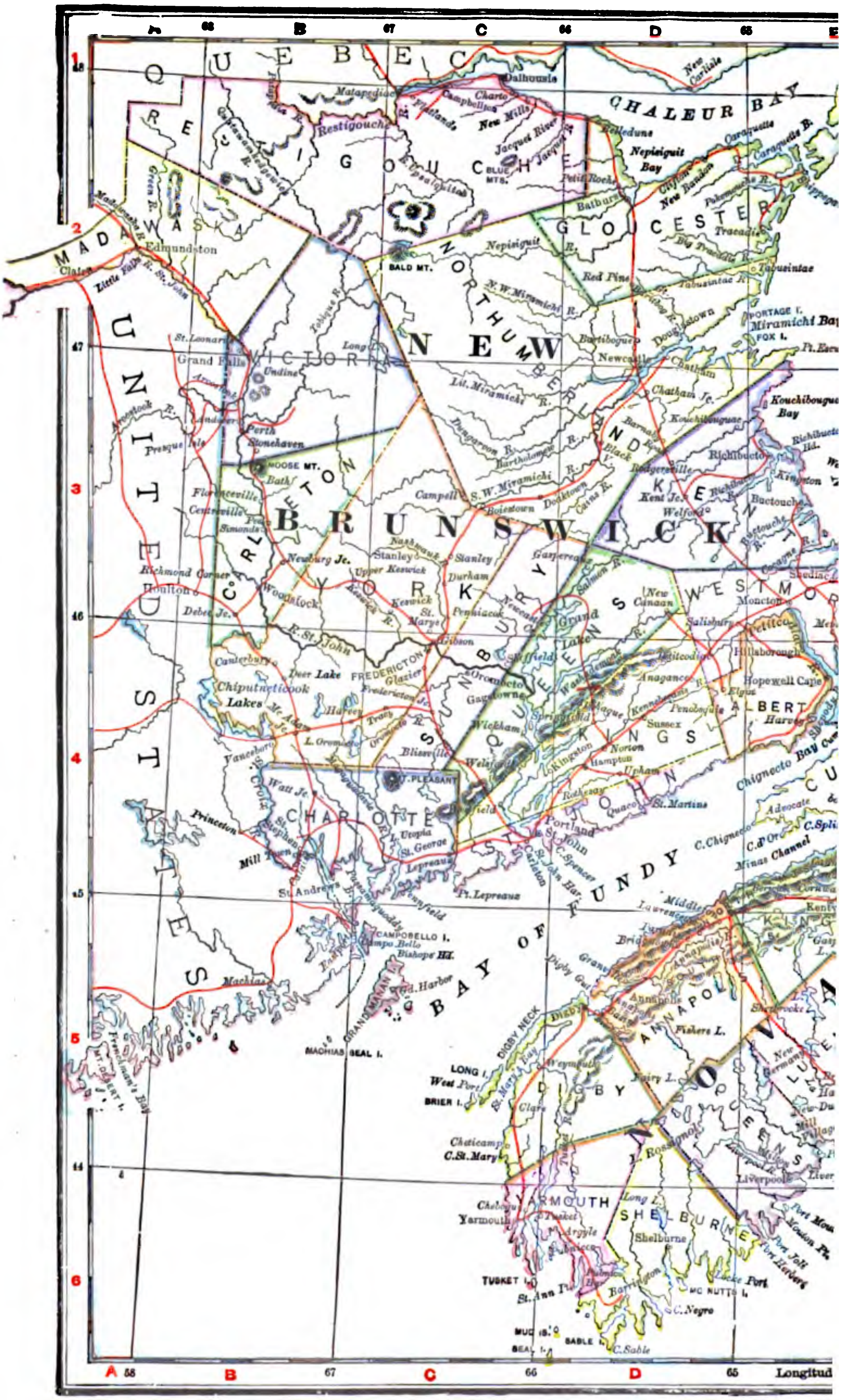
NEW BRUNSWICK. A city and the county-seat of Middlesex County, N. J., 23 miles southwest of Newark; at the head of navigation on the Raritan River, about 15 miles from its mouth, and on the Pennsylvania and the Raritan River railroads (Map: New Jersey, D 3). It is the terminus of the Delaware and Raritan Canal. A magnificent new railway bridge over the river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Little Falls
R. St. John
St. Leonard
Grand Falls
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Boiestown
Doaktown
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Kingston
Kent Jc.
Welford
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Shediac
UNITED STATES
Richmond Corner
Houlton
Debec Jc.
Woodstock
Newburg Jc.
Stanley
Nashwaak
Upper Keswick
Keswick
Durham
YORK
St. Marys
Penniac
Gibson
SUNBURY
Gaspereau
Salmon R.
Grand Lake
QUEENS
New Canaan
WESTMORLAND
Moncton
Salisbury
Petitcodiac
Hillsborough
Hopewell Cape
Elgin
ALBERT
Harvey
Canterbury
Deer Lake
FREDERICTON
Fredericton Jc.
Chiputneticook Lakes
Mc Adam Jc.
Harvey
Tracy
Oromocto
Gagetown
Sheffield
Washademoak
Anagance
Kennebecasis
Sussex
Penobsquis
KINGS
Norton
Hampton
Kingston
Springfield
Wickham
Welsford
Blissville
L. Oromocto
Vanceboro
St. Croix
Watt Jc.
MT. PLEASANT
CHARLOTTE
Utopia
St. George
Lepreaux
Princeton
St. Stephen
Mill Town
St. Andrews
Passamaquoddy B.
Pennfield
Pt. Lepreaux
Upham
Rothesay
ST. JOHN
Quaco
St. Martins
Portland
St. John
Carleton
C. Spencer
St. John Har.
Chignecto Bay
Cumberland
Advocate
C. Chignecto
C. d'Or
C. Split
Minas Channel
BAY OF FUNDY
CAMPOBELLO I.
Campo Bello
Bishops Hd.
Eastport
GRAND MANAN I.
Grd. Harbor
MACHIAS SEAL I.
Machias
Frenchman's Bay
Mt. Desert I.
Middleton
Lawrencetown
Bridgetown
Annapolis R.
Granville
Digby Gut
Annapolis
Digby
DIGBY NECK
ANNAPOLIS
Fishers L.
KINGS
Kentville
LONG I.
West Port
BRIER I.
St. Marys Bay
Weymouth
DIGBY
Fairy L.
Clare
Cheticamp
C. St. Mary
L. Rossignol
QUEENS
LUNENBURG
Sherbrooke
New Germany
New Dublin
Mill Village
Liverpool
Liverpool L.
YARMOUTH
Chebogue
Yarmouth
Tusket
Argyle
SHELBURNE
Long L.
Shelburne
Port Mouton
Mouton Pt.
Port Joli
Port Herbert
TUSKET I.
St. Ann Pt.
Barrington
Locke Port
MC NUTTS I.
C. Negro
MUD IS.
SEAL I.
SABLE I.
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A 68
B
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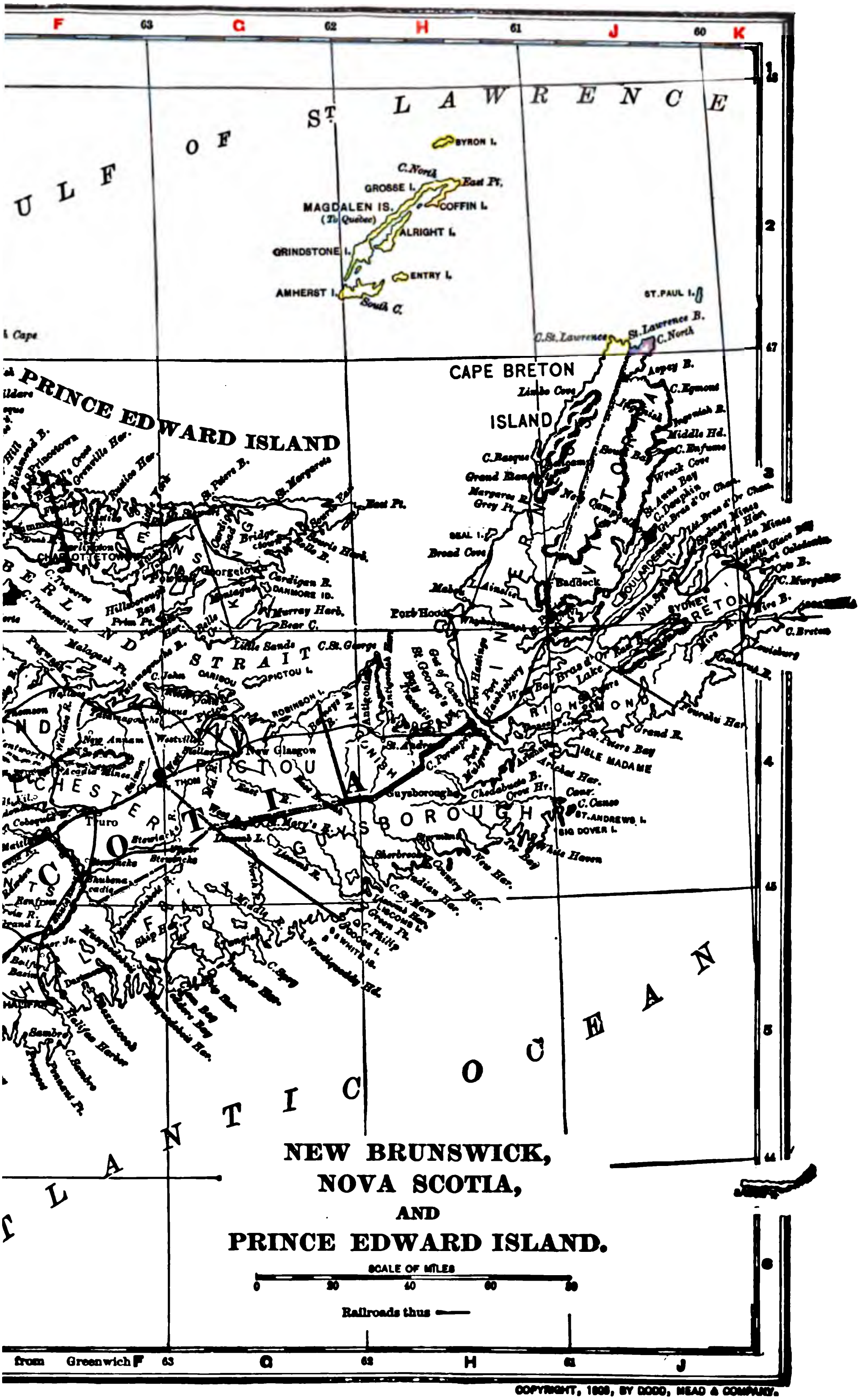
C
66
D
65
Longitud



NEW BRUNSWICK, NOVA SCOTIA, AND PRINCE EDWARD ISLAND.

SCALE OF MILES
0 20 40 60 80

Railroads thus ——

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is in course of construction. The city has a public library with over 17,300 volumes and the Gardner A. Sage Library of 44,500 volumes, and is the seat of Rutgers College (q.v.), connected with which is the Theological Seminary of the Dutch Reformed Church, and of the State Agricultural and Mechanical College with the State model farms. New Brunswick is extensively engaged in manufacturing hosiery, wall paper, rubber boots and shoes, bicycle tires, chemicals, fruit jars, boilers, cigars, foundry products, knitting needles, sash and blinds, shoes, etc. Under a charter of 1863, the government is vested in a mayor, elected biennially, a unicameral council, and in administrative boards. The boards of library trustees and of health are appointed by the mayor; the board of water commissioners is elected by the council; the board of education is chosen by popular vote. The waterworks are owned and operated by the municipality. Population, in 1890, 18,603; in 1900, 20,006. The first settlement here was made in 1681. The place was first called 'Prigmore's Swamp' (1681-97), then 'Inion's Ferry' (1691-1714), and finally New Brunswick, in honor of the House of Brunswick. New Brunswick was incorporated as a town in 1736, and was chartered as a city in 1784. It suffered much during the Revolution, and during the winter of 1776-77 was occupied by the British.

NEW'BURGH. A city in Orange County, N. Y., 60 miles north of New York City; on the Hudson River, about five miles above the picturesque Highlands, and on the Erie and the West Shore railroads (Map: New York, F 4). It is built on a steep, terraced slope, rising about 300 feet above the river to an extended plateau. The city has a public library, a public park, Saint Luke's Home and Hospital, Home for the Friendless, and Home for Children. The river here expands into Newburgh Bay, giving the city a deep water front and exceptional facilities for traffic by water. There is a trade in agricultural and dairy products, and large quantities of coal from Pennsylvania are here transferred to barges and coasting vessels. Newburgh is of considerable importance as an industrial centre, having manufactories of cottons, woolens, silks, paper, powder, flour, felt hats, and carpet; shipyards; foundries and machine shops; tanneries and leatherette works; and plaster works. The government, as provided by the charter of 1898, is vested in a mayor, elected biennially; a common council; and administrative officials, the majority of whom are appointed by the executive, either absolutely or with the consent of the council. The city clerk, however, is elected by the council, and the water commissioners, board of education, and almshouse commissioners are chosen by popular vote. The water-works are owned and operated by the municipality. Population, in 1890, 23,087; in 1900, 24,943. The first settlement at Newburgh was made in 1709 by German Lutherans from the Rhenish Palatinate, who named it the 'Palatine Parish by Quassaic.' By 1750 most of the Germans had been replaced by people of English and Scotch descent, who in 1752 changed the name to the 'Parish of Newburgh' (after Newburgh, Scotland). Newburgh was the headquarters of the American Army from March, 1782, until the latter part of 1783, and it was here that the Newburgh Addresses were circulated, that the army was disbanded, and that Washington received the famous Nicola letter, proposing that he become King. The 'Hasbrouck House,' then occupied by Washington, is now owned by the State and used as a museum for Revolutionary relics. On the grounds is the 'Tower of Victory,' an imposing stone structure erected by the United States and State governments to commemorate the close of the war. Newburgh was incorporated as a village in 1800 and was chartered as a city in 1865. Consult: Ruttenber, *History of the Town of Newburgh* (Newburgh, 1859); Powell (editor), *Historic Towns of the Middle States* (New York, 1899); Nutt (comp.), *Newburgh* (Newburgh, 1891).

NEWBURGH ADDRESSES. Two anonymous letters that appeared in 1783, after the close of the Revolutionary War. They urged some organized action to redress the wrongs of American soldiers, especially the withholding of their pay, and were later found to have been written by General John Armstrong.

NEW'BURN. A town in Northumberland, England, on the Tyne, 5½ miles west of Newcastle. Population, in 1891, 8000; in 1901, 12,500.

NEW'BURY. A municipal borough and market town in Berkshire, England, on the Kennet, 17 miles southwest of Reading (Map: England, E 5). Trade in agricultural produce and malting are the principal industries, and an annual wool market is held. The chief buildings are the church, built in the reign of Henry VII., and the Corn Exchange. The town owns real estate, markets, and the gas works. It dates from the Roman period, and was a gift of the Conqueror to Ernulf de Hesdin. Newbury is best known for two hard-fought but indecisive battles between the Royalists and Parliamentarian forces in September, 1643, and in October, 1644. On the battlefield is a handsome memorial to Lords Falkland, Sutherland, and Carnarvon, Royalists, who fell in 1643. Population, in 1901, 11,061. Consult Money, *History of Newbury* (Oxford, 1887).

NEW'BURYPORT. A city, including several villages, a port of entry, and one of the county-seats of Essex County, Mass., 37 miles northeast of Boston; on the Merrimac River and on the Boston and Maine Railroad (Map: Massachusetts, F 2). Among the city's noteworthy buildings and objects of interest are the public library of 40,000 volumes, Marine Museum, Putnam Free School, Anna Jaques Hospital, Old Ladies' Home, Home for Destitute Children, the Old South Church, containing the remains of George Whitefield, the house in which William Lloyd Garrison was born, the Dexter House, a statue of Washington, Washington Park, and a chain suspension bridge. The harbor, opening into the Atlantic Ocean, is safe and spacious. The principal manufactured products include boots and shoes, cotton cloths, celluloid collars and cuffs, silverware, electric car works, machinery, hats, and combs; and there is some shipbuilding, formerly a very extensive and important industry. Newburyport is also a distributing centre for coal. Under the original charter of incorporation of 1851, the government is administered by a mayor, annually elected, and a bicameral council, of which the Upper House is elected on a general ticket and the Lower by wards. The municipality owns and operates the water-works. Population, in 1890, 13,947; in 1900, 14,478.

Newburyport was settled about 1635, was a part of Newbury until 1764, when it was separately established and incorporated as a town, and was chartered as a city in 1851. It was the home of Theophilus Parsons and the birthplace of Francis C. Lowell, who introduced cotton manufacturing on a large scale into the United States. Consult: Smith, *History of Newburyport, Mass.* (Boston, 1854); and Hurd, *History of Essex County, Mass.* (Philadelphia, 1888).

NEW CALEDONIA, kăl'ē-dō'nĭ-ȧ. An island in the Pacific, belonging to France, the southernmost of the Melanesian Islands. It is situated 1200 miles southeast of New Guinea, 850 miles from the coast of Queensland, and about the same distance from New Zealand (Map: Australasia, J 5). It is elongated in shape, extending from northwest to southeast, with a length of 240 miles, an average width of 30 miles, and an area of 6584 square miles. It is almost entirely surrounded by a coral reef, which is five to fifteen miles from the shores, and affords a belt of well-protected navigable water inside. The coast itself is indented with numerous bays, forming, especially on the southwestern side, many excellent harbors. The interior is very mountainous. There are two parallel ranges running the entire length of the island and inclosing a longitudinal valley between them. They are of nearly uniform height, except in the south, where they are broken by marshy lowlands. The highest point is an unnamed peak near the northwest coast, with an altitude of 5570 feet. Mount Humboldt in the southeast is 5360 feet high. The rocks are composed chiefly of serpentine, gneiss, schists, and limestone. There are no active volcanoes, but some evidences of ancient volcanic activity, including thermal springs. The rivers are all short, only one being navigable (25 miles).

The proverbially healthful climate is both drier and cooler than that of the other Melanesian Islands. Perpetual spring reigns. The rainfall (70 inches) is sufficient to sustain a very rich flora, although large areas are semi-arid pine barrens in which the *Araucaria Cookii* is prominent. True forests appear chiefly in the northern part, and contain much valuable timber, though sandal-wood has now practically disappeared. The fauna, like that of all other Oceanic islands, is very poor in varieties, a single species of bat being probably the only indigenous mammal, while reptiles are also few. The avifauna is the richest, and is related to that of the Australian continent rather than to that of New Zealand. The natives of New Caledonia, whom the French style Canaques ('Kanakas'), are Melanesians, probably of mixed (Papuan-Polynesian) type. The coast tribes seem to be better shaped and more regularly featured than the rest. They are above the average in stature, with dolichocephalic head-form. The absence of large animals on the island has made them practically vegetarians, but it may account in part for the cannibalism which once prevailed in this part of the world. One of their most interesting institutions is the pilu-pilu, or yam-harvest dance, with its mock fight. Something like the 'duk-duk' society of New Britain exists among them. Among other things worthy of note are their beehive huts, grotesque carvings of heads, and sling-stones. The bow seems to be little employed, the spear and club being preferred. Traces of ancient aqueducts are reported to have been discovered in some parts of the island. Numerous petroglyphs and rock-carvings exist, some of which are considered pre-Kanaka. Since New Caledonia has been made a French penal colony, some admixture between the Europeans and the native women has taken place. Some of the tribes of the interior are still little known. The Webias of Central New Caledonia, who still live in a state of independence, and have not yet been seriously influenced by the whites, are said to be good-natured people and skillful fishermen.

The natives are the best agriculturists of all the Oceanic tribes, and irrigate the soil by means of aqueducts. They have even succeeded better than the white farmers, as the latter have been embarrassed for lack of labor, though they have imported Chinese and New Hebrides islanders. The natives live on reservations from which whites are excluded, but they are rapidly decreasing in number—50 per cent. in the last fifty years. The chief agricultural products are coffee, maize, tobacco, sugar, grapes, and pineapples. Wheat and cotton have also been introduced. The mineral wealth is considerable, including gold, silver, lead, copper, nickel, cobalt, chromate of iron, and coal. The last six are mined, and the nickel output is the most valuable, amounting in 1899 to 74,614 tons of ore, valued at about $800,000. The commerce is considerable, amounting in 1899 to about $4,000,000, including imports and exports. Of the latter the principal are minerals, canned meats, and coffee. A railroad is under construction from Nouméa, the capital, to Bourail (90 miles).

The island with its dependencies, the isles of Pine, Wallis, Futuna, and Alafi, and the Huon and Loyalty Islands, is administered by a military governor, who is assisted in civil matters by a privy council. The colony is chiefly used as a penal settlement, and convicts constitute the majority of the white inhabitants. In 1898 the total population was 52,756, of whom 5585 were free colonists, 1762 officials, 1714 soldiers, 7477 convicts under sentence, 2515 liberated convicts, 1829 Asiatics, and 31,874 natives.

The island was discovered by Cook in 1774. In 1843 the French flag was raised, but the act was disavowed, owing to protests from England. Ten years later, however, the French took formal possession in order to put a stop to the cannibalism and excesses committed by the natives. In 1864 the penal settlement was founded, and after the Franco-Prussian War thousands of Communists were deported hither, most of whom have now returned to France. The natives have always been suspicious of the whites, and in 1878 rose in revolt, massacring many of the colonists.

Consult: Garnier, *La Nouvelle-Calédonie* (3d ed., Paris, 1876); Anderson, *Fiji and New Caledonia* (London, 1880); Cordeil, *Origines et progrès de la Nouvelle-Calédonie* (Nouméa, 1885); Griffith, *In an Unknown Prison Land: An Account of Convicts and Colonists in New Caledonia* (ib., 1901.)

NEW CASTILE, kăs-tēl'. The southern part of Castile (q.v.).

NEW'CASTLE. A city of New South Wales, situated at the mouth of the Hunter River, 102 miles north-northeast of Sydney, with which it is connected by rail and by steamers (Map: New South Wales, F 3). It is a well-built town with paved streets and fine public buildings. It is the principal port for the northern part of New South Wales, and is the greatest coaling port in the Southern Hemisphere. There are twenty-five collieries in the district, employing about 7000 persons. The wool trade is also large. Newcastle has some five miles of wharves, at which vessels of the largest tonnage may load and discharge. The area of the harbor, which is protected by two forts and two breakwaters, is 540 acres. The width of the channel at the entrance of the harbor is 1200 feet, and the depth of water on the bar 25½ feet, and of the harbor 27 feet at high and 23 feet at low water. The industries of Newcastle include a steam biscuit factory, copper-smelting works, a brewery, shipbuilding yards, foundries, carriage factories, and a boot factory. It is the seat of a United States consul, and owns its gas and electric lighting plants and water-works. Population, in 1891, 13,000; in 1901, 14,250.

NEWCASTLE. A city in New Castle County, Del., six miles south of Wilmington; situated on the Delaware River, at the head of Delaware Bay, and on the Philadelphia, Baltimore and Washington railroad (Map: Delaware, P 2). New Castle has a good harbor and regular steamship connection with Philadelphia and Baltimore, is the centre of an agricultural and fruit-growing region, has large shad-fishing interests, and manufactures iron pipe, woolen and cotton goods, shirts, flour, and bricks. The city possesses several buildings of historic interest, a public library of 6000 volumes, and two parks. Under the charter of 1875, the government is administered by a mayor, chosen every three years, and a unicameral council, elected at large. Settled by Swedes in 1640, New Castle was held successively by the Swedes, Dutch, and English, and was the landing place of William Penn in 1682. It was incorporated first in 1875. Population, in 1890, 4010; in 1900, 3380.

NEW CASTLE. A town and the county-seat of Henry County, Ind., 41 miles east-northeast of Indianapolis; on the Blue River, and on the Lake Erie and Western, the Cleveland, Cincinnati, Chicago and Saint Louis, and the Pittsburg, Cincinnati, Chicago and Saint Louis railroads (Map: Indiana, D 3). The town is surrounded by a farming district and has a supply of natural gas, and is an industrial centre of importance. The leading manufactures include tin, sheet iron and steel, bridge works, iron and brass beds, pianos, agricultural machines, furniture, handles, shovels, carriages, bricks, paper boxes, flour, etc. The water-works and street lighting plant are owned by the municipality. Population, in 1890, 2697; in 1900, 3406.

NEWCASTLE. A city and the county-seat of Lawrence County, Pa., 50 miles northwest of Pittsburg; at the junction of the Shenango and Neshannock rivers, and on the Erie, the Pennsylvania, the Pittsburg and Lake Erie, the Pittsburg and Western, and the Western New York and Pennsylvania railroads (Map: Pennsylvania, A 3). It is the commercial centre of a fertile agricultural region, which has also rich deposits of bituminous coal, limestone and sandstone, fire clay, and iron ore, and is noted for its extensive manufactures of iron, glass, fire brick, steel wire nails, boilers, machinery, tin plate, stoves, plows, lumber products, flour, paper, etc. The Y. M. C. A. maintains a library; and the city has a beautiful place of resort in Cascade Park, owned by the traction company. Settled in 1812, New Castle was chartered as a city in 1869. The government, under a charter of 1889, is vested in a mayor, chosen every three years, and a bicameral council, of which the Upper House (Select Council) confirms the executive's appointments of the heads of administrative departments. Population, in 1890, 11,600; in 1900, 28,339.

NEWCASTLE, HENRY PELHAM FIENNES PELHAM CLINTON, Fifth Duke of (1811-64). An English statesman. He was educated at Christ Church, Oxford, and represented South Notts in Parliament from 1832 to 1846, when he was ousted by the influence of his father, the fourth Duke, for supporting Sir Robert Peel in his free-trade measures. In the brief Conservative Administration of 1834-35 he had been a Lord of the Treasury, and First Commissioner of Woods and Forests in the Peel Administration, from 1841 to 1846. He was then made Chief Secretary to the Lord Lieutenant of Ireland, but went out of office with his chief a few months afterwards. He succeeded to the dukedom in 1851, and returned to office in 1852, filling the post of Secretary of State for the Colonies (which formerly included the Department of War) in the Aberdeen Government. The war with Russia broke out, and in June, 1854, it was found necessary to create a Secretary of State for War, and the new office was assigned to Newcastle. The sufferings of the British army before Sebastopol in the winter of 1854 raised a storm of popular discontent, and when the House of Commons determined to inquire into the conduct of the war, the Duke resigned, though the system, not the Minister, was to blame. Newcastle was reappointed Secretary of State for the Colonies in the second Administration of Lord Palmerston, 1859. In 1860 he accompanied the Prince of Wales during a tour in Canada and a portion of the United States, and on his return received the Order of the Garter from the Queen. Though his administration was meeting with general approval, failing health compelled him to resign, and he died a few months later on October 18, 1864.

NEWCASTLE, MARGARET, Duchess of. See CAVENDISH, MARGARET.

NEWCASTLE, THOMAS PELHAM-HOLLES, First Duke of (1693-1768). An English statesman. He was educated at Westminster School, and for a short time attended the University of Cambridge. He gave considerable aid to the House of Brunswick on the death of Queen Anne, and as a result various honors were conferred on him, and in 1715 he was created Duke of Newcastle. In 1724 he became Secretary of State for the southern department in Walpole's coalition Administration, and by aiding now one party and then another, as it best suited his interests, he remained in office almost continuously for thirty-eight years. In 1754 Newcastle became Prime Minister. He was in power at the beginning of the hostilities of the Seven Years' War (q.v.), but affairs were mismanaged completely, and in November, 1756, Newcastle resigned. Pitt now took charge of the war and foreign affairs. In 1757 a Newcastle-Pitt Ministry was formed, Pitt being the virtual head. In 1762 Newcastle was forced out of office by Lord Bute, and thereafter was of little importance, though during the short Rockingham Administration, formed in 1765, he filled the office of Privy Seal. He died November 17, 1768. Newcastle seems to have had much of the absurd and grotesque in his character. Consult: Coxe, *Pelham Administration* (London, 1829); Cobbett, *Parliamentary History* (London, 1806-20); Carlyle, *Frederick the Great* (London, 1888); Stanhope, *History of England from the Treaty of Utrecht to the Treaty of Versailles, 1713-83* (London, 1851-54); Lecky, *History of England in the Eighteenth Century* (London, 1878-90).

NEWCASTLE, WILLIAM CAVENDISH, Duke of. An English statesman. See CAVENDISH, WILLIAM, Duke of Newcastle.

NEWCASTLE-UNDER-LYME, lim. A Parliamentary and municipal borough in Staffordshire, England, 15 miles northwest of Stafford (Map: England, D 3). Its chief buildings are the town hall and high school, with which is incorporated the free grammar school, founded in 1602. The quaint red sandstone tower of the restored parish church dates from the twelfth century. The town has greatly improved in modern times; it owns remunerative real estate, gas, markets, and free library, and provides technical instruction, and maintains a sewage farm, cemetery, and isolation hospital. Hats were formerly the principal branch of manufacture, but the making of army clothing is now the chief industry. Newcastle-under-Lyme is surrounded by famous potteries, and coal-mines are worked in the vicinity. Of Saxon origin, the town was named after a castle built by Henry I. near the great forest of Lyme. The town received its first charter from Henry II. in 1175. Population, in 1891, 18,450; in 1901, 19,914.

NEWCASTLE-UPON-TYNE, tin. An episcopal city and municipal county of England, capital of Northumberland, on the left bank of the Tyne, eight miles from its mouth (Map: England, E 1). The town stands partly upon an elevated plateau and partly upon the north bank of the river. The river is crossed by three bridges, which connect Newcastle with Gateshead (q.v.)—the High Level Bridge, the Redheugh Bridge, and a swing bridge (completed in 1874 at a cost of nearly £500,000). The High Level Bridge is one of the engineering triumphs of Robert Stephenson. The length of the viaduct is 1337 feet, and the height of the railway above high-water mark, 112 feet. It has a broad carriageway, by which the ordinary traffic avoids the precipitous streets on both sides of the river, with passenger paths on each side, and the railway above.

The Church of Saint Nicholas is a noble edifice, chiefly in the Decorated style. In the Guildhall, an old and somewhat inconvenient building, situated beside the river, the town assizes are opened and the quarter sessions held. Under the Guildhall proper there is an exchange for the merchants, ship-owners, and brokers of the quayside. In the Moot Hall, a modern, handsome Grecian building overlooking the swing-bridge, the town and county assizes are held. The spacious town hall, a modern building, stands on a block of ground facing Saint Nicholas Church; associated with it are a corn market and offices for the transaction of the town business. The market for the sale of meat and vegetables is one of the most spacious and commodious in the kingdom. All the railways entering the town terminate in a large station near its centre. The jail, a heavy and costly building, occupies a low and confined situation. The postal and telegraph office is one of the largest and finest of the public buildings in the town. There are two theatres—the Royal (the ornament of Grey Street, the handsomest street in the town), and the Tyne Theatre in Westgate Street. Among the educational institutions are a natural history museum, a public library, a literary and philosophical society, society of antiquaries, a natural history society, mechanics' institute, and an institute of mining engineers. The colleges of medicine and science are both connected with the University of Durham. A column surmounted by a statue of Earl Grey, to commemorate the passing of the Reform Bill, and a bronze statue to George Stephenson are the principal monuments in the city.

Of benevolent institutions there are an infirmary, a dispensary, asylums for the blind, the deaf and dumb, and two orphanages. The municipal property is valued at $15,000,000, and consists of real estate, markets, street railways, and quays. The municipality maintains baths, wash houses, free libraries, cemeteries, and dust destructors, and indirectly contributes to technical education; important domestic utilities such as gas, water, etc., are provisionally monopolized by companies. Extensive improvements have modernized the older portions of the town, and the streets generally are wide, well paved and well lighted. The trade of Newcastle consists chiefly in coal from the Northumberland and Durham regions, of which it is the great centre. Large quantities of lead, the produce of the mines of Alston Moor and Weardale, are brought to Newcastle for manufacture, and a large quantity of unrefined lead is also imported from Spain.

At Newcastle the railway system had its origin, and its locomotive and engineering works are among the largest in England. The ordnance works of Sir William Armstrong at Elswick, the western part of Newcastle, are well known. Iron shipbuilding and various branches of engineering are extensively carried on, and since 1882 several men-of-war have been constructed on the Tyne. Newcastle occupies an important position in the manufacture of soda, bleaching-powder, vitriol, salt, and other chemical products. Earthenware is largely manufactured, and glass-staining has reached great perfection. The firebrick trade has attained large proportions, and there are important manufactures of gas-retorts and sanitary pipes, which are sent all over the world. Immense numbers of grindstones are exported. Portland and other cements are manufactured in vast quantities.

The river Tyne from the sea to Newcastle forms a natural dock for the accommodation of shipping, and for ten miles both banks are lined with quays, docks, and factories. It has four natural docks, the largest nearly a mile long, and including two piers at its mouth; £3,250,000 have been spent on the improvement of the Tyne. The entrance and many parts of the river have been deepened by dredging, and, though eight miles from the mouth of the Tyne, the tidal river is as much a port for Newcastle as the Thames is for London. An average of 15,000 vessels annually enter and clear at the Tyne ports, which comprise Newcastle and North and South Shields, with a gross tonnage of 16,000,000. The value of exports, consisting chiefly of iron, copper, lead, alkali, and machinery, averages $60,000,000 annually; and imports, including fruits, grain, butter, sugar, metals, and petroleum, average $50,000,000. The total exports from Newcastle to the United States amount to about $20,000,000. It is the seat of a United States consul.

Newcastle dates from the Roman Pons Ælii—one of the chain of forts by which the wall of Hadrian was fortified. On the withdrawal of the Romans, the deserted camp became the residence of a colony of monks, and the town was called Monkchester. Robert, eldest son of William the Conqueror, commenced to built a castle here in 1079 or 1080. Hence the modern name of New Castle. William Rufus finished his brother's castle, surrounded the town with a wall, and gave the inhabitants peculiar privileges. The present castle, which displays better than any other in England the genius of Norman military architecture, was erected by Henry II. between the years 1172 and 1177. Newcastle being made the rendezvous of the vast armaments which the first three Edwards led into Scotland, it was in their time surrounded with new walls of unusual strength and magnitude; portions of them yet remain. During the Civil War it declared for the King, and sustained a ten months' siege by the Scots. The coal trade dates from the reign of Henry III. In 1615, 400 colliers cleared the port, one-half to supply London. Lords Stowel, Eldon, and Collingwood, Mark Akenside, and Hutton, the mathematician, were natives of Newcastle. Intimately connected with it, though not born in it, were Thomas Bewick, the engraver; Robert Morrison, the Chinese scholar; and George and Robert Stephenson. Population, in 1801, 28,400; in 1851, 87,800; in 1891, 186,300; in 1901, 214,803. Consult Rendel, *Newcastle-on-Tyne: Its Municipal Origin and Growth* (London, 1898).

NEW CHURCH. See SWEDENBORGIANS.

NEW COLLEGE. A college at Oxford, England, originally known as the College of Saint Mary of Winchester. It was founded by William of Wykeham, Bishop of Winchester, and sometime Lord Chancellor of England, in 1379 for a warden, 70 fellows and scholars, 10 chaplains, 3 clerks, and 16 choristers. The college was but a part of Wykeham's plan, which included also the establishment of the famous school at Winchester, the first of the English public schools, from whose numbers the scholars of New College were to be chosen. To this new feature in English education was added also the beginning of a tutorial system in the college, by which the ordinary university instruction was supplemented by the work of the fellows of the college with the younger scholars. In the buildings of his college, Wykeham founded the school of English college architecture, and the buildings remain to-day the finest of the early colleges. In every way, this foundation was the most splendid of its time, but, owing chiefly to certain curious exemptions from university supervision in examinations (cf. King's College, Cambridge), it did not play the part that might have been expected of it during most of its history. Here Vitelli taught Grocyn Greek, and thus gave the college a very real connection with the new awakening. It is to-day, in scholarship and athletics, one of the leading colleges in Oxford. The establishment, as fixed by statutes of 1855 and 1881-82, consists of a warden, 22 fellows, 3 chaplains, 40 scholars, college officers, a choir, with a total of some 250 undergraduates. The connection with Winchester School is still maintained very closely. The buildings are of great beauty, particularly the hall and the chapel, with windows designed by Sir Joshua Reynolds, and an imposing tower. The gardens, which include in their limits part of the old city wall of Oxford, are among the most attractive in Oxford. The college presents to 40 livings. Among the worthies of New College have been Archbishop Chichele, founder of All Souls' College, Bishop Waynflete, founder of Magdalen College, Bishops Ken and Lowth, and Sydney Smith. See KING'S COLLEGE, Cambridge; WINCHESTER; OXFORD UNIVERSITY; WILLIAM OF WYKEHAM.

NEWCOMB, nū'kom, SIMON (1835—). An American astronomer and mathematician, born in Wallace, Nova Scotia. He was educated in his father's school and came to the United States in 1853. A year afterwards he began teaching in Maryland, and in 1857 was appointed computer on the *Nautical Almanac* at Cambridge. In 1858 he graduated at the Lawrence Scientific School, and in 1861 was appointed professor of mathematics in the United States Navy. He negotiated the contract for and supervised the construction of the 26-inch equatorial telescope at the Naval Observatory. He was secretary of the Transit of Venus Commission in 1871-74, observed the transit of Venus at the Cape of Good Hope in 1882, and directed several eclipse expeditions, beginning in 1860. In 1877 he became senior professor and director of the *Nautical Almanac*, a position which he held till he was retired on account of age in 1897. He was professor of mathematics in Johns Hopkins University in 1894-1901 and editor of the *American Journal of Mathematics*. Newcomb became a member of nearly all the Imperial and Royal Societies of Europe and of the various scientific associations of this country. He was also made an associate of the Institute of France, and an officer of the Legion of Honor, being the first American since Franklin to be so honored. He was president of the American Association for the Advancement of Science in 1877, of the Society for Psychical Research in 1885-1886, of the Political Society of America in 1887, of the American Mathematical Society in 1897-1898, and of the Astronomical and Astrophysical Society of America, from its foundation in 1899; vice-president of the National Academy of Sciences in 1883-89, and was chosen president of the Saint Louis Congress of Arts and Sciences. He received the Copley (1874), the Huygens (1878), the Royal Society (1890), and the Bruce medal (1898); and numerous other prizes and honorary degrees from societies and universities in this country and Europe. In addition to scientific attainments he wrote on finance and political economy, and delivered a course of lectures at Harvard University on kindred topics.

NEWCOMBE (nū'kom) **MEMORIAL COLLEGE.** See TULANE UNIVERSITY.

NEWCOMEN, nū-kŏm'*e*n, THOMAS (1663-1729). An English blacksmith, inventor of the atmospheric steam engine, a prototype of the modern machine. He was born at Dartmouth, and, it would seem, had addressed himself to the task of devising a practical engine before 1698, when Savery took out his patent. Possibly Newcomen had forged the larger parts of Savery's engine—they lived only fifteen miles apart. But it is certain that Savery shared in the patent taken out by Newcomen about 1710. The part played by John Calley is uncertain; probably he was only a grazier who advanced Newcomen money. Newcomen's engine is described and pictured in a copper engraving dated 1719; it was a combination of preceding machines and an improvement on all of them, in that it was a complete change of type, the various elements of boiler, condenser, and engine pump being divided among so many separate parts, which, with the exception of the condenser (the present form of which is due to Watt), are essentially the same as those of the modern engine. Newcomen's was the first practical machine, and it was successfully and commonly used for pumping.

NEWCOMES, nū'komz, THE. A novel by W. M. Thackeray (1854-55). The character of Colonel Newcome is one of the finest delineations of a simple-minded, pure-hearted gentleman in fiction, and is said to have been drawn from the author's stepfather, Colonel Smyth.

NEW CONNECTION METHODISTS. See METHODISM.

NEW CONNECTION OF GENERAL BAPTISTS. See BAPTISTS.

NEW CUM'BERLAND. A town and the county-seat of Hancock County, W. Va., 33 miles north of Wheeling; on the Ohio River, and on the Pittsburg, Cincinnati, Chicago and Saint Louis Railroad (Map: West Virginia, D 1). It is chiefly engaged in the manufacture of pottery (semi-porcelain), fire and paving brick, sewer pipe, and tiling, the adjacent region having valuable clay deposits. There are also coal mines, a foundry, and mills for the pulverization of fire clay for use in iron works. Population, in 1890, 2305; in 1900, 2198.

NEW DECATUR, dē-kā'tūr. A city in Morgan County, Ala., 25 miles west by south of Huntsville; on the Tennessee River, just above Decatur, and on the Louisville and Nashville and the Memphis and Charleston railroads (Map: Alabama, B 1). It is developing rapidly as an industrial centre, being noteworthy for iron manufactures. According to the census of 1900, capital to the amount of $1,349,000 was invested in the various industries, which had a production valued at $2,977,000. New Decatur was settled in 1887, and was incorporated in 1889. Under a revised charter of 1899 the government is vested in a mayor, elected every two years, and a unicameral council. Population, in 1890, 3565; in 1900, 4457.

NEW DONGOLA, dŏŋ'gō-lȧ. A town of the Egyptian Sudan. See EL-ORDEH.

NEWELL, nū'*e*l, PETER (1862—). An American illustrator, born near Bushnell, McDonough County, Ill. He worked for a time as photographer and maker of crayon portraits in Jacksonville, Ill., and later studied at the Art Students' League in New York City. Afterwards he settled at Leonia, N. J., and contributed constantly to various current publications. His work in flat tones was a later development of his original talent, and became very popular through the ingenious *Topsys and Turveys* (1893-94); *A Shadow Shown* (1896); and *Peter Newell's Pictures and Rhymes* (1899); volumes for which he furnished the text himself. He also produced the clever and grotesque illustrations for John Kendrick Bangs's *House-Boat on the Styx*, *Pursuit of the House-Boat*, and *Mr. Munchausen;* Lee's *Tommy Toddles;* Stockton's *The Great Stone of Sardis;* Mark Twain's *Innocents Abroad;* and Lewis Carroll's *Alice in Wonderland* and *Through the Looking Glass.*

NEWELL, ROBERT HENRY (1836-1901). An American humorist, born in New York, December 13, 1836. His reputation was made during the Civil War by newspaper sketches and letters over the name 'Orpheus C. Kerr' (Office Seeker). These letters were collected in four volumes (1862-68). Newell also wrote romances and several volumes of verse. His humor lightened the toil of Lincoln, and it was genuine though not excellent.

NEW ENGLAND. The collective name of the States of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut. It has an area of 67,384 square miles, and had a population, in 1900, of 5,592,017.

Leif Ericson is believed by many to have sailed along the coast of New England as early as 1000 A.D., and it is in New England that the mythical city, Norumbega (q.v.), is generally supposed to have been located. The coast seems to have been visited by Verrazano in 1524, and was to a considerable extent explored by Sir Humphrey Gilbert in 1583, by Gosnold in 1602, by Sir Martin Pring in 1603, and by George Weymouth in 1605. By the charter of 1606 the Plymouth Company was empowered to make settlements in what was then called 'North Virginia;' but an attempt (1607), by a company under George Popham, to found a settlement on what is now the Maine coast, failed. In 1614 Capt. John Smith sailed along the coast, and also went for some distance inland up several of the rivers. He prepared a description of his voyage and a rough map of the coast, and suggested the name 'New England' for the region. Beginning with 1620, when the Plymouth colony was established in the present Massachusetts, settlers gradually came into New England, and in 1643 the colonies of Connecticut, New Haven, Massachusetts Bay, and Plymouth united to form a confederacy known as the United Colonies of New England, the first attempt at federation made in America. Each colony was to choose two commissioners, and the eight commissioners thus chosen were to hold annual sessions at Boston, Hartford, New Haven, and Plymouth, and were to take action with reference to various matters of common interest to the four colonies. In 1663 the meetings became triennial. Meetings were held as late as 1684, though in the last years little was accomplished. Of the present New England States Connecticut resulted from the union of the colonies of Connecticut and New Haven, and Massachusetts from the union of the colonies of Massachusetts Bay and Plymouth, while both New Hampshire and Maine were originally under the jurisdiction of Massachusetts, Maine not receiving a separate organization until 1820. See articles on the various States and the historical section of the article United States.

NEW ENGLAND HISTORIC AND GENEALOGICAL SOCIETY, The. An association incorporated in 1845 in Boston, Mass., for historical research in regard to the family histories of the early settlers in New England, and the collection of old records. The society began the collection of a library which now contains 30,000 volumes and as many pamphlets, chiefly upon the subject of New England history and biography, and has also a collection of relics and curios, manuscripts, and many old portraits and oil paintings. It now has a membership of a thousand, and holds monthly meetings. In 1847 the society began the publication of a quarterly magazine, *The New England Historical and Genealogical Register,* and also publishes the *Bibliopolist,* for circulation among its members, giving the proceedings and necrology of the society.

NEW ENGLAND PRIMER, The. One of the most famous school-books in the history of education. Yet it is uncertain when it first appeared, and of the 2,000,000 copies that it is reasonable to suppose were printed and sold in the eighteenth century, less than 50 survive, representing, however, some forty editions. Much has been done to clear up the bibliography of the work by Paul Leicester Ford in *The New England Primer: A History of Its Origin and Development, with a Reprint of the Unique Copy of the Earliest Known Edition, and Many Facsimile Illustrations and Reproductions* (New York, 1897). The compiler of the work was shown by Ford to have been Benjamin Harris, an English printer and rhymester, who during the Catholicizing reign of James II. came to Boston and set up a book, coffee, tea, and chocolate shop 'by the Town Pump near the 'Change.' Here some time before 1690 he first issued the *Primer*, an abridgment of another compilation, *The Protestant Tutor.* A fragment of this first edition, or of a second, soon after, was found used as waste in the binding of a book printed in 1688, and is known as "The Bradford Fragment." The *Primer* was changed from time to time to suit not only religious, but political feeling, though in general through the eighteenth century the tendency was strongly religious. The most familiar quotation from the *New England Primer* is doubtless the nursery prayer, "Now I Lay Me Down to Sleep," but many couplets from the rhymed alphabet are still remembered. The composition of the different editions varies greatly. The earliest is thus made up: (1) Title; (2) Godly Admonitions; (3) Alphabet and Syllabary; (4) Rhymed Alphabet; (5) The Dutiful Child's Promises; (6) An Alphabet of Lessons, Texts of Scripture; (7) Choice Sentences; (8) The Lord's Prayer, Creed, and Ten Commandments; (9) The Duty of Children, Texts; (10) Hortatory Verses; (11) Names in Order of Biblical Books; (12) Roman and Arabic Numerals, from 1 to 100; (13) John Rogers's Exhortation to His Children; (14) The Shorter Catechism. The more noteworthy features of other editions are: John Cotton's "Spiritual Milk for American Babes," a still shorter catechism, and a "Dialogue Between Christ, Youth, and the Devil."

NEW ENGLAND THEOLOGY. The name given to a distinct school of Calvinistic theology, originating in New England, and characterized by modifications of the older theology in respect to the nature of God; the freedom, ability, and responsibility of man; the nature of moral action; and the constitutive principle of virtue. The originator of the school was Jonathan Edwards (q.v.). With Edwards and his immediate successors the general aim was to combat Arminianism. In 1770 John Murray (q.v.) arrived in New England and began to preach Universalism, and thus introduced a new element into theological thought and controversy. (See Universalism.) The early decades of the nineteenth century were occupied with the Unitarian controversy and with discussion of the teachings of Dr. Taylor of New Haven, particularly concerning sin, depravity, and regeneration. The outcome was the adoption of the principles which have since been known as the New England theology, and which may be stated in the propositions that all sin is voluntary; that through the connection with Adam there is in man a sinful propensity which renders it certain that every man will sin from the beginning of moral action; that, though man has complete freedom of will, as a fact, he never turns to God without the previous regenerating operation of the Holy Spirit, which persuasively turns him to repentance and holiness; that holiness is disinterested love; that election is the choice, for reasons lying in the knowledge of God alone, of certain persons, without regard to their own merits, as the recipients of such gracious influence as shall certainly secure their repentance. During the past half century theological thought in New England, as elsewhere, has been profoundly influenced by German philosophy and historical criticism and by the theory of evolution. As a consequence the New England theology as a distinct school has become a thing of the past, and the unmodified doctrines of the older leaders are no longer taught in the Congregational seminaries. Among those prominent in developing and defending the teachings of the school, after Edwards (1703-58), may be mentioned: Joseph Bellamy (1719-90); Samuel Hopkins (1721-1803); Jonathan Edwards, the Younger (1745-1801); Stephen West (1735-1819); Samuel West (1730-1807); Nathaniel Emmons (1745-1801); Timothy Dwight (1752-1817); Nathaniel W. Taylor (1786-1858); Leonard Woods (1774-1854); Moses Stuart (1780-1852); Edwards A. Park (1808-1900); Henry B. Smith (1815-76); Horace Bushnell (1802-76); Samuel Harris (1814-99). Consult: Fisher, *History of Christian Doctrine* (New York, 1896); Walker, *History of the Congregational Churches in the United States* (New York, 1894); Boardman, *New England Theology* (New York, 1899). See also Congregationalism; and the biographical notices of the leaders.

NEW FOREST. A forest region in the southwestern part of Hampshire, England, with an area of 92,000 acres (144 square miles) (Map: England, E 6). The name dates from the Norman Conquest, when the district was afforested and protected by severe laws by William the Conquerer. It is a Crown possession managed by the Court of Verderers as a public pleasure ground.

NEWFOUNDLAND, nū′fŭnd-lănd′. A British colony in North America, comprising the island of Newfoundland and its dependency, Labrador. The island lies across the entrance to the Gulf of Saint Lawrence between latitudes 46° 35′ and 51° 40′ N., and between longitudes 52° 35′ and 59° 25′ W. It is separated from the eastern extremity of Labrador in the north by the Strait of Belle Isle, 10 miles wide, while Cabot Strait separates it from Cape Breton Island, 65 miles to the southwest. Newfoundland is that part of North America which lies nearest to Europe, its distance from Valentia in Ireland being 1640 miles. It is roughly triangular in shape, measuring 317 miles from Cape Ray, its southwestern, to Cape Norman, its northernmost point, while the distance from Cape Anguille in the extreme west to Cape Spear in the east is 316 miles. The total area of the island is 42,200 square miles. The coastline is extremely irregular, being indented with numerous large bays studded with countless islands, and ramifying into narrow fiords which run far into the interior. In the southeast the Bay of Placentia and Trinity Bay run in from opposite sides of the island, cutting off the Avalon Peninsula, which is connected with the mainland by a very narrow isthmus. In the northwest there is a corresponding peninsula, though less detached, known as Le Petit Nord, at the head of which the coast is deeply indented by White Bay. Many of the bays form commodious and well-sheltered harbors with deep water close to shore.

Topography. The coasts are nearly everywhere bold and rugged, presenting a line of rocky cliffs from 200 to 400 feet high, broken by the fissures which form the entrances to the fiords. In the Bay of Islands on the west coast, the small rocky islets are 1000 feet high, while the shores of the bay rise in Blomidon Cliff to a sheer height of 2125 feet from the water's edge. The interior is an undulating plateau of moderate elevation traversed by a number of ridges which terminate in the headlands, and which, like all the chief physical features, river valleys, headlands, and geological formations, run diagonally across the island from southwest to northeast. The principal ridge is the Long Range, which runs along the entire western coast, and has numerous peaks from 1500 to 2000 feet high. Avalon Peninsula is rugged and hilly, and scattered over the interior plateau are a number of isolated peaks known as 'tolts.'

Hydrography. Newfoundland has an abundance of lakes, ponds, and streams. The principal rivers flow toward the northeast coast, except the Humber, which breaks through the Long Range and enters the Bay of Islands. The largest stream is the Exploits River, which flows through a chain of long lakes stretching almost across the island, its length being 200 miles. The rivers, however, cannot be used as means of communication except as canoe routes for hunters. The largest lake is Grand Pond, 56 miles long, with an area of 192 square miles, and there are several others almost equaling this in size.

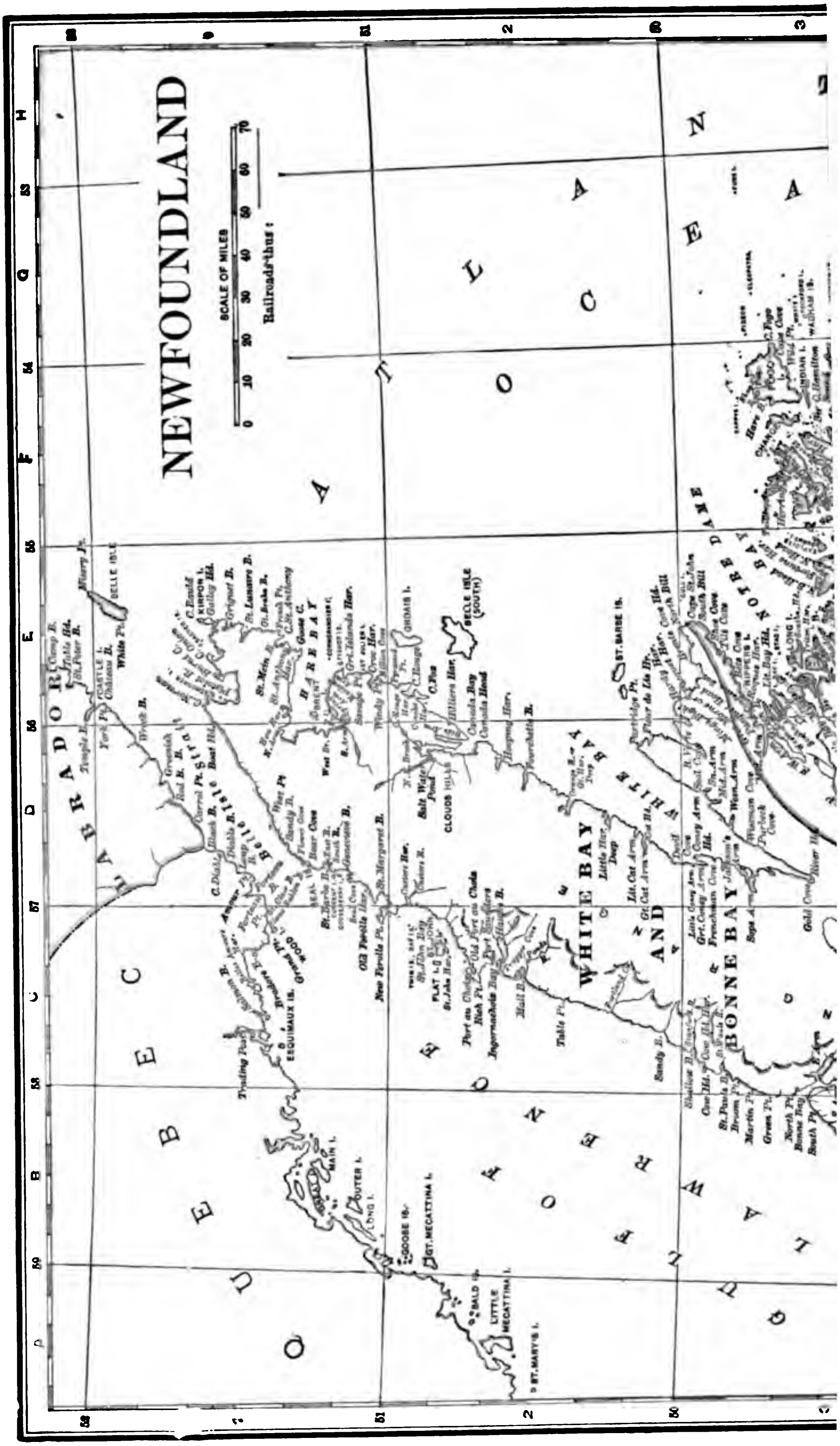
Climate. The winters are not as cold, nor are the summers as warm as in Canada, the annual extremes of temperature being 7° and 83°. The Arctic current, which skirts the eastern coast, and the east winds, which drive the floating ice into the bays along that coast, prolong the winter and spring, and render the climate here raw and chilly in winter and cool in summer. The moisture-laden east winds, moreover, bring frequent fogs.

Geology and Minerals. The bulk of the island consists of Archæan rocks, among which the Huronian system predominates in the southeastern third, and the Laurentian in the remainder of the island. There are, however, beds of Paleozoic and Lower Mesozoic, reaching as far as the Lower Carboniferous system. These are found chiefly in the troughs forming the river valleys, the valley of the Exploits following a bed of Upper Silurian rocks, 20 miles wide. The chief mineral is copper, while some lead and silver and a little gold have been found. There are large beds of gypsum on the western coast, and a small coal field exists near Saint George's Bay.

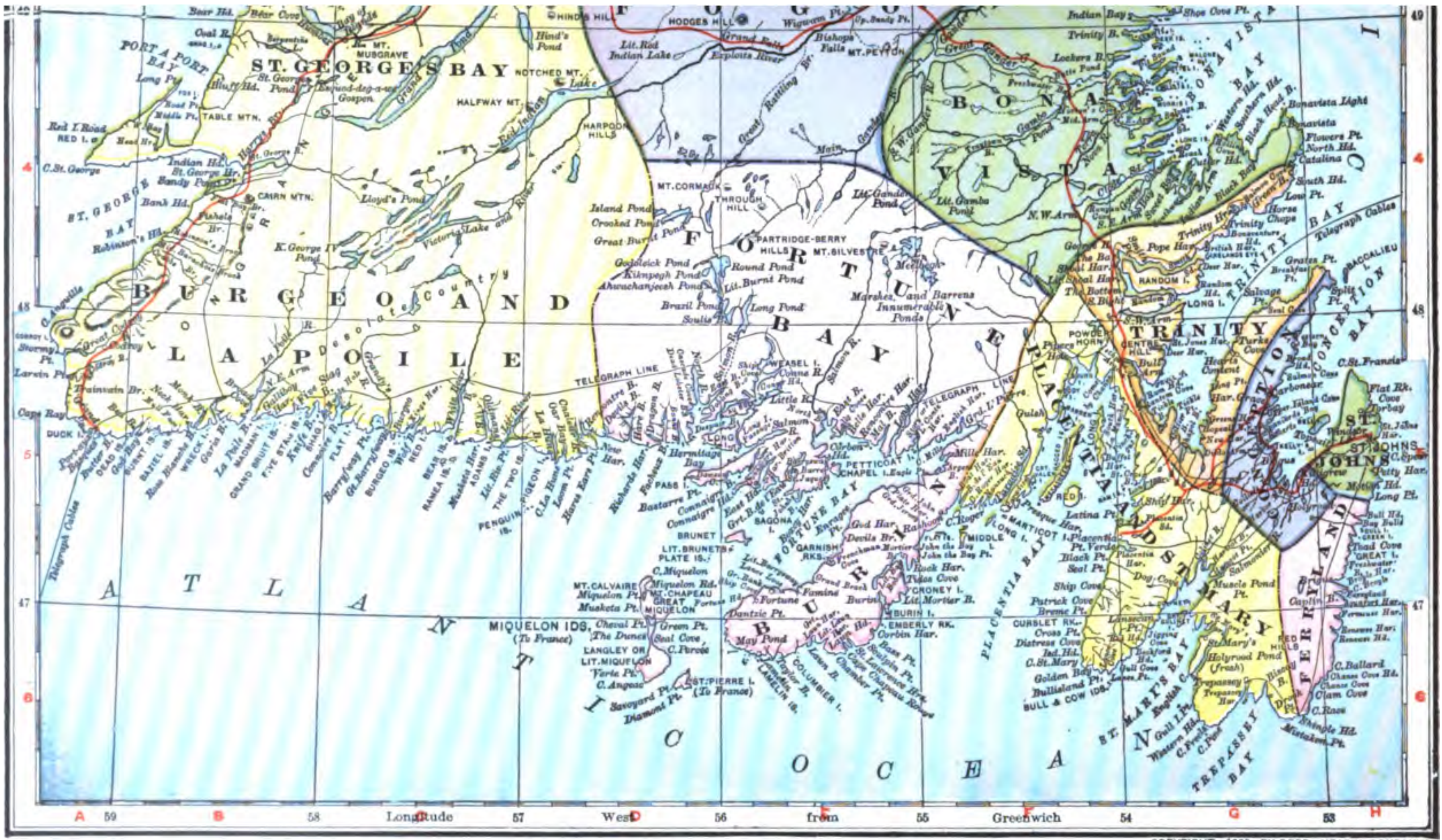
Soil and Flora. Large portions of the interior consist of marshes, and there are barren areas of rock covered with lichens and low shrubs of pine and larch. Some parts, however, are heavily timbered, especially at the heads of the bays, and along the river valleys. The latter also afford large tracts of good arable land. The principal trees are white and yellow pine, white, black, and red spruce, fir, tamarack, birch, and red maple. Among the wild animals are the black bear, wolf, and several species of fox.

Agriculture and Mining. Although there are probably 5,000,000 acres of land on the island suitable for agriculture, only 64,494 acres had been improved in 1891. Since that time the Government has offered a bonus for cleared land, and the area under cultivation now amounts to about 100,000 acres, located almost wholly along the southeast coast. The principal crops are potatoes and turnips; hay and oats are also raised. The most important mineral exploited is copper, the output of which has increased considerably in recent years. The value of the exports of copper ore in 1900 was $616,170. Pyrites and iron ore follow with a combined value of $415,764.

Fisheries. Fishery far exceeds all other occupations, and the only manufactures worthy of mention are subsidiary to the fisheries, such as the manufacture of cordage, biscuits, etc. More than 50,000 inhabitants of Newfoundland are engaged in the fisheries, and the fishing fleet in 1900 consisted of 1449 vessels and over 20,000 boats. The fisheries on the Grand Bank (q.v.) have declined, and are no longer important for Newfoundland, whose inhabitants are engaged chiefly along the coast and off the coast of Labrador. Along the west coast of the island, known as the French Shore (see *History* below), the French still enjoy the exclusive right to fish, and the United States enjoy similar rights on the southwestern coast. The cod-fisheries are the most important, the quantity caught annually in the waters of Newfoundland being valued at $9,000,000, about two-thirds of which are caught by Newfoundland fishermen. Next in importance come the seal, lobster, herring, and salmon fisheries. Seal fishing is conducted from steamers which enter the solid drift ice upon which the



NEWFOUNDLAND



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young seal are suckled by their mothers. The number of seal has lately declined, and the season for hunting has been restricted by law to one month, from March 16th to April 16th. The values of the fishery products exported from Newfoundland in 1900 were as follows: Dried cod, $5,446,067; cod oil, $301,091; seal skins, $162,005; seal oil, $433,011; canned lobster, $441,593; pickled herring, $146,611.

COMMERCE AND COMMUNICATIONS. Trade is chiefly with Great Britain, Canada, and the United States. In 1901 the total imports were valued at $7,287,200, and the exports at $8,125,920. The chief imports are flour and other food products, textiles, and hardware. Communication between the coast settlements is still effected chiefly by water, there being few roads, and practically none in the interior except the transinsular railroad. The transinsular railroad was completed in 1897, and with its branch lines had, in 1899, a length of 638 miles. There were also in that year 1314 miles of telegraph lines.

POPULATION. The total population of the colony in 1901 was 220,249, of whom 3634 resided in Labrador. In 1891 the total population was 202,040, of whom 4106 were in Labrador. There is practically no immigration, 97 per cent. of the population being native born, chiefly of English, Irish, and Scotch descent. The population is almost wholly concentrated on the southeast coast, the interior being practically uninhabited, and the west coast barred by the French treaty rights. The capital and largest town is Saint John's, with a population of 29,594, and only four other towns, Harbor Grace, Carbonear, Bonavista, and Twillingate, have populations exceeding 3000.

EDUCATION AND RELIGION. In 1900 34 per cent. of the population were Roman Catholics, 33 per cent. belonged to the Church of England, and 27 per cent. were Methodists. The schools are wholly denominational. The school funds are proportioned according to the number of pupils of each denomination, and there are three superintendents of public instruction—one for each denomination. Education is not compulsory, but the public schools are well attended; there are very few private schools. Higher education is given through four colleges which prepare students for the examinations of the London University.

GOVERNMENT. The executive power is vested in a Governor appointed by the Crown and a Ministry or executive council of nine members, responsible to the majority of the Lower House of the Legislature. The latter consists of a council of not more than fifteen members, and an Assembly whose members are elected by manhood franchise. The public revenues in 1901 were $1,953,720, and the expenditures $1,952,748. The public debt was $16,891,902. The colony, like Canada, has adopted the dollar as the unit of currency.

HISTORY. Newfoundland was discovered by John Cabot in 1497, but the English did not take advantage of the discovery for nearly a century. In the meantime the cod-fisheries attracted numerous Portuguese, Spanish, and French fishermen. In 1583 Sir Humphrey Gilbert took formal possession of the island for the British Crown, but various attempts at settlement were defeated by the French. English fishermen, however, frequented the shores in increasing numbers. By the Treaty of Utrecht in 1713, France conceded the absolute sovereignty of England over the whole territory of the island. She retained, however, the neighboring islets of Miquelon and Saint Pierre as stations for her fishing fleets, and reserved the exclusive right to the cod-fisheries on the western coast, including the right to build such temporary structures on land as were necessary for curing the fish. Even after the English acquisition, however, the prosperity of the island was delayed for a century by the repressive measures adopted by the home Government, influenced by the mercantile and fishing interests, which desired the island simply as a place for drying fish during the season, to be left barren and uninhabited when the fishing season was over. Settlements were practically forbidden, no titles to land were granted until 1813, and until 1820 no house could be built without a license, while the government of the island was practically left in the hands of the fishing captains. In 1832 Newfoundland finally received a representative government giving the control of its affairs to its inhabitants. In recent years the question of the French treaty rights on the west coast has reached an acute stage. The French interpretation of the treaty, acquiesced in by the British home Government, prevented the settlement and exploitation of the west coast by inhabitants of Newfoundland. Two attempts to arrange a convention between the French and the British governments were vetoed by the Newfoundland Government, which furthermore passed an act cutting off the local supply of bait from the French fishermen. The French Government retaliated by ordering the confiscation of all fishing implements belonging to foreigners found fishing on the west coast, and it later claimed the right to confiscate the Newfoundland lobster factories which had been established there, although the treaty referred only to cod-fishing. In 1890 a temporary settlement was arranged by the *Modus Vivendi* Act, by which the French and Newfoundland establishments then existing on the shore should be left undisturbed, but no more Newfoundland lobster factories could be built until a final settlement could be reached.

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NEWFOUNDLAND DOG. This, one of the largest, handsomest, and most intelligent of dogs, named from the island whence he was first introduced to European notice, offers, in his present characteristics, something of a puzzle as to his origin. He is not an aboriginal Newfoundlander. The dog of the native Beothuks was that of the adjacent mainland (Labrador), used mostly for hauling sleds, and it had a double coat of the warmest and thickest hair, the hairs protruding through an undercoat of short and fluffy fur, or 'wool.' From early in the sixteenth century French, Spanish, Portuguese, and English fishermen frequented the shores of Newfoundland in ever-increasing numbers. The presence of so relatively great a foreign population, all arriving in short periods, overtaxed the capability of the native dogs to meet the demand, and, exactly as happened later in Alaska, the first settlers took into the island 'outside dogs,' among which were undoubtedly some of the big dogs of Spain, where the mastiff, the bloodhound, and a ferocious variety of pointer were then common. These crossed miscellaneously with the Indian dogs, but the pointer especially seems to have introduced into the double-coated native his color, size, intelligence, and keen scent, all qualities well marked in the Newfoundland dog as he came into European knowledge at the end of the eighteenth century. So highly was he then esteemed for his wonderful retrieving powers, that he was almost entirely exported, and his breed in the land of his home almost eliminated. Inquiries made in 1890 showed that, except in one or two outlying islands, none remained in Newfoundland. Fortunately, the breed has been maintained in Great Britain and in America, from the original stock.

The Newfoundland is a massive dog, 27 inches high at the shoulder, and often weighing 100 pounds. In color he is almost always black and white, or all black, although when first imported many were brown and white; and he has a dense coat of coarse texture and oily nature, able to resist water, for which this breed has a passion. If the coat be brushed the wrong way it should fall back into its place naturally. His head is broad and massive; his fore legs perfectly straight, his hind legs very strong with great freedom of action; his feet large and well shaped; his ears small, set well back and lying close to the head. His eye is small and deeply set, but does not show any haw. Consult authorities cited under Dog.

NEW'GATE. A famous London prison, established at the 'new gate' of the city, probably near the beginning of the twelfth century. The earliest authentic mention of it dates from 1218, when it was repaired by order of the King. It was repaired and enlarged in 1638, and wholly rebuilt after the great fire of 1666, which had partially destroyed the old building. In 1770 work was begun on the reconstruction of the prison. The work was hardly finished when the prison was sacked during the 'Lord George Gordon riots.' In 1857-59 the internal structure of Newgate was changed, so as to provide separate cells for prisoners, who had formerly been permitted to mingle with each other. In 1902 the building was demolished.

In the early centuries of its existence Newgate was used for almost every class of prisoners—prisoners of State, Jews charged with child murder, regrators and forestallers, debtors, as well as for ordinary criminals. The prisoners endured a most wretched existence. If they possessed property, they were subjected to the limitless rapacity of their jailers; if without property, they had to rely upon alms for food. Frequently they were detained for years before securing a hearing on the charges upon which they had been committed to prison. These conditions remained practically unchanged in the sixteenth and seventeenth centuries, when the prison began to be crowded with a new class of inmates, those who adhered to proscribed religious creeds. Henry VIII. and Mary, and in later years of her reign, Elizabeth, made use of Newgate as a place of detention for those who were to be tried for heresy or popery, as the case might be. It was in Newgate that such prisoners were tortured in the hope of their recantation, or to force them to implicate others. John Rogers and Hooper were among the more famous of the prisoners of this class.

With the cessation of religious persecution, Newgate was again occupied chiefly by felons awaiting execution, of persons awaiting trial on criminal charges, and of debtors. The condition of its inmates was evil both from a moral and a sanitary point of view. Those who were guilty of mere misdemeanors were permitted to associate with the most hardened criminals, with the result that many not originally inclined toward professional crime became involved in the plots of the professional criminals. This evil was aggravated after 1780, when Newgate became the regular place of detention of felons condemned to transportation. After 1815 debtors were no longer confined in Newgate. Sanitary conditions were even worse. From the Middle Ages Newgate had been noted for its epidemic diseases—the 'jail distemper,' probably a form of typhus fever, being a frequent malady. In 1414 sixty-four prisoners had died of this disease; and its ravages were common down to the end of the eighteenth century. In 1752 an attempt was made to check the evil by the employment of mechanical ventilation, but with small success. In the early part of the nineteenth century philanthropists began to interest themselves in the moral and sanitary conditions of Newgate. Effective reform did not take place, however, until after 1840. After 1849 convicted prisoners were removed to a new prison in Holloway, and Newgate remained, until its demolition, almost exclusively a place of detention for prisoners awaiting trial. Consult Griffiths, *Chronicles of Newgate* (London, 1884).

NEW GLASGOW, glăs'kô. A manufacturing town of Pictou County, Nova Scotia, Canada, on the East River and on the Nova Scotia Railway, 8 miles southeast of Pictou Landing on Northumberland Strait, with which it is connected by a branch line. It is the centre of an important coal and iron mining district with their supplemental industries; there are also ship-building yards, glass factories, tanneries, etc. Population, in 1891, 3776; in 1901, 4447.

NEW GRANADA, grȧ-nä'dȧ. The old name for the Republic of Colombia (q.v.).

NEW GUINEA, gĭn'ê, or Papua. A large island north of Australia, from which it is separated by Torres Strait. It is surpassed in size only by Greenland. Borneo is a little smaller, and Madagascar about three-fourths as large. Its area is estimated at 313,183 square miles, or almost exactly that of Texas and Louisiana together. It lies on the extreme western side of the Pacific Ocean between latitude 0° 19′ and 10° 43′ S. and longitude 131° 12′ and 150° 48′ E. Its length is nearly 1500 miles, its greatest width over 400 miles, and its longer axis extends from northwest to southeast. The larger portion of the island west of longitude 141° has been claimed by the Dutch since 1828; the eastern portion is divided between the British on the south and the Germans on the north, their territories having been defined respectively in 1884 and 1886.

TOPOGRAPHY. The waters on the south of the island are so shallow that if the sea floor were elevated 300 feet New Guinea would form a part of Australia and the Louisiade Archipelago in the southeast would be a part of the mainland. Oceanic depths encircle the island on the other sides. Around it are scattered a considerable number of islands, some of which were undoubtedly torn away from the greater land mass. In many places the coast is fringed with coral reefs and islands, most of them covered with vegetation. The vastness of the island, together with the marshy coastlands and dense forests and jungle, hindered exploration and white enterprises till the last decades of the nineteenth century. The interior has not been adequately explored, and most of the western half of the island, under the Dutch flag, is still unknown except along the coasts. There are a sufficient number of indentations on the coasts to provide excellent harbors as the country develops. Port Moresby, with a population of 1000 natives and 10 Europeans, has wharves for shipping, and is the seat of government and the chief port of Southeastern New Guinea (British New Guinea); Samarai and Daru, islands near the mainland, provide the other ports for this colony. Friedrich Wilhelmshafen is the most important port of the northeast of the island, or Kaiser Wilhelmsland (German New Guinea), and vessels trade at a few points in Western New Guinea, the half of the island which is possessed by the Netherlands.

A large part of the coasts are fronted by low and marshy plains suitable for rice-growing; but the interior is very rugged and so densely covered with tropical vegetation that progress is extremely difficult, excepting along a few rivers. Nearly everywhere paths have to be cleared with hatchets, and a mile of advance is often a hard day's work; under such circumstances exploration has been very slow; but the sum total of the work of many explorers has given a fair idea of the interior, excepting in Dutch New Guinea.

Through the eastern half of the island stretches range after range of mountains extending from northwest to southeast, the eastern ranges culminating in the Owen Stanley Mountains, whose highest peaks, Mount Victoria (13,200 feet) and Mount Albert Edward (13,000), are supposed to be the loftiest elevations of British New Guinea. The eastern mountains are of igneous origin, the central masses schistose, and the western ranges chiefly sandstone. The parallel chains of the Kaiser Wilhelmsland ranges are also stupendous and may be seen far out at sea long before the coast lands come into view. The two lofty peaks of the Bismarck range are supposed to be from 15,000 to 20,000 feet high, probably the highest summits in New Guinea. It is thought that the German mountains may be the eastern prolongation of great ranges in Dutch New Guinea still unexplored. The geological structure of the German mountains has not yet been studied. Lofty mountains, some of them 10,000 feet high, fringe long stretches of the north coast of Dutch New Guinea; and farther south the long range of the Charles Louis Mountains extends far east with elevations of 12,000 to 16,000 feet, some of them said to be covered with snow, though this statement is not authoritatively reported. The Dutch coast mountains appear to be of tertiary limestone excepting the Cyclops, which are of volcanic origin; the great mountains of the interior are chiefly composed of slates and sandstones. Everywhere between the mountains extend wide or narrow plains filled with high grass or dense jungle and scrub.

HYDROGRAPHY. The central mountain ranges form the water parting between rivers flowing to the south and the north. Navigation may be developed more extensively than on most of the great islands of the world. The largest river is the Fly, which, rising on the British-German border, has a course of 620 miles to the Papua Gulf and may be ascended by steam launches for 500 miles. The Purari, farther east, is navigable by steamboats for 120 miles. The Kaiserin Augusta River in Kaiser Wilhelmsland has been ascended by a sea-going steamer for 180 miles. The Ottilia is navigable, and it is believed the Marga will be useful as a means of transportation. Little but the mouths of the Dutch rivers can yet be laid down on the maps, but the depth and breadth of some of the outlets indicate important streams.

CLIMATE. As the island lies just south of the equator, the climate is hot in the lower altitudes, with a small annual range and an average temperature of about 79° F. The climate is usually agreeable at elevations of 3500 feet and water freezes during the night at 10,000 feet. Rain falls nearly every week in the year, but the quantity is subject to large variation, the precipitation at Port Moresby, for example, averaging 37 inches a year, while that of Samarai, farther east, is 126 inches, and at Daru, farther west, 82 inches. Malarial fever of a mild type is common on the lower grounds, but the climate away from the swamps is not inimical to the health of white men. The dense vegetation found everywhere shows the great natural fertility of the soil.

FLORA. The rich flora is transitional between that of the Malay Archipelago and that of Australia. It varies with altitude and climate. Many varieties of grass and flowers are found even on the tops of the high mountains. The great forests of the south are chiefly cypress, cedar, and ebony. In Kaiser Wilhelmsland there is a great variety of cabinet timber, banyan trees, tangled vines, and the rarest of orchids. The gutta-percha tree has recently been discovered, and the Germans intend to cultivate this valuable commodity. The cultivated plants are rice, sugar, maize, yams, bananas, breadfruit, and other tropical products. The massoi tree supplies spices, medicines, and dyes, and the prospects of the rubber industry are promising. The natives make cloth from the bark of the paper mulberry and other trees, and obtain fibre from the banana, cocoanut, and the aërial roots of the pandanus. Some of the aborigines live exclusively on sago, others on yams and taro, and bananas or sweet potatoes are the staple food of other tribes. There is no agriculture in our sense of the word, except that the Germans have introduced tobacco and cotton farming with some success. It is expected that coffee, tea, and vanilla will ultimately be valuable crops.

FAUNA. Wild swine are common, but there

are no dangerous carnivora. The crocodiles in the rivers cause some loss of life, and there are many poisonous snakes. On the whole, the fauna is poor in quadrupeds, which include the phalanger, echidna, and rodents, and among the marsupials the wallaby and tree kangaroo. The bird of paradise is preëminent among the birds, including fourteen of the eighteen known varieties, and all those of the most magnificent plumage. Other birds include the cassowary, pigeon, emeu, hornbill, cockatoo, geese, ducks, quail, snipe, and woodcock. The capture of the trepang or bêche-de-mer, in about twenty varieties, affords an important industry off the coasts. There is considerable trade in turtle-shell, pearls, and pearl-shell.

Geology. Although the geological structure of the island has not yet been adequately investigated, important discoveries of gold have been made in British New Guinea—alluvial gold on the eastern islands and along the Mambare and other streams, and auriferous reefs on Mount Scratchley and in other places. Prospecting has scarcely more than begun, but the gold-bearing region seems to be extensive, and mining is almost the only industry of the white men in British New Guinea, the number of miners varying from 100 to 1000 men, who are meeting with some success and some disappointment. Gold has also been found in the Bismarck range of Kaiser Wilhelmsland.

Commerce. The trade of the island is still very small. The incoming of miners into British New Guinea has increased the commerce of that colony, which now amounts to over $500,000 a year, about equally divided between imports (chiefly foodstuffs, tobacco, cloth, and hardware) and exports (copra, pearl shell, gold, pearls, and sandal wood). Nearly the entire trade of this possession is with Queensland and New South Wales, about 400 small vessels a year entering and clearing the ports. The colony is treated as a postal district of Queensland, the postal movement being about 20,000 letters and 13,000 newspapers a year. The German New Guinea Company has a concession placing in its hands the development of Kaiser Wilhelmsland with stations along the coast at Friedrich Wilhelmshafen, Konstantinhafen, Finschhafen, and Stephansort. The few plantations yield export tobacco and cotton, and the natives barter copra, trepang, and mother-of-pearl. Several steam and sailing vessels owned by the company connect the ports with Bremen. Dutch New Guinea has very little trade except along the coast, an occasional Dutch war vessel supplying the needs of the trading and missionary posts.

Government. British New Guinea (estimated area, 90,540 square miles; population, 358,000) is a Crown colony with an administrator and a legislative council. The expenses of administration, about $75,000 a year, are guaranteed by the Commonwealth of Australia, which practically monopolizes the trade. The revenues are from $50,000 to $60,000 a year, chiefly from customs duties. A company called the British New Guinea Syndicate has a concession of 250,000 acres of land, best suited for cultivation, and has begun to develop systematic planting. Land is offered to settlers at 2s. 6d. an acre. Native labor is in ample supply, and the natives are improving under the British policy of gradually making them more useful to themselves and foreigners without depriving them of their inherited rights and social usages.

The German New Guinea Company maintains a court of law in each section of the colony of Kaiser Wilhelmsland (estimated area, 70,843 square miles; population, 110,000). The revenues are still very small, the expenditures being about three times as great; the deficit is covered by a Government subvention. Dutch New Guinea (estimated area, 151,800 square miles; population, 238,000) belongs to the Residency of Ternate, Molucca Islands, and is one of the outposts. A Dutch official (*Controleur*) has charge of the Government interests, but very little is done for the country excepting to protect the few white stations and prevent intertribal wars along the coast.

Population. The total population, estimated at 706,000, is very thinly spread over the island. The dense forests have had the effect to keep the small tribes apart and to make them suspicious of one another. Near the British settlements many of them are beginning to speak English, and it is found that they are best controlled by native policemen in the pay of the Government. While they often make war upon one another, they have offered no important opposition to the ingress of the whites. Many of them are cannibals, and a few white men have been killed by members of tribes addicted to eating human flesh.

Ethnology. The term 'Papuan,' which is of Malay origin (*papúwah*, 'frizzled'), is applied by modern ethnologists to the type of man found in its greatest purity in certain parts of New Guinea (often called 'Papua') and some small islands to the east and west of it. Some writers use 'Papuan' and 'Melanesian' as equivalent terms, but most authorities divide the negro-like race in question into a Papuan proper and a Melanesian section. It would seem best to restrict the term Papuan to the assumed autochthones of the great island of New Guinea and the peoples closest akin to these. Physically, the Papuans are of rather short stature, dolichocephalic, frizzly-haired, dark-skinned. This general type is not, however, without variations due to Malay, Melanesian, Negrito, and Polynesian influences. The Papuans are, as a rule, sedentary, with pile-dwellings about the coast, and may be said to be in the 'Stone Age.' Tree-dwellings, especially for purposes of refuge, are common. The Papuans generally are good fishermen, boat-users, and boat-builders, but not farers into the open sea like the Malays and Polynesians. Their characteristic vessel is the one-trunk canoe. In matters of government they seem to be less communistic than the Australians, for private property in a number of things (land, fields, houses, besides ornaments and weapons) exists, while the general tone is quite democratic, subjection to chiefs being rather a matter of popular recognition than of individual imposition. Shamanism is, however, a powerful factor. The position of woman varies in diverse parts of the Papuan domain, but is generally not low. In disposition and temperament the Papuans vary from the less energetic and very hospitable peoples of German New Guinea like the Varopu, to the savage and warlike tribes of some regions of the British territory and the cannibals of various sections. The Papuans are an imaginative people, and possess numerous myths and an abundant folk-lore; they possess a remarkable form-sense, and are skillful in ornamental work. Their art has been treated by Prof. A. C. Haddon, in his *Evolution in Art* (London, 1895). The religion of the Papuans includes ancestor-worship, shamanism, 'temple-cults,' and spiritism. Among their customs are head-hunting, vendettas, secret societies, and the *duk-duk* of New Britain. In intellectual ability the Papuans are ranked above the Australians and below the African negroes. The chief Papuan tribes of New Guinea are the peoples about Geelvink Bay and its islands; the Arfaks of the extreme western interior—the Karons of the Arfak Hills are by some said to be Negritos; the Onimes of Maclure Inlet, and farther south, the Kovai; the Talandjang of Humboldt Bay; in German New Guinea the peoples of Astrolabe Bay, Finschhafen, the Bismarck Archipelago; in British New Guinea the tribes in the region of the Fly River (Daudai, Kiwai, etc.), and the Gulf of Papua (Orokolo, Toaripi), the tribes of the southeastern interior (Koitapu, Kupele), the Moresby region and the terminal peninsula (Kerepunu, Loyalupu, Aroma, Massim), the peoples of the Entrecasteaux and Louisiade archipelagoes (Samarai, etc.). Papuans are also to be found on the Aru group and the islands of Salawatti, Waigu, etc., to the northwest of New Guinea, and there are probably Papuan elements in the population of the Ke and Tenimber islands, and some slight traces elsewhere in Malaysia.

History. The name Guinea, derived from the name of a large negro kingdom, Ganuya, was applied by the Portuguese in the fifteenth century to the territory of the Senegal in West Africa. The Spanish explorer Iñigo Ortiz de Rez in 1545 gave the name New Guinea to the large island north of Australia on account of the physical resemblance of its inhabitants, in his opinion, to the natives of West Africa. The island was seen and reported by Dabreu in 1511, but the first European to land was Menezes in 1526, when he named it Papua after the local designation of the natives. During succeeding centuries it was visited by most of the Polynesian explorers despite the efforts of the Dutch to bar the passage to lands beyond their Molucca Islands. From 1815 to 1873 several Dutch and English hydrographic expeditions surveyed the coast, and Dutch and English missions were established respectively at Geelvink Bay and the Gulf of Papua. The inhabitants were divided into a number of petty independent tribes, over whom feudatory rights were claimed by the Moslem chiefs of small neighboring islands. The presumed rights of one of these, the Sultan of Tidore, were acquired by the Dutch and led to their expedition of annexation in 1828. In 1883 the Ministry of Queensland, Australia, proclaimed the annexation to that colony of the eastern half of New Guinea; the British Government promptly disavowed the act, but in 1884 established a protectorate over the south coast. A short time after the British occupation of the south coast, the German Government took possession of the northeast, together with the Bismarck Archipelago.

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NEWHALL, nū′ha̤l, Charles Stedman (1842—). An American naturalist and author of juvenile books. He was born in Boston; studied at Amherst (1869) and at the Union Theological Seminary; soon left the ministry for educational work; and then became United States assistant special forest agent and superintendent of the forest reserves of northern and central California. Newhall wrote: *A History of Fall River, Mass.* (1862); various juveniles, including: *Harry's Trip to the Orient* (1885) and *Ruthie's Story* (1888); and the following works on botany: *Trees of Northeastern America* (1892); *Shrubs of Northeastern America* (1893); *Leaf Collector's Handbook and Herbarium* (1892); and *Vines of Northeastern America* (1897).

NEW HAMPSHIRE (popularly called the 'Granite State'). A North Atlantic State of the United States, belonging to the New England group. It lies between latitudes 42° 40′ and 45° 18′ N., and between longitudes 70° 37′ and 72° 37′ W. It is bounded on the north by the Canadian Province of Quebec, on the east by the State of Maine and for a distance of 18 miles by the Atlantic Ocean, on the south by Massachusetts, and on the west by Vermont, trom which it is separated by the Connecticut River. Its general shape is that of a right triangle with the right angle at the southeastern corner and the acuter apex pointing north. Its extreme length is 178 miles, its extreme width 88 miles, and its area 9305 square miles, of which 9005 square miles, or 5,763,200 acres are land surface. It ranks fortieth in size among the United States.

Topography. New Hampshire is relatively more rough and mountainous than the average State on the Atlantic slope. The easternmost extension of the Appalachian system traverses the State lengthwise, running first as a ridge along the western boundary on the east bank of the Connecticut River, and culminating in the rugged mass of monadnocks known as the White Mountains. These cover about 1300 square miles in the north-central part of the State, and constitute a region of romantic scenery. Among the peaks, whose naked, rocky summits reach above the timber-line, the highest is Mount Washington, with an altitude of 6293 feet. Several isolated monadnocks, outlying members of the group, are scattered over the southwestern quarter of the State, the most prominent being Mount Kearsarge, 2943 feet high, and Mount Monadnock, with an altitude of 3186 feet. North of the White Mountains, in Coos County, another elevation rises to a height of over 2000 feet, and extends indefinitely into Maine and Canada. The southeastern part of the State is generally low, being relieved by numerous 'drumlins'—rounded hills of glacial drift generally covered with boulders. Every part of the State is well drained by numerous streams, the narrow western portion by the Connecticut River, the remainder by rivers flowing to the Atlantic Ocean. The northern part of the State is drained by the Androscoggin River, which issues from Lake Umbagog, and after making an irregular detour to the west flows into Maine. The Saco also enters that State after draining the eastern group of the White Mountains. The principal river of the State after the Connecticut is the Merrimac, whose main fork, the Pemigewasset, rises in the Franconia or western group of the White Mountains. It flows southward in a series of falls and rapids, furnishing enormous water power. It has been said that the Merrimac turns more spindles than any other river in the world. The lower course of this river is in Massachusetts. Finally, the southeastern corner of the State is drained by the streams flowing into the Piscataqua estuary, this being the only harbor on the coast. Like all glaciated areas, New Hampshire abounds in lakes—irregular, beautiful sheets of water studded with wooded islets. The largest is Lake Winnipiseogee, 16 miles long and 6 miles wide. Other notable lakes are Umbagog, in the north on the Maine boundary; Squam, northwest of Winnipiseogee; and Sunapee and New Found Lake, in the west.

Climate. The climate is strongly affected by the elevation of the land. It is colder, on the average, than that of Maine, and the winters are severe, the ground being usually snow-covered and the rivers frozen from autumn to spring. The lower Merrimac Valley is the warmest part of the State. It is of slight elevation and but little affected by ocean breezes. Here the mean temperature for January is 21°, and for July 70°, the corresponding figures for the northern portion being 16° and 67°, and for Mount Washington 5° and 47°. The climate is quite humid, and the precipitation sufficient all over the State. It is especially abundant on the mountain summits, where it reaches 55 inches, and on the eastern slope of the mountains, where it ranges from 40 to 46 inches. It is least near the seashore and on the western slope, where there is a fall respectively of only 35 and 30 inches. The whole State is, as a rule, very healthful.

For flora and fauna, see paragraphs under United States.

Geology. New Hampshire consists almost exclusively of ancient crystalline rocks, a fact which has earned for it the title of "Granite State." The main formations run lengthwise through the State parallel with the coast and the Connecticut River. The eastern or New Hampshire bank of the latter and a broad band along the coast are composed of rocks mainly of the Huronian series. Between these, through the centre of the State, the predominant formation consists of Montalban and other gneisses together with calciferous mica-schists in the north. The structure is, however, complicated by extensive outcrops of still older rocks. A line of granites and diorites appears near the coast west of the Piscataqua, and through the centre of the State, running west of the Merrimac Valley toward the White Mountains, there are extensive outcrops of porphyritic gneiss. The heart of the White Mountains themselves is composed mainly of granite. Few regions exhibit more well-marked evidences of glacial action than New Hampshire. The rocks are everywhere striated, and boulders of all sizes are scattered all over the State, even on the mountain summits. Moraines are also well marked; but, though there are deposits of glacial drift, and of fertile modified drift along the river valleys, the soils of the State are in general not encouraging to agriculture.

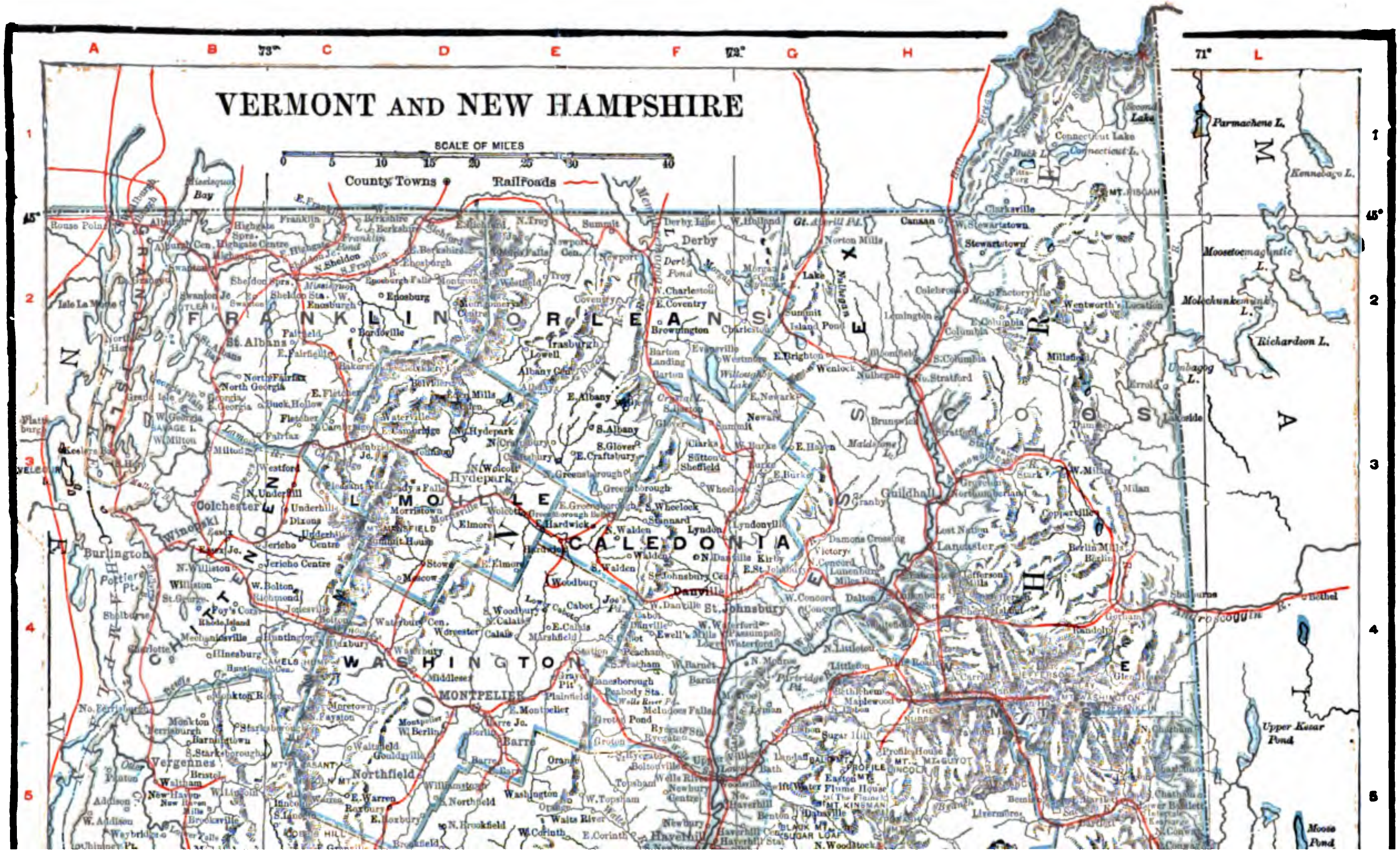
Mineral Resources. The most valuable mineral output of the State is derived from its nonmetallic rocks. Up to 1900 New Hampshire ranked first in the production of mica, the output in that year being 191,118 tons. In 1901 it fell to 65,800 tons, and was exceeded by that of North Carolina. The production of granite in 1901 was valued at $935,494. The celebrated Indian Pond and White Mountain scythestones are quarried in great quantities. Copper is mined to some extent, and ores of lead, zinc, tin, arsenic, iron, and some gold and silver are found.

Fisheries. In the fishing industry New Hampshire is the least important of the New England coast States. Its commercial fisheries are confined to Rockingham County, on the Atlantic. The industry showed a considerable decline from 1889 to 1898. The value of the catch (1898) was $48,987, as compared with $88,511 nine years before. The most important catches in 1898 were haddock, cod, and lobsters. The 11 hatcheries of the State distributed in 1900 about 3,256,000 fry, mainly salmon, salmon trout, brook trout, and lake trout.

Forests and Forest Products. The manufacture of lumber products is the oldest of the State's industries. It is claimed that the first sawmill in New England was established near Portsmouth in 1635. In 1900 the woodland was

AREA AND POPULATION OF VERMONT BY COUNTIES.

County.	Map Index.	County Seat.	Area in square miles.	Population.	
				1890.	1900.
Addison	A 5	Middlebury	722	22,277	21,912
Bennington	B 10	Bennington	658	20,448	21,705
Caledonia	F 8	St. Johnsbury	652	23,436	24,381
Chittenden	B 4	Burlington	515	35.389	39,600
Essex	G 3	Guildhall	692	9,511	8,056
Franklin	B 2	Saint Albans	645	29,755	30.198
Grand Isle	A 2	North Hero	83	3,843	4,462
Lamoille	C 3	Hydepark	436	12,831	12,289
Orange	D 6	Chelsea	686	19.575	19,313
Orleans	E 2	Newport	729	22.101	22,024
Rutland	B 7	Rutland	911	45,397	44,209
Washington	D 4	Montpelier	688	29,606	36,607
Windham	D 9	Newfane	788	26,547	26 660
Windsor	E 8	Woodstock	930	31,706	32,225


VERMONT AND NEW HAMPSHIRE
SCALE OF MILES
0 5 10 15 20 25 30 40
County Towns
Railroads
FRANKLIN
ORLEANS
ESSEX
LAMOILLE
CALEDONIA
CHITTENDEN
WASHINGTON
GRAND ISLE
LAKE CHAMPLAIN
COOS
MAINE
MONTPELIER
St. Albans
Burlington
St. Johnsbury
Lancaster
Guildhall
Hydepark
Newport
Derby
Colchester
Vergennes
Northfield
Barre
Danville
Canaan
Colebrook
Berlin Mills
Androscoggin R.
Umbagog L.
Parmachene L.
Richardson L.
Mooselucmaguntic L.
Upper Kezar Pond
MT. WASHINGTON
73°
72°
71°
45°
A
B
C
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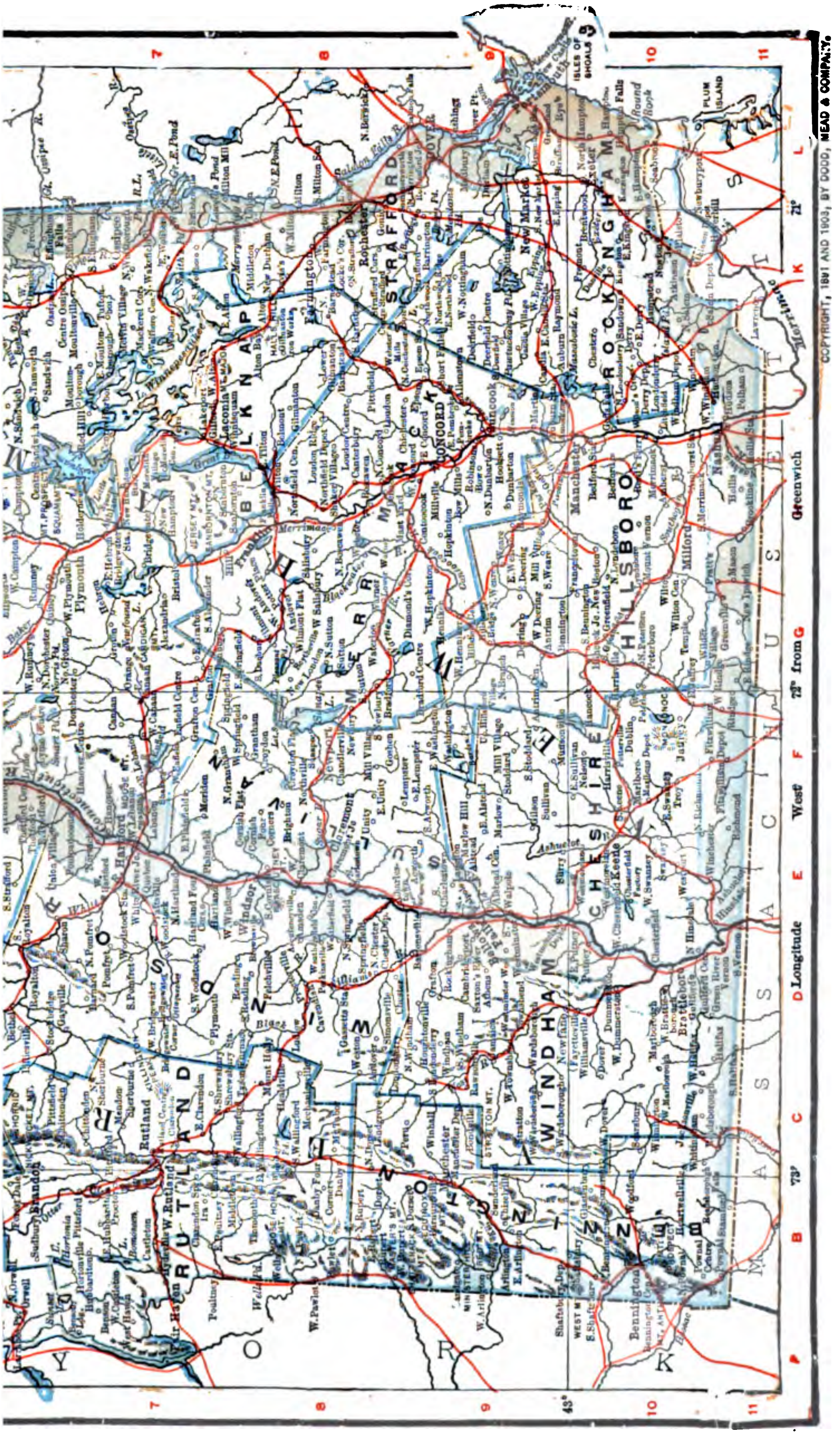

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AREA AND POPULATION OF NEW HAMPSHIRE BY COUNTIES.

County.	Map Index.	County Seat.	Area in square miles.	Population.	
				1890.	1900.
Belknap	H 7	Laconia	410	20,321	19,526
Carroll	J 6	Ossipee	939	18,124	16,895
Cheshire	F 10	Keene	734	29,579	31,321
Coos	J 3	Lancaster	1,812	23,211	29,468
Grafton	G 6	Woodsville	1,691	37,217	40.844
Hillsboro	G 10	Nashua	873	93,247	112,640
Merrimack	G 8	Concord	921	49,435	52,430
Rockingham	K 10	Exeter	693	49,650	51,118
Strafford	H 8	Dover	394	38,442	39,337
Sullivan	F 9	Newport	538	17,304	18.009

estimated at 5200 square miles. Much of this is cut-over land, the primeval forests of white pine having almost disappeared. But there is an extensive area of second-growth white pine, some of which is merchantable. It is estimated that since 1850 1,764,609 acres (nearly one-third) of the farm land has reverted to unimproved land, most of which is growing up in white pine. The highest mountain slopes are still covered with primeval forests of spruce, the variety of wood most largely used in the manufacture of wood-pulp. The town of Berlin, in the Androscoggin Valley, claims to be the largest pulp-manufacturing centre in the country. The manufacture of this product increased 462 per cent. in the decade 1890-1900. The value of the lumber and timber products increased ninefold from 1850 to 1900, and nearly doubled in the last decade of that period. See table below.

Agriculture. A large portion of the surface of the State lies too broken for agriculture. Only along the coast and in the river valleys is the soil rich and well adapted for farming. Latterly it has been cheaper to import cereals than to grow them in New Hampshire. The number of farms and their total acreage were but slightly greater in 1900 than in 1850, but the area of the improved acreage decreased over one-half during the half-century, amounting in 1900 to only 29.8 per cent. of the farm acreage. The most marked decline in the improved area was from 1890 to 1900. The average size of farms—123.1 acres—was about the same in 1900 as in 1860. Only 7.5 per cent. of the farms are rented. The cash system of lease is rapidly supplanting the share system. In the table below will be noticed the decided decrease in the cereal acreage from 1890 to 1900. Wheat and rye, both formerly of considerable prominence, have practically ceased to be cultivated. A considerable area of corn grown for forage or ensilage is not included in the table figures. As the cereals have decreased in importance much more attention has been given to vegetables, garden products, and fruits. In 1899 the potato crop was, after hay and forage, the most valuable farm crop. Apples are the chief orchard fruit, the number of trees in 1900 being 2,034,398. Many of the abandoned farms in New Hampshire are being acquired for summer homes by residents of cities.

Stock-Raising. With the changes in the system of agriculture dairying has become an important industry, and the number of dairy cows increased decidedly from 1880 to 1900. The value of dairy products for 1899 was $5,591,272, of which 80.5 per cent. was realized from sales. The number of other cattle, by contrast, decreased after 1850, and the number of sheep in 1900 was only about one-sixth as many as in the former year. The accompanying census figures are self-explaining.

	1900	1890
Corn	25.694	23,746
Oats	12,589	26,618
Barley	1,596	4,934
Buckwheat	1,835	3,117
Hay and forage	615,042	652,722
Potatoes	19,422	22,085

	1900	1890
Dairy cows	115,036	109,423
Other cattle	111,756	113,465
Horses	54,866	52,458
Sheep	65,318	131,611
Swine	51,211	58,585

Manufactures. Manufacturing is the leading industry. The percentage of wage-earners engaged therein gradually increased during the last half of the nineteenth century, being 17.1 in 1900, or twice that of 1850. Of the 70,419 thus employed, 21,921 were women. The decade 1890-1900 witnessed the largest absolute gain in the value of products—$118,669,308 in 1900. The southern part of the State possesses the advantage of being close to the business centre of New England, has a convenient harbor at Portsmouth, and shares with Massachusetts the excellent water power afforded by the Merrimac. The manufacturing interests accordingly are confined largely to this section of the State. The manufacture of cotton goods headed all industries until 1900. From its establishment in 1804 its growth has been steady. The water power of the Merrimac was largely the cause of the success of this industry, and determined the location of the two main cotton manufacturing centres—Manchester and Nashua. With the development of this industry in the Southern States latterly, the relative importance of New Hampshire is diminishing. The woolen industry was established in the first year of the nineteenth century. In 1900 the product was valued at a little less than half that of the cotton products. The woolen output decreased slightly during 1890-1900. Hosiery and knit goods are manufactured at Laconia, but in less quantities than formerly. The boot and shoe industry almost doubled the value of its product during 1890-1900, and acquired first rank among the industries of the State. The closely related tanning industry owes its development to the former abundance of the local supply of tanning bark. This branch reached its maximum in 1880, since when it has declined. The manufacture of flouring and grist-mill products is a long established industry, but the factory production of butter, cheese, and condensed milk is of recent though rapid growth. The table following shows the relative importance and condition of the ten leading industries.

Transportation. The first railroad charter was granted in 1835. In 1850 the mileage amounted to 467 miles. This was increased to 1142 in 1890, and 1193 in 1900. The numerous small lines have been consolidated until in 1900 the lines were operated by three companies—the Boston and Maine, the Grand Trunk, and the Maine Central. The railroad built up Mount Washington in 1868 is a remarkable piece of engineering. In its steepest part it ascends 1980 feet to the mile. Portsmouth is a port of entry, but its foreign trade is insignificant.

Banks. The first bank was the New Hampshire Bank, of Portsmouth, chartered in 1792 and until 1800 the only bank in the State. In the beginning of the nineteenth century several banks were established, which called forth special legislation, and as early as 1814 the State passed a law requiring annual reports from them. By 1835 there were twenty-five banks in the State, but in the financial panic of 1837 many suspended payment. In 1845 there were only seventeen banks, with a small aggregate capital, and a circulation of less than $1,000,000.

INDUSTRIES	Year	Number of establishments	Average number wage-earners	Value of products, including custom work and repairing
Total for selected industries given below, for State	1900	1,040	49,828	$85,488,450
	1890	1,001	45,271	63,855,641
Increase, 1890 to 1900	......	39	4,557	21,632,809
Per cent. of increase	......	3.9	10.1	33.9
Per cent. of total of all industries in State	1900	22.3	70.8	72.0
	1890	31.0	75.3	74.4
Cotton goods	1900	23	20,454	$22,998,249
	1890	27	19,383	21,958,002
Wool manufactures	1900	45	5,461	10,381,056
	1890	50	6,038	10,769,240
Hosiery and knit goods	1900	22	2,492	2,592,829
	1890	37	3,121	3,481,922
Boots and shoes, factory product	1900	67	12,007	23,405,558
	1890	64	7,912	11,986,008
Leather—tanned, curried, and finished	1900	12	552	2,664,942
	1890	18	668	2,988,209
Flouring and grist-mill products	1900	149	185	2,505,936
	1890	121	174	2,358,616
Cheese, butter, and condensed milk—factory product	1900	53	119	1,467,503
	1890	23	51	494,466
Foundry and machine-shop products	1900	87	1,979	3,049,334
	1890	76	2,034	2,895,716
Lumber and timber products	1900	553	4,188	9,218,310
	1890	570	5,870	5,641,445
Paper and wood pulp	1900	29	2,391	7,204,733
	1890	15	520	1,282,022

In the next decade the banks recovered, and by 1863, when the national banking system was introduced, there were fifty-two State banks in operation, with a capital of almost $5,000,000. By 1870 all but three banks had become national. State banks have remained unimportant since then. Private banks have been prohibited since 1799.

Trust companies appeared in 1885 and tried to do the business of both discount banks and savings banks. Six of them are in existence. Savings banks have always been numerous and popular. The two savings banks chartered in 1823 were among the first in the country. The savings banks deposits grew with special rapidity after the Civil War. About one-fourth of all the savings banks went into liquidation in the panic of 1893, and a bill was passed for their regulation in 1895, strictly limiting their investments. The act was further amended in 1901. In 1902 there were 147,928 depositors (one for about every 2.8 of the population), with an average deposit of $407.29. The condition of the banks in the State in 1902 is shown in the following table:

	National banks	State banks	Savings banks
Number of banks	56	10	53
Capital	$5,355,000	$610,000	No capital
Surplus	1,500,000	131,000	$3,348,000
Cash, etc	1,146,000	80,000	138,000
Loans	13,410,000	1,100,000	29,061,000
Deposits	13,449,000	1,418,000	60,249,000

Finances. Up to the beginning of the Civil War the debt of the State was insignificant, amounting to $60,000 in 1860. The war expenditures made loans necessary, and their aggregate sum rose from less than $1,000,000 in 1862 to $4,236,000 in 1865. The total expenditures of the State treasury for war purposes were $6,852,678, only $897,122 of which were repaid by the Federal Government. The State debt was gradually reduced, and by 1872 amounted only to $2,205,695. In that year, however, the commonwealth assumed the Civil War debt of the towns and cities, which increased the State debt to $4,138,124. The financial condition has been sound since then, and the debt is being reduced at the rate of from $100,000 to $200,000 a year. In 1878 a law was passed by the Legislature for taxation of railroads. In 1902 the total liabilities were $1,669,071, out of which the State owed $813,574 to trust funds, and $839,200 formed the funded debt. The cash in the treasury on June 1, 1902, was $575,612. The receipts for the fiscal year 1901-02 were $1,389,332, derived as follows: 30 per cent. from a general State tax; 25 per cent. from a tax on savings banks deposits; 27 per cent. from tax on railroads; and the rest from miscellaneous sources. The disbursements were $1,261,614, of which $570,136 was returned to towns as their share of the railroad and savings banks tax.

Government. The present Constitution was adopted in 1877. The question of revising the Constitution is submitted to the people every seven years, and if approved by a majority of those voting, a convention for revision must be called. The right of suffrage is given to male citizens twenty-one years of age who have resided in one town six months. Paupers and persons excused from paying taxes are excepted.

Legislative. Every town or place entitled to town privileges, and wards of cities having 600 inhabitants may elect one representative to the Lower House, and one additional representative for every additional 1200 inhabitants. Whenever the unit of representation contains less than 600 inhabitants, it is entitled to a representative such proportionate part of the time as the number of its inhabitants shall bear to 600. The State is divided into twenty-four districts, paying approximately equal portions of direct taxes. Each of these districts is entitled to one Senator. Representatives and Senators are elected biennially in November in open town meetings. The Legislature convenes on the first Wednesday of January. Money bills must originate in the

Lower House. Members 'seasonably attending' are paid $200, exclusive of mileage.

Executive. The Governor and the five members of the Governor's Council are chosen biennially in the month of November. The resolutions and advice of the Governor's Council are recorded, and may be called for at any time by either House of the Legislature. A two-thirds vote of each House overcomes the Governor's veto. The president of the Senate and the Speaker of the House are in the line of succession to the Governorship in case of vacancy. The pardoning power rests with the Governor, with the advice of the Council. The Secretary, Treasurer, and Commissary-General are chosen by joint ballot of the Senators and Representatives.

Judiciary. The Legislature erects and constitutes judicatures, courts of record, and other courts. Most judicial officers, including the Attorney-General, coroners, and registers of probate, are appointed by the Governor. Judicial officers serve during good behavior, except justices of the peace, whose terms expire in five years.

Local Government. The laws of the State provide for the election in each county of a treasurer, register of probate, solicitor, sheriff, and register of deeds.

Militia. The population of militia age in 1900 was 88,149. The militia in 1901 numbered 1342.

Population. The growth of the population is shown by the following figures: 1790, 141,885; 1820, 244,022; 1850, 317,976; 1860, 326,073; 1870, 318,300; 1880, 346,991; 1890, 376,530; 1900, 411,588. New Hampshire ranked 10th among the States of the Union in 1790, 22d in 1850, and 36th in 1900. The largest gain was made in the first census decade, and the population actually decreased in the decade 1860-70. The gain between 1890 and 1900 amounted to 9.3 per cent., as compared with 20.7 for the United States. Throughout the century the State contributed largely to the tide of Western migration, but this outflow has been offset in recent years by the increase in the immigration of foreigners, particularly French-Canadians, who constitute over half of the 88,107 foreign born returned by the census of 1900. The 15 towns exceeding each 4000 inhabitants collectively contain 46.7 per cent. of the total population. The density of population in 1900 was 45.7 per square mile. The State sends two members to the National House of Representatives.

Cities. The population of the largest towns in 1900 was: Manchester, 56,987; Nashua, 23,898; Concord, 19,632; Dover, 13,207; Portsmouth, 10,637. The capital is Concord.

Religion. The Roman Catholic element amounts to about 10 per cent. of the total population of the State. The principal Protestant denominations are the Congregational, with about 20 per cent. of all the church members; the Baptist, with over 17 per cent.; and the Methodist, with about 12 per cent.

Education. A number of town schools were established in accordance with the law of 1647. Grants of land for educational purposes were made before the War of Independence. In 1769, 44,000 acres were granted for the establishment of a college, and in 1821 a law was passed appropriating for a literary fund the taxes from banking corporations. The illiterate population amounted in 1900 to 6.2 per cent. of the total population of ten years and over. Of the whole school population of 71,544 in 1900, there were enrolled 65,688. The average attendance amounted to 47,276, or about 72 per cent. of the total enrollment. The total number of schools fell off from 2644 in 1882 to 2198 in 1900, but the number of graded schools increased from 481 to 773 during the same period. The length of the school term was nearly 148 days in 1900, as compared with about 118 days in 1890. The school revenue for 1900 amounted to $1,120,219, of which only $15,707 was derived from the permanent school fund. From the State came $55,519, and from local taxes, $997,667. New Hampshire has only one State normal school (at Plymouth). Representing secondary education there were, in 1900, 57 public high schools, with a total attendance of 3700, and 33 private high schools and academies, with a total attendance of 2600. The institutions of higher education are Dartmouth College, at Hanover, and Saint Anselm's College (Roman Catholic), at Manchester.

Charitable and Penal Institutions. The State Board of Charity and Correction consists of five members appointed by the Governor and Council, and of the secretary of the State Board of Health. This board inspects all State and county charitable or correctional institutions, except the State prison and the asylum for the insane (both of which are located at Concord). The changes recommended by it must be made by the responsible officers. In 1902 there were 1203 children wholly or partially supported by public charity, 979 of them being in orphan asylums. There are 15 private orphan homes—7 Protestant and 8 Catholic—but in all but one of these, county or city children are boarded at public charge. There is a State industrial school for boys and girls, located at Manchester. In 1901 the State Legislature made appropriations for the erection of a State school for feeble-minded. During the year ending September 30, 1902, were accommodated in the almshouses of the State 1630 persons, of whom 687 were confined because of insanity, feeble-mindedness, or epilepsy. Drunkards and petty criminals are sometimes committed to the pauper institution, where they mingle freely with the other inmates. At the State prison the convicts are worked under the contract system, a fixed sum being paid per day per convict. The State has general control of the convicts.

History. The first explorer of this region was probably Martin Pring, who anchored in Piscataqua Harbor in 1603. It was included in the grant to the Council for New England in 1620, and this body on August 10, 1622, granted to John Mason and Sir Ferdinando Gorges all the land lying between the Merrimac and Kennebec for sixty miles inland, under the title 'Province of Maine.' The next year David Thomson settled at Little Harbor. In 1627 Edward Hilton settled at Dover Neck, and secured a patent later in 1629 or 1630. The province was divided November 7, 1629, and that part lying between the Merrimac and the Piscataqua fell to Mason. In November, 1631, Mason and Gorges, together with a number of merchants, received from the Council territory lying on both sides of the Piscataqua within the territory already granted to them. Several trading stations were founded, the most important of which was Strawberry Bank (Portsmouth). Many settlers came out, but the proprietors derived little profit from the colony. When the Council dissolved in 1635, Mason was confirmed in all his grants and received 100,000 acres more west of the Kennebec. The settlement of Exeter was founded by Rev. John Wheelwright in 1638 after his expulsion from Massachusetts Bay. All these settlements were practically independent and with little form of organized government. Mason was a busy man who paid little attention to this province, which was named for his native Hampshire in England. Massachusetts Bay looked with disfavor upon the settlements of Royalists and Churchmen, and laid claim to the territory. In 1641 all the settlements except Exeter were joined to Massachusetts, and Exeter followed in 1643. Mason's grandson, Robert Tufton Mason, applied to the King for restitution of the territory granted to his ancestor. A decision that Massachusetts had usurped possession was secured in 1677, and in 1679 a decree declaring New Hampshire a royal province was issued, but Mason received little satisfaction. It remained a royal province until the Revolution, but its existence was dependent entirely upon the King's will, as no charter was issued. The Governor of Massachusetts was often commissioned the Governor of New Hampshire as well. After the expulsion of Andros in 1689 New Hampshire asked to be incorporated with Massachusetts, but was refused. The colony suffered greatly in the Indian wars of the eighteenth century, but nevertheless gradually extended its settlements north and west. Boundary disputes were frequent. The dispute over the southern and eastern boundaries was settled in 1740, but the question of the possession of Vermont was not settled until 1764. During the Revolution New Hampshire bore a conspicuous part. The Continental Congress, from which counsel was asked, advised the formation of a temporary State. A convention at Exeter, December-January, 1775-76, adopted a brief constitution. In 1779 a constitution was submitted to the people, but was rejected. A convention, June 12, 1781-October 31, 1783, framed a new constitution, which was ratified and went into effect June 2, 1784. Another convention, September 7, 1791-September 5, 1792, drafted a third constitution, which was ratified during the session of the convention. This provided that the question of the expediency of revision must be submitted to the people every seven years. Accordingly, modifications were made in 1852, 1877, 1889.

The State was the ninth to ratify the Federal Constitution, June 21, 1788, thus making certain the establishment of the United States. The capital of the Province of New Hampshire was Portsmouth. Until 1805 it was migratory, but at that date Concord was chosen. New Hampshire was Federalist in national politics till 1816, with the exception of 1804, when it voted for Jefferson. From 1816 to 1852 it was consistently Democratic. Since 1856 it has been stanchly Republican. The following is a list of the Governors of the Colony and State of New Hampshire:

AS A ROYAL PROVINCE

PRESIDENTS

John Cutts	1679-80
Richard Waldron	1681

GOVERNORS

Edward Cranfield	1682-85
Walter Barefoote	1686
Joseph Dudley	1686
Edmond Andros	1686-89
Simon Bradstreet	1690-92
Samuel Allen	1692-98
Richard Coote, Earl of Bellomont	1699-1701
Joseph Dudley	1702-14
Samuel Shute	1716-24
William Burnet	1728-29
Jonathan Belcher	1730-40
Benning Wentworth	1740-67
John Wentworth	1767-75

AS A STATE

Matthew Thornton, President Provincial Convention	1775
Meschech Weare, President of the State	1776-84

PRESIDENTS UNDER THE CONSTITUTION OF 1784

Meschech Weare	1784
John Langdon	1784-85
John Sullivan	1786-87
John Langdon	1788
John Sullivan	1789
Josiah Bartlett	1790-92

GOVERNORS OF THE STATE

Josiah Bartlett	Federalist	1792-94
John T. Gilman	"	1794-1805
John Langdon	Democrat-Republican	1805-09
Jeremiah Smith	Federalist	1809-10
John Langdon	Democrat-Republican	1810-12
William Plumer	" "	1812-13
John T. Gilman	Federalist	1813-16
William Plumer	Democrat-Republican	1816-19
Samuel Bell	" "	1819-23
Levi Woodbury	" "	1823-24
David L. Morrill	" "	1824-27
Benjamin Pierce	" "	1827-29
John Bell	Democrat	1829-30
Matthew Harvey	"	1830-31
Joseph M. Harper (acting)	"	1831
Samuel Dinsmoor	"	1831-34
William Badger	"	1834-36
Isaac Hill	"	1836-39
John Page	"	1839-42
Henry Hubbard	"	1842-44
John H. Steele	"	1844-46
Anthony Colby	"	1846-47
Jared W. Williams	"	1847-49
Samuel Dinsmoor	"	1849-52
Noah Martin	"	1852-54
Nathaniel B. Baker	"	1854-55
Ralph Metcalf	American	1855-57
William Haile	Democrat	1857-59
Ichabod Goodwin	Republican	1859-61
Nathaniel S. Berry	"	1861-63
Joseph A. Gilmore	"	1863-65
Frederic Smyth	"	1865-67
Walter Harriman	"	1867-69
Onslow Stearns	"	1869-71
James A. Weston	Democrat	1871-72
Ezekiel Straw	Republican	1872-74
James A. Weston	Democrat	1874-75
Person C. Cheney	Republican	1875-77
Benjamin F. Prescott	"	1877-79
Natt Head	"	1879-81
Charles H. Bell	"	1881-83
Samuel W. Hale	"	1883-85
Moody Currier	"	1885-87
Charles H. Sawyer	"	1887-89
David H. Goodell	"	1889-91
Hiram A. Tuttle	"	1891-93
John B. Smith	"	1893-95
Charles A. Busiel	"	1895-97
George A. Ramsdell	"	1897-99
Frank W. Rollins	"	1899-1901
Chester B. Jordan	"	1901-03
N. J. Bachelder	"	1903 —

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NEW HANOVER. The northernmost large island of the Bismarck Archipelago (q.v.).

NEW HARMONY. A town in Posey County, Ind., 15 miles north of Mount Vernon, the county-seat, on the Wabash River and on a branch of the Illinois Central Railroad (Map: Indiana, B 4). It has the free library of the Workingmen's Institute with some 15,000 volumes, founded in 1838. There are flouring and planing mills, brick works, and minor industries. Population, in 1890, 1197; in 1900, 1341.

New Harmony was settled in 1805 by a community of Harmonists (q.v.), who, in 1824, sold out to Robert Owen and moved to Economy, Pa. In 1825 Owen organized a 'Preliminary Society,' and invited here 'the industrious and well disposed of all nations.' There was to be a community of goods according to age, religious worship was to be replaced by a series of 'moral lectures,' and children, when two years of age, were to be taken from their parents and educated by trained teachers. Within a few months the village became a 'scene of idleness and revelry,' but in 1826 Owen returned, and for a time the settlement prospered. Later in the year, disagreements arising, the original community separated to form three communities—New Harmony, Macluria, and Feiba Pevla—and in a short time the whole experiment was abandoned. William Maclure, one of the original leaders, then bought part of the land and founded a 'school of industry,' which after a short time was discontinued. Consult Lockwood, *The New Harmony Communities* (Marion, Ind., 1902).

NEWHA'VEN. A seaport town in Sussex, England, on the English Channel at the mouth of the Ouse, 8½ miles east of Brighton (Map: England, G 6). Its importance is to be measured by its shipping trade and not by its population. It is a bonding port with a well-equipped harbor, a large coasting trade, and bi-diurnal communication with Dieppe, France, 64 miles to the southeast. The average annual value of its imports and exports is $70,000,000. The principal articles of export are woolen, cotton, silk, and hat manufactures, leather, silver plate, pictures, paper, machinery and mill work, cycles, hardware and cutlery, chemical products, etc.; the imports include agricultural produce and provisions of all kinds, cotton, woolen, silk, and linen manufactures, gloves, india-rubber goods, glassware, spirits, sugar, tobacco, and timber. It is a terminus of the London, Brighton and South Coast Railway, a coast guard station, and is protected by a large modern fort. Its twelfth-century Norman church is archæologically interesting. Population, in 1891, 4995; in 1901, 6772.

NEW HAVEN. The county-seat of New Haven County, Conn., and the largest city of the State, situated at the head of New Haven Bay, four miles from Long Island Sound, and on the main line and several leased lines of the New York, New Haven and Hartford Railroad, 73 miles east by north of New York and 36 miles distant from Hartford, the State capital (Map: Connecticut, D 4).

New Haven is widely known as the 'City of Elms'—these famous trees bordering many of the streets and surrounding 'The Green,' a public square in the heart of the town as originally laid out. The city occupies about 22½ square miles on a level plain, bounded east and west by the Quinnipiac and West rivers, and inclosed by hills, two spurs of which, East Rock and West Rock, rise to a height of 360 and 400 feet, respectively, and command fine views. East Rock is the picturesque point in an attractive park, its summit crowned by a Soldiers' and Sailors' Monument, while on the slope of West Rock is Judge's Cave, where the two regicides, Goffe and Whalley, lay in concealment for a time. There are parks overlooking the harbor and other smaller inclosures, the entire public park system comprising 1100 acres. The city has some 200 miles of streets, about 70 miles of which are paved, a large proportion with macadam, and drained by 95 miles of sewers. New Haven is the seat of Yale University (q.v.), which, with its buildings and its historical and educational prominence, is the chief attraction. There are other noteworthy educational institutions, namely, Hopkins Grammar School (founded in 1660), Hillhouse High School, Boardman Manual Training School, and a State normal school. The more important charitable institutions include the New Haven and Grace hospitals, and Saint Francis (Roman Catholic) and New Haven orphan asylums. The Public Library contains more than 52,000 volumes, and there are also valuable collections belonging to the American Oriental Society, New Haven Colony Historical Society, New Haven Orphan Asylum, State Board of Health, and the Young men's Institute. Among other features are several churches built in the early years of the nineteenth century, and the old burying-ground in Grove Street, in which are the graves of Noah Webster, Timothy Dwight, B. Silliman, Eli Whitney, Samuel F. B. Morse, Theodore Winthrop, Presidents Day, Woolsey, and Porter, James D. Dana, and W. D. Whitney.

The commercial interests of the city lie in a distributing and coastwise trade, the latter being facilitated by an excellent natural harbor, which has been greatly improved, and which was once the scene of extensive shipbuilding. New Haven ranks first among the industrial centres of the State. Its manufactures, representing, according to the census of 1900, an invested capital of $30,463,000, and having an annual production valued at $40,762,000, include carriages, clocks, firearms and ammunition, rubber goods, corsets, hardware, foundry and machine-shop products, slaughtering and meat-packing products, boxes, etc. There are also large railroad repair shops.

New Haven is the name borne by three distinct administrative corporations—the city, town, and school district of New Haven—the town being coextensive with the limits of the city; thus New Haven maintains a town and a city government. The city government is vested in a mayor, elected every two years, a bicameral council, and in administrative officers, the majority of whom are appointed by the executive, but with the following exceptions: assistant city clerk, elected by the council; and city clerk, controller, sheriff, treasurer, and collector of taxes, chosen by popular vote. New Haven spends annually, in maintenance and operation, about $1,415,000; the principal items of expense being $380,000 for schools, $190,000 for the police department, $150,000 for interest on debt, $140,000 for the fire department, $90,000 for street cleaning and sprinkling, $80,000 for municipal lighting, and $75,000 for charitable institutions. The assessed valuation of property, real and personal, is more than $115,000,000, including exemptions, and the bonded debt is over $3,750,000.

Population, in 1800, 4049; in 1850, 20,345; in 1870, 50,840; in 1880, 62,882; in 1890, 81,298; in

1900, 108,027, including 30,800 persons of foreign birth and 2900 of negro descent.

In 1637 a small company of Puritans under John Davenport, their pastor, and Theophilus Eaton, a wealthy London merchant, arrived in Boston, and in the following year settled at New Haven, then called by the Indians Quinnipiac. Adriaen Block had previously visited the place and named it Roodenberg, probably from the reddish color of the soil. In November the new settlers bought from an Indian chief, Momanguin, a large tract of land, for which they paid "twelve coats, twelve alchymy spoons, twelve hatchets, twelve hoes, two dozen of knives, twelve porringers, and four cases of French knives and scissors." Momanguin agreed that the Indians should not "terrify, disturb, or injure" the whites, who, in return, promised to protect the Indians and extend hunting privileges in part of the ceded territory. In December another tract thirteen miles long and ten miles wide was bought from another Indian chief, Montowese, for thirteen English coats. Immediately after landing the settlers had entered into a 'plantation covenant,' but a regular government was not established until the 'Fundamental and Written Constitution' was adopted in June, 1639. The privileges of voting and holding office were limited to church members, and the Scriptures were solemnly proclaimed as the supreme and only law in both civil and ecclesiastical affairs. Eaton was chosen as first Governor, and by successive elections was retained in this office until his death in 1658. In 1640 the settlement received its present name (from Newhaven, England), and three years later it formed with Milford, Guilford, and Stamford (Southhold, L. I., and Branford, Conn., being admitted later) a confederation known as the 'New Haven Colony,' which, in the same year, entered the New England Union. From 1660-64 the regicides Goffe and Whalley found shelter in and near New Haven (see above), and from 1670 to his death in 1688, another regicide, Dixwell, lived here under the name of 'James Davids.' In 1665, after a long and bitter struggle, the New Haven Colony was united to Connecticut under the Connecticut charter of 1662. In 1701 New Haven was made a joint capital with Hartford, and as such remained until 1873. In 1717 Yale College was moved here from Saybrook. On July 5, 1779, a British force under Generals Tryon and Garth captured the town after fighting sharp skirmishes with the inhabitants, and remained here until the 7th, having lost about 70 killed, while of the Americans 29 were killed and 17 wounded. In 1784 part of New Haven was incorporated as a city. Until its shipping trade was crippled by the Embargo and the War of 1812, New Haven was an important commercial port, but since then its energies have been devoted mainly to manufacturing. Steamboat communication with New York was opened in 1815, and the first railroad was completed in 1848. In 1856 a company left New Haven to help found Wabaunsee, Kan. Fair Haven was annexed in 1870. Consult: Lambert, *History of the Colony of New Haven* (New Haven, 1838); Kingsley, *A Historical Discourse* (ib., 1838); Barber and Punderson, *History and Antiquities of New Haven* (ib., 1870); Levermore, *Republic of New Haven* (Baltimore, 1886); Atwater, *History of the City of New Haven* (ib., 1887); id., *History of the Colony of New Haven*, new ed. (ib., 1902); Bartlett, *Historical Sketches of New Haven* (ib., 1897); and a brief article in Powell, *Historic Towns of the New England States* (New York, 1898); Blake, *Chronicles of New Haven Green* (New Haven, 1898); Baldwin, *Stories of Old New Haven* (ib., 1902); *Papers of the New Haven Colony Historical Society* (6 vols., ib., 1865-1900).

NEW HEBRIDES, hĕb′rĭ-dēz. A group of islands in the Pacific Ocean, northeast of New Caledonia, extending from latitude 13° to 20° S., and from longitude 165° to 170° E. (Map: Australasia, J 4). Its total area is estimated at over 5000 square miles. The chief islands are Espiritu Santo, Mallicolo, Pentecost, Maewo, Sandwich, and High Islands. Some of the islands are composed of coral; others are of volcanic origin with several active volcanoes. The soil is fertile. Considerable quantities of sandalwood are exported. The chief agricultural products are the breadfruit, sago palm, banana, yam, pineapple, orange, etc. The climate is unhealthful. Even the natives are not immune from fever, and dysentery makes great ravages among them. The population is steadily decreasing; in 1901 it was estimated at 50,000. The people of this group of islands are Melanesians. They are chiefly dolichocephalic (cranial index, 70.4, but examples as high as 85 are found), very dark in complexion, below the medium in stature (64 inches), and have abundance of woolly hair. They are still in savagery, though under the teachings of Christian missionaries they have abandoned to a large extent head-hunting and cannibalism. Under discipline they become industrious and are a factor in the trade of the Pacific. The languages of New Hebrides belong to the sub-Papuan family everywhere except in Fotuna and Aniwa, and at Mel and Fel in Efat, which are Maori colonies from New Zealand still speaking Maori dialects. The best-known sub-Papuan languages are Epi, Pama, Amboym, Vunmarama, and Sesaki. On the southernmost island, Aneityum, the inhabitants are Christianized, can all read and write, and have over forty schools. The group forms a protectorate administered by a mixed commission of French and English officers.

NEW HOLLAND. The former name for Australia (q.v.).

NEW IBE′RIA. A town and the parish seat of Iberia Parish, La., 125 miles west of New Orleans, at the head of navigation on the Bayou Teche, and on the Southern Pacific Railroad (Map: Louisiana, D 3). This section has many natural features of interest, and is the scene of part of Longfellow's *Evangeline.* Avery's Island is famous for its deposits of rock salt. A Federal Government post-office is (1903) in course of construction, and the city has a public high school library, a fine city hall, and a public market. New Iberia is the centre of a productive agricultural section devoted to the cultivation of sugar-cane, cotton, rice, corn, potatoes, small fruits, and vegetables. It is also of considerable importance as an industrial centre, its establishments including ship-yards, foundries and machine shops, a knitting mill, and manufactories of cypress lumber, shingles, sash, doors, and blinds, cypress cisterns and tanks, cotton-seed products, soap, tabasco sauce, pressed and common brick, wagons, and carts. The water-works and electric light plant are owned and operated by the municipality. Population, in 1890, 3447; in 1900, 6815.

NEW INN HALL. See OXFORD UNIVERSITY.

NEW IRELAND. See NEW MECKLENBURG.

NEW JER'SEY. A middle Atlantic State of the United States. It lies between latitudes 38° 56′ and 41° 21′ N., and between longitudes 73° 54′ and 75° 33′ W. It is bounded on the north by the State of New York, which also bounds it for some distance on the east, being separated from it by the Hudson River, New York Bay, and Staten Island Sound. The remainder of the eastern boundary is formed by the Atlantic Ocean. On the south the State is bounded by Delaware Bay. The whole western boundary is formed by the Delaware River, which runs eastward in a sharp angle nearly to the middle of the State, and separates it from Pennsylvania. New Jersey is one of the smallest States of the Union, only three others, Rhode Island, Delaware, and Connecticut, having a smaller area. Its extreme length is 167 miles, and its average width 50 miles. Its area is 7815 square miles, of which 7525 square miles, or 4,816,000 acres, are land surface.

TOPOGRAPHY. The northern and southern divisions of the Atlantic slope meet in New Jersey on a line running west from Newark Bay. The former division is characterized practically by the absence of the coastal plain and by the less definite demarcation of the Piedmont plain (q.v.). The latter division is characterized by the well-defined presence of both. Though the State lies wholly within the Atlantic slope, it is crossed in the northwest by several ranges of the Appalachian system. There are four distinctly marked topographical regions running in parallel bands across the State from southwest to northeast, coterminous with and closely dependent on the outcropping bands of geological formations. (See paragraph *Geology.*) The first, beginning at the northwest, is the Kittatinny range and upland valley. This range is an extension of the Blue Mountains of Pennsylvania, and runs in a continuous ridge into New York, reaching in High Knob, near the boundary, a height of 1799 feet. The second region includes the Highlands, an outlying Appalachian range consisting of semi-isolated, plateau-like masses, rising to a height of 1200 to 1400 feet. The third band is the Piedmont plain, nearly as wide as the first two combined. It is, for the most part, an undulating plain ranging in elevation from the sea level in the marshes of the Hackensack Valley in the east to over 500 feet in the west. It is, however, diversified by bold trap-rock ridges extending in a northeast and southwest direction, such as the Palisades along the Hudson and the First and Second Mountains. The fourth region constitutes the coastal plain and includes the entire southern half of the State south of a line running from Trenton to Newark Bay. It is a gently undulating plain, sloping south and eastward. It is nowhere more than 400 feet, and in large part is less than 100 feet above sea level. It is trenched by river-valleys, and here and there diversified by isolated hills such as the Navesink Highlands. It is bordered on the coasts by salt marshes fringed along the Atlantic by shallow coast-lagoons inclosed by outlying sand beaches.

The western slope of the State is drained by short tributaries into the Delaware River, but by far the greater portion drains directly into the Atlantic Ocean or its inlets. The principal rivers are the Passaic and Hackensack, flowing into Newark Bay; the Raritan, flowing through Raritan Bay into Lower New York Bay; the Mullica and Great Egg, emptying into the Atlantic lagoons; and the Maurice, into Delaware Bay. Lakes are confined chiefly to the northern section. There are several beautiful mountain lakes in the Highlands, the largest being Lake Hopatcong and Greenwood Lake, the latter lying partly in New York State. The most noted natural features are the Falls of the Passaic River at Paterson, the Palisades of the Hudson, and the Delaware Water Gap.

CLIMATE. The particular element affecting the climate of New Jersey is the ocean. Since the extreme northern portion is also the most elevated and the extreme southern portion is low and surrounded by water, the slight range in temperature due to difference in latitude is accentuated, so that there is a variation of 8 degrees between the mean annual temperature of the north and the south. The former is 46° and the latter 54°. The mean winter temperature is 35° in the south and 25° in the north, and the mean summer temperatures, respectively, 75° and 67°. The mean annual rainfall is, in general, between 44 and 50 inches in the greater part of the State. In the extreme eastern portion it is over 50 inches, and in the south along Delaware Bay it is less than 42 inches. As a whole, the State is quite healthful, and the sandstone belt is considered particularly favorable to persons inclined to lung diseases. There are numerous summer and winter health resorts. Lakewood (q.v.), in the heart of the pine woods, is one of the most popular winter resorts in the Northern States. Atlantic City, Asbury Park, and Cape May, although essentially summer resorts, are also popular winter resorts for invalids. Other well-known summer seaside places are Long Branch, Elberon, and Ocean Grove.

For flora and fauna, see paragraph under UNITED STATES.

GEOLOGY. The geology of New Jersey is very intimately connected with its topography. The outcrops of the rock formations cross the State from the southwest to northeast in bands closely coincident with the topographical regions described above. Beginning at the northwestern corner, we find the Kittatinny Mountain and valley, consisting of Paleozoic slate, limestone, and sandstone, and these formations also extend into some of the western valleys of the Highlands. The Highlands themselves, however, consist of the still older Archæan gneiss, granite, and mica-schist. The Piedmont plain is also called the Red Sandstone Plain, as it consists mainly of the Triassic red sandstone, with scattered intrusions of trap-rock. In the coastal plain the surface deposits consist wholly of unindurated materials. In the north there is a band running from Staten Island Sound southwest to Camden, composed of Cretaceous marls, sands, and clay, while the entire remaining portion is covered with Tertiary clays and sand finally fringed by the modern sand bars along the coast. Each of the main geological eras is represented except the Carboniferous.

Mining. The most extensively utilized of the State's diversified geological resources are its clays. New Jersey ranks second in the production of pottery and third in the total output of clay products. Brick clay is found in most parts of the State. The value of the pottery products and of the combined output of brick and tile, respectively, ranges between $5,000,000 and $9,000,000 annually. (See *Manufactures* below.) Morris County furnishes infusorial earths used in the manufacture of dynamite and giant powder, and for polishing purposes. Deposits of marl found in the State are utilized for fertilizers. A variety of stone is quarried in the northwestern counties, and constitutes another important source of wealth. The production of granite has increased rapidly since 1896. The output for 1900 was appraised at $1,170,555, or five times the value of the product in the former year. The value of the sandstone quarried in 1900 was $198,234, but the annual yield is usually worth much more. New Jersey ranks second in the production of Portland cement. Iron was mined in Warren County early in the history of the State, and has been mined continuously in the northwestern part until the present time. The entire product in 1900 was of the magnetite variety, estimated at 344,247 long tons. The iron is mined with greater difficulty than in the larger iron-producing regions, but the saving of the cost of transportation makes it profitable. The New Jersey ores have a larger per ton value ($3.18 in 1899) than those obtained in any other State.

Fisheries. New Jersey, with its long and well indented coast line, and bounded by the Hudson and the Delaware, is well adapted for the development of an extensive fishery industry, in which seventeen out of the twenty-one counties of the State participate directly. There were 12,270 persons so engaged in 1898, as against 16,539 in 1891. The value of the product for 1898 was $3,563,766, only about $44,000 more than the product of 1891. The catch of oysters in the same year was valued at $1,670,000. Next to oysters, the principal species with respect to value are clams, shad, squeteague, bluefish, and cod. The value of caviar in 1898 was $79,693. The menhaden industry in that year was represented by six factories, and yielded a product of $57,995.

Agriculture. Only 59 per cent. of the total land area is included in farms. The area of improved land increased until 1880, since when it has remained practically stationary. In 1900 the percentage of farm land improved was 69.6. The number of farms increased during the half century nearly 45 per cent., while the average acreage decreased from 115.2 in 1850 to 82 in 1900. There is a gain in the per cent. of rented farms, especially cash-tenant farms, which increased 53.6 per cent. during the decade 1890-1900, so that these farms represented in 1900 15.3 per cent. of the total number of farms, as against 14.6 per cent. for the share tenants. The soil is generally a red sandy loam, easily tilled. The river valleys are very fertile, but in most parts of the State fertilizers are advantageously used. The cost of fertilizers per farm in 1900 was $62. Between 1880 and 1890 the area devoted to cereals decreased considerably, but the falling off was checked in the next decade, when the loss was confined to oats and rye, the other crops showing gains. Accordingly the decrease in the cereals is not so marked as in some other Eastern States. Corn, the principal cereal, is raised throughout the State; wheat, next in rank, is grown in the western counties; rye, oats, and buckwheat are confined almost entirely to the northwestern counties. The acreage of hay and forage crops exceeds that of corn and wheat combined, and considerable areas of the poorer lands are being turned into permanent pasture lands. As above suggested, the proximity of large cities—notably New York and Philadelphia—has led to a large gardening and fruit-raising industry. Of the $8,400,000 of vegetable produce grown in the census year 1900, 26 per cent. and 14.4 per cent. respectively represented the value of the Irish and the sweet potatoes. New Jersey ranks next to Maryland in the production of tomatoes; the acreage devoted to their cultivation exceeded that of sweet potatoes. Sweet corn, melons, and cabbages were the most important of the other vegetables. The raising of early vegetables under glass for the New York and Philadelphia markets is a large industry.

Orchard fruits receive much attention, the peach-growing industry being very extensive in the northwestern counties. From 1890 to 1900 the number of peach trees decreased about 38 per cent. There was an equal percentage of increase in the number of apple trees. In 1900 32.1 per cent. of all fruit trees in the State were apple trees, and 48.6 were peach trees. A great variety of small fruits are raised, strawberries and cranberries being most important. Cranberry culture is confined largely to the marshy lands of Burlington and Ocean counties. New Jersey is surpassed by few States in the extent of its floriculture. The value of the product grown for the market in 1900 was nearly $2,000,000.

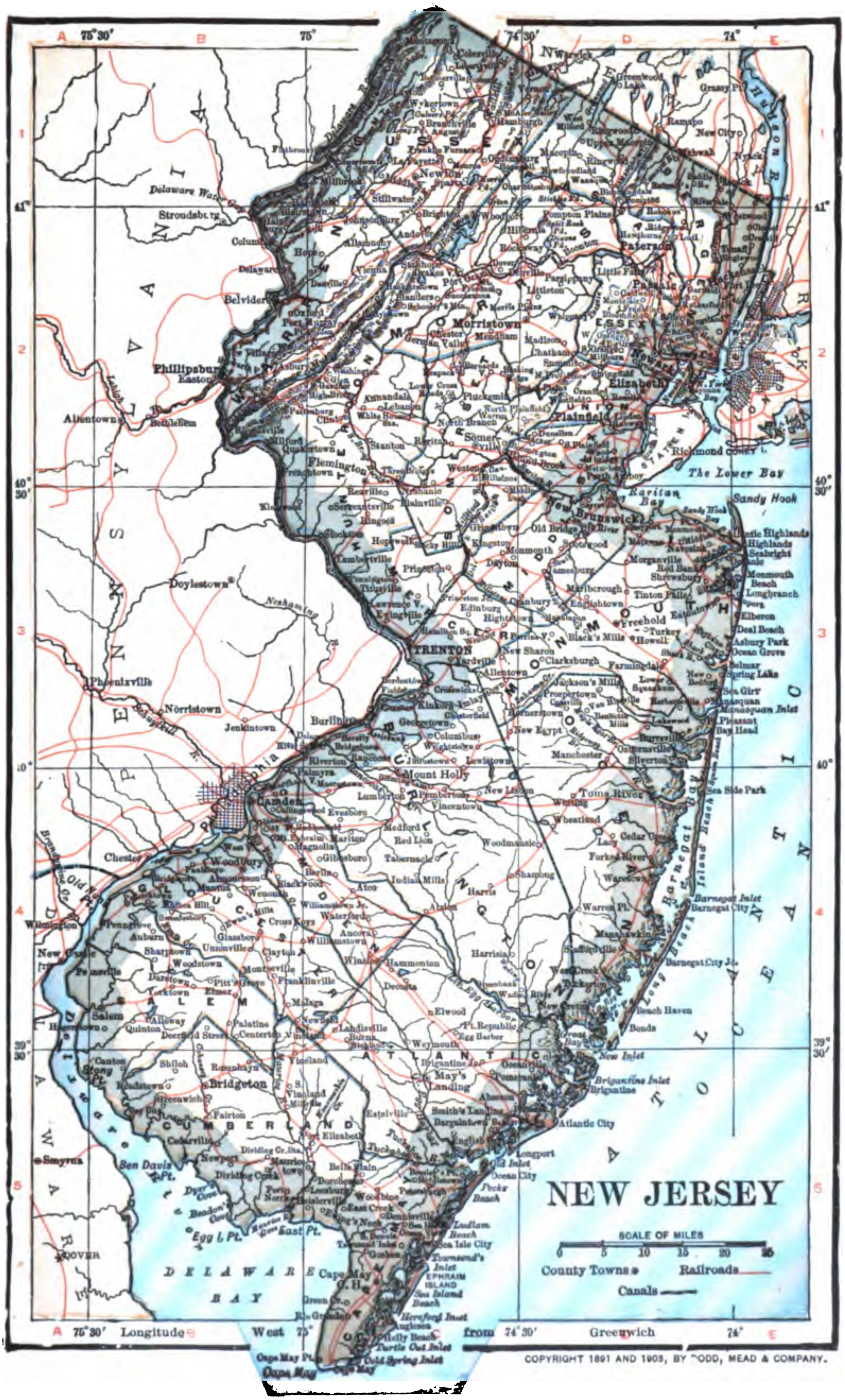
The following table of acreage is self-explanatory:

CROPS	1900	1890
Corn	295,258	267,648
Wheat	132,571	121,570
Oats	75,959	121,327
Rye	68,967	77,245
Buckwheat	15,762	13,520
Hay	444,610	458,267
Potatoes	52,896	46,711
Potatoes (sweet)	20,588	20,157

Stock-Raising. From 1890 to 1900 there was a marked increase in the number of neat cattle, a decrease in sheep and swine, and a noticeable increase in horses. The decrease in dairy cows, as shown below, is more apparent than real, owing to the change in the method of enumeration. Over one-half of the total income of all animal products was derived from the dairy industry. Of the $7,170,000 realized from dairy produce sold, $6,318,000 represented milk. The value of the poultry products is also quite large.

The following table shows the leading livestock holdings:

	1900	1890
Dairy cows	157,407	161,576
Other cattle	82,577	50,486
Horses	94,024	86,925
Mules and asses	4,931	8,227
Sheep	26,363	55,409
Swine	175,887	224,388



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AREA AND POPULATION OF NEW JERSEY BY COUNTIES.

County.	Map Index.	County Seat.	Area in square miles.	Population.	
				1890.	1900.
Atlantic	C 5	Mays Landing	567	28,836	46,40[illegible]
Bergen	D 1	Hackensack	236	47,226	78,441
Burlington	C 4	Mount Holly	869	58,528	58,241
Camden	B 4	Camden	222	87,687	107,643
Cape May	C 5	Cape May C. H	256	11,268	13,201
Cumberland	B 5	Bridgeton	511	45.438	51,193
Essex	D 2	Newark	127	256,098	359,053
Gloucester	B 4	Woodbury	326	28.649	31,905
Hudson	D 2	Jersey City	43	275,126	386,048
Hunterdon	C 3	Flemington	437	35,355	34,507
Mercer	C 3	Trenton	226	79,978	95,365
Middlesex	D 3	New Brunswick	312	61,754	79,762
Monmouth	D 3	Freehold	479	69.128	82,057
Morris	C 2	Morristown	475	54,101	65.156
Ocean	D 3	Toms River	583	15,974	19,747
Passaic	D 1	Paterson	103	105,046	155,202
Salem	B 4	Salem	350	25,151	25,530
Somerset	J 2	Somerville	305	28,311	32,948
Sussex	C 1	Newton	529	22,259	24,134
Union	D 2	Elizabeth	103	72.467	99,353
Warren	B 2	Belvidere	362	36,553	37,781

Manufactures. Manufacturing affords employment to a larger number of wage-earners than any other industry in the State. The number in 1900 was 241,582, or 12.8 per cent. of the population. The percentage of people thus engaged has increased faster than the population itself, there being in 1850 only 7.7 per cent. connected with manufactures. The increase in the value of the product has been twice as rapid. From 1890 to 1900 but few States exceeded New Jersey either in the absolute or the percentage (72.5) of gain attained in the value of manufactured products. In the latter year this value was estimated at $611,748,000, placing the State sixth in rank. Prominent among the factors contributing to the development of manufactures are first, New Jersey's proximity to the large markets of New York and Philadelphia; secondly, its admirable transportation facilities; and lastly, its iron and clay resources and its proximity to the coal and other mineral fields of Pennsylvania.

The manufacture of textiles constitutes the most important group of industries. New Jersey ranks first in the production of silk and silk goods; and Paterson, the chief centre, is the largest silk manufacturing city in the United States. The industry was first established here in 1840, but it was not until the decade ending with 1870 that its great growth began. From 1890 to 1900 the value of the product increased nearly 30 per cent. Cottons, woolens, and worsteds are also produced, but in less quantities. The output of woolens suffered a decline from 1890 to 1900, while the output of worsteds increased more than threefold. The dyeing and finishing of textiles has assumed large proportions.

Another important group includes the manufacture of iron and steel and their products. The iron and steel industry began in Warren County at an early period, the supply of iron ore being secured in that locality. The value of products more than doubled during the decade 1890-1900. Of yet greater value are the products of the closely related foundry and machine-shop industry. During 1890-1900 the advantages of cheaper land and more efficient railway service brought hither a number of New York establishments. Newark, Paterson, and Elizabeth are the largest centres. The value of the electrical apparatus produced in 1900 was nearly eightfold greater than in 1890. The sewing-machine output increased in value 59 per cent. in the same period. In 1900 the State ranked fourth in the manufacture of jewelry, Newark being the chief centre.

The State's valuable beds of clay and sand have each given rise to an important industry. Brick clays are found in every section, but nearly all the rich clays are in Middlesex County, and fortunately close to the navigable coast waters or the Raritan River. Architectural clay products, sewer pipe, etc., are produced in this section in great abundance. Trenton has become famous for its pottery. The industry was begun here in 1852, but it was not until the Centennial Exhibition in 1876 that the superior quality of the product became known, and a wide market was opened for it. From 1890 to 1900 the value of the total clay product increased 73.1 per cent. The sand deposits in the southern part of the State are of a quality that makes them valuable in the manufacture of glass, and glass has been produced in that section since pre-Revolutionary times. The leather industry is centred largely in Newark. Elizabeth has one of the largest sewing-machine factories in the United States. Chemicals, liquors, and tobacco goods are all extensively produced and have each made large gains. The first two are most important in Newark, the last in Jersey City. Extensive oil-refining works are located at Bayonne, where the surrounding water of New York Bay is of sufficient depth to enable ocean-going vessels to load from the docks. The table on the following page explains itself.

Forests and Forest Products. The primeval forests, consisting mainly of hard woods, have been almost wholly removed, but there is considerable merchantable second-growth timber. In 1900 the woodland was estimated at 3234 square miles, or 43 per cent. of the State's area. The value of the timber cut did not show any marked tendencies to increase or decrease in the last half of the nineteenth century, the maximum value, $2,745,317, being attained in 1870. The value of the planing-mill products, etc., may be seen in the table on the following page.

Transportation and Commerce. New Jersey is well provided with transportation facilities. Railroads which approach New York City from the west or Philadelphia from the east necessarily traverse its territory. New Jersey, therefore, has a greater railroad mileage in proportion to its area than any other State. The mileage increased from 560 in 1860 to 2109 miles in 1890, and 2242 miles in 1900. The terminals of the lines centring in New York City are on the New Jersey side of the Hudson River.

The canals of New Jersey were once its principal commercial channels. The Morris Canal, 101 miles long, from Jersey City to the Delaware River at Phillipsburg, has always transported vast quantities of coal from Pennsylvania to New York, and now belongs to the Lehigh Valley Railroad. It cost originally $14,000,000. The Delaware and Raritan Canal, from New Brunswick to Bordentown, 43 miles long, with a feeder to Trenton, 22 miles, was built in the early part of the nineteenth century at a cost of $3,935,287. It is under lease to the Pennsylvania Railroad.

Banks. In 1804 two banking companies were chartered by the Legislature, one to do business in Newark and the other in Trenton. A general banking law was passed in 1812 for the protection of depositors. This law remained in force till 1850. Reports were made obligatory, the total indebtedness and the rate of discount were limited. But the provisions of the law were avoided, and a number of speculating banks flooded the State with worthless paper. This condition of affairs and the suspension of specie payment in 1837 led to a reform in 1850. Another general banking law was passed. Under this statute the bank circulation had to be guaranteed by deposits of collateral security—bonds of States, etc. The limits of loans on real estate were strictly set and investigations of the banks made possible. In 1860 there were eight banks of issue. Besides these, there were a number of specially incorporated banks of discount and deposit. In 1859 the number was 36, but most of them availed themselves of the national banking law, and there were only five left in 1870. State banks became somewhat more popular toward the end of the century. They numbered 18 in 1902.

COMPARATIVE SUMMARY OF FIFTEEN LEADING INDUSTRIES

INDUSTRIES	Year	Number of establishments	Average number wage-earners	Value of products, including custom work and repairing
Total for selected industries for State	1900	1,780	117,008	$258,421,105
	1890	1,367	77,974	156,491,146
Increase, 1890 to 1900	......	413	39,034	$101,929,959
Per cent. of increase	......	30.2	50.1	65.1
Per cent. of total of all industries in State	1900	11.5	48.4	42.2
	1890	14.8	44.9	44.1
Textiles, total	1900	321	46,932	$72,921,528
	1890	242	33,860	52,855,496
Cotton goods, including cotton small wares	1900	25	5,681	6,930,766
	1890	17	5,632	5,902,615
Dyeing and finishing textiles	1900	59	7,074	10,488,963
	1890	41	3,735	6,183,397
Silk and silk goods	1900	180	24,157	39,966,662
	1890	132	17,445	30,760,371
Woolen goods	1900	13	2,942	4,755,398
	1890	21	4,165	5,652,166
Worsted goods	1900	11	3,910	6,823,721
	1890	6	937	2,058,662
Iron and steel	1900	25	8,288	24,381,699
	1890	28	5,150	11,018,575
Foundry and machine-shop products	1900	353	17,918	32,621,229
	1890	249	12,798	21,666,955
Electrical apparatus and supplies	1900	35	2,798	6,447,154
	1890	3	425	744,274
Sewing machines and attachments	1900	4	4,701	6,643,348
	1890	3	3,931	4,177,330
Jewelry	1900	100	2,779	7,379,777
	1890	74	1,757	4,724,500
Pottery, terra cotta, and fire-clay products	1900	81	8,117	8,940,723
	1890	60	4,425	5,165,537
Glass	1900	26	5,383	5,098,822
	1890	34	5,688	5,218,152
Rubber and elastic goods	1900	37	2,609	8,458,274
	1890	12	926	2,135,705
Leather—tanned, curried, and finished	1900	77	4,178	13,747,155
	1890	31	706	2,780,016
Liquors, malt	1900	45	1,723	14,386,456
	1890	34	1,174	10,018,393
Tobacco—chewing, smoking, and snuff	1900	12	1,955	7,788,379
	1890	4	131	348,814
Cigars and cigarettes	1900	486	1,640	2,647,595
	1890	444	1,051	1,909,406
Chemicals	1900	61	3,048	12,207,289
	1890	44	1,712	8,146,795
Petroleum, refining	1900	4	2,951	29,649,460
	1890	4	2,610	20,711,826
Lumber, planing-mill products, including sash, doors, and blinds	1900	113	1,993	5,107,217
	1890	101	1,635	4,869,372

In 1868 there were 55 national banks, and in 1900, 115. A Department of Banks and Insurance was established in 1891. The banking law was revised in 1899. Trust companies have rapidly multiplied in the State since 1880, under the influence of the organization of gigantic corporations, which have made the State conspicuous. In ten years the number of these increased from 11 to 23, and the deposits increased eightfold. Savings banks were established early (1828). A law for regulating them was passed in 1876. It remains almost unchanged. The condition of the various banks in 1902 is shown in the following table:

	National banks	State banks	Trust companies	Savings banks
Number of banks	124	18	47	28
Capital	$17,164,000	$1,593,000	$9,321,000	....
Surplus	11,375,000	979,000	6,890,000	$6,060,000
Cash, etc	5,965,000	493,000	1,823,000	423,000
Deposits	87,949,000	8,960,000	67,642,900	69,866,000
Loans	80,248,000	8,053,000	56,105.000	28,812,000

FINANCES. The beginning of the Civil War found the State in a satisfactory financial condition. It became involved in heavy war expenses, and a loan of $2,000,000 and a State tax of $100,000 for war purposes were authorized in 1861. In 1866 the total war debt amounted to $3,305,200. Besides, the minor civil divisions of the State (counties and towns) spent more than $23,000,000 for war purposes. This debt was totally extinguished by the redemption of the last $71,000 on January 1, 1902.

In the matter of taxation New Jersey is in advance of many States, having long ago solved the problem of conflict between State and local taxation by entirely dividing these two fields. Even between 1840 and 1850 the income of the State was largely derived from taxes on the gross receipts of railroads ('transit duties' was their official designation), taxes on capital stock of railroads, etc. A State tax upon general property was only introduced in 1861 for war purposes, and though it existed for twenty years, it was exceedingly small. In 1880 7.5 per cent. of the income was derived from corporation taxes. New laws for taxation of railroads, as well as other corporations, were passed in 1884 and 1885, and were declared constitutional after a hard struggle. Since then the only State tax on general property is collected for the purposes of the school fund. The whole sum collected is returned to the towns. This is therefore a State tax in form only.

The income of the State Government is derived from taxes on railroads (70 to 75 per cent.) and other corporations (15 per cent.), and fees, licenses, etc. Since 1890 taxes on new corporations, of which so many have been formed in New Jersey, have constituted a large share of the receipts. In 1902 the total receipts of the general State fund were $4,317,846, of which $2,866,363 came from corporation taxes. The expenditures reached $3,924,811, leaving a balance of $393,035. But of the general fund, $883,978 was distributed among the counties for school purposes. Besides, the State collected and redistributed among the counties $1,486,806 as school tax, and $400,784 as a local railroad tax. The school fund amounts to $3,839,692. Though there was no debt, the sinking fund contained $172,550.

GOVERNMENT. The present Constitution was ratified by the people in 1844, and amended at a special election in 1875. Proposed amendments must receive the approval of a majority of the members elected to both Houses at two consecutively chosen Legislatures, and afterwards the approval of a majority of the qualified electors. But amendments cannot be submitted to the people oftener than once in five years. Voters must be citizens who have resided in the State one year, and in the county five months. An elector is not deprived of his vote by reason of being in the actual military service of the army or navy of the State or United States. The registration of voters is required by law. The capital is Trenton.

LEGISLATIVE. The Legislature, meeting annually, and unlimited as to session, is composed of 21 Senators, one from each county, elected for three years, and of Representatives, not to exceed 60, elected for one year, from the counties on the basis of population, every county being at all times entitled to one member. The salary of a Representative is $500. State elections are held annually on the Tuesday after the first Monday in November. Revenue bills originate in the Lower House.

EXECUTIVE. The Governor is elected for three years, and cannot be reëlected until three years shall have elapsed. He can convene extra sessions of the Legislature or of the Senate alone. The Governor's veto of bills or items of appropriation bills is overridden by a majority vote of the whole number elected to each House. In conjunction with the six judges of errors and appeals and the Chancellor, the Governor grants pardons, etc. The president of the Senate and the Speaker of the House respectively succeed to the Governorship in case of a vacancy. The State Treasurer and Controller are appointed for three years by the Senate and General Assembly in joint meeting. The Attorney-General, prosecutors of the pleas, clerk of Supreme Court, clerk of the Court of Chancery, Secretary of State, and keeper of the State prison are appointed for five years—by the Governor and Senate.

JUDICIARY. The distinction between courts of law and courts of equity is still maintained in New Jersey. The judges are appointed by the Governor, the judges of the Supreme Court and Chancellor for seven years, others for five years—all subject to confirmation by the Senate. The first or lower courts are the county courts of common pleas and oyer and terminer, presided over by a single judge; an orphan's court; and court of general quarter sessions of the peace. Next above is the Supreme Court, which makes the circuit of the State, and is composed of a Chief Justice and eight associates. A prerogative court is presided over by the Chancellor alone. The Court of Errors and Appeals in the last resort is composed of the Chancellor, the justices of the Supreme Court, and six judges specially appointed. The Senate acts as a court for the trial of cases of impeachment.

LAWS, ETC. A wife holds property acquired before marriage free from control of her husband or liability for his debts. If living with her husband, she cannot convey her real property without his consent. The legal and only rate of interest is 6 per cent. A State Board of Agriculture was established in 1886, and there are a board of health and bureau of vital statistics. Each city and township is required to have local boards of health.

LOCAL GOVERNMENT. County sheriffs and coroners are elected by the people for terms of three years, but cannot be their own immediate successors. The counties also elect clerks and surrogates for terms of five years. The townships elect justices of the peace for terms of five years. The affairs of towns and counties are regulated according to general laws, and special laws cannot be passed relating to them.

The State has ten Representatives in the Lower House of Congress.

MILITIA. The number of men of militia age in the State in 1900 was 422,758. The number of militia in 1901 was 4038.

POPULATION. The growth of the population is shown by the following figures: 1790, 184,139; 1820, 277,426; 1850, 489,555; 1860, 672,035; 1870, 906,096; 1880, 1,131,116; 1890, 1,444,933; 1900, 1,883,669. From the 9th position in 1790 New Jersey fell to 21st in 1860, but rose again to 16th in 1900. Both the absolute and the proportionate increase have been much greater since 1840 than prior to that year. The absolute increase was greatest from 1890 to 1900, the percentage of increase being 30.4, as compared with 20.7 for the United States, and was exceeded only in one State east of the Mississippi River. The recent rapid growth is due largely to the heavy immigration of foreigners. Of the 431,884 foreign-born, according to the census of 1900, about one-half were German or Irish, the most prominent among the remainder being the English and Italians. In the same year the negroes numbered 69,844. The density of the population—250.3 to the square mile—is exceeded in only two States. The increase from 1890 to 1900 has been almost wholly on the part of the urban population. In 1900 the 49 cities containing over 4000 inhabitants each, together contained 67.5 per cent. of the total population, only three States having as high a percentage of urban population.

CITIES. In the State of New Jersey in 1900 the population of the ten largest cities was as follows: Newark, 246,070; Jersey City, 206,433; Paterson, 105,171; Camden, 75,935; Trenton, 73,307; Hoboken, 59,364; Elizabeth, 52,130; Bayonne, 32,722; Atlantic City, 27,838; Passaic, 27,777.

RELIGION. The Roman Catholics form about 16 per cent. of the total population of the State.

The principal Protestant denominations are the Methodist, with about 19 per cent. of the total number of church members; the Presbyterian, 12 per cent.; the Baptist, 8 per cent.; and the Protestant Episcopal and the Reformed, with about 6 per cent. each.

EDUCATION. The question of education received attention at a very early date. Bergen had a school as early as 1661, and the charter of Woodridge (1669) provided for the granting of 100 acres of land for school purposes. The arrival of the Quakers gave an additional impetus. Even before the foundation of Princeton University, a number of classical schools were in existence. The finances for schools were not infrequently obtained by means of lotteries. After the Revolutionary War the matter of education, which had been almost entirely neglected during the struggle for freedom, again came to the fore. In 1816 the State Legislature laid the foundation of a permanent school fund by a grant of $16,000; and in 1824 a provision was made for the addition of one-tenth of all the annual State taxes. In 1871 a free public school system was established.

The educational affairs of the State are under the supervision of a State superintendent, appointed by the Governor and the Senate for three years, and of a board of education, whose 16 members are also appointed by the Governor and Senate. The State has a compulsory education law, and provides free text books and school supplies. The illiterate population in 1900 amounted to 5.9 per cent. of the total population of ten years and over. The proportion of illiteracy among the native whites is 1.7 per cent.; foreign whites, 14.1 per cent.; colored, 17.5 per cent. The 1893 public schools of the State employed, in 1901, 7561 teachers, of whom only 998 were males. The average monthly salaries received were $91.87 for male and $52.88 for female teachers. The length of the school term in 1901 was 183 days. The revenue for educational purposes amounted in 1901 to $6,718,189, of which $200,000 was derived from the permanent school fund and the rent of school lands, $2,399,724 from State taxes, and $4,079,945 from local taxes. The expenditures for the same year amounted to $7,189,712, or $32.49 per pupil in average attendance. The evening schools maintained in the larger cities of the State had an average attendance of 5397 in 1900.

For the preparation and training of teachers there are the State Normal School at Trenton and its auxiliaries and the Model and Farnum Preparatory schools. New Jersey had, in 1900, 170 public and private high schools and academies, with a total of 15,158 students. Technical education is provided by Stevens Institute (q.v.) at Hoboken and the Newark Technical School. The principal institutions for higher education are Princeton University, at Princeton; Stevens Institute of Technology, at Hoboken; Saint Peter's College (R. C.), at Jersey City; Saint Benedict's College (R. C.), at Newark; Rutgers College (Reformed), at New Brunswick; Seton Hall College (R. C.), at South Orange; and Bordentown Female College, at Bordentown.

CHARITABLE AND PENAL INSTITUTIONS. There is a State board of charities. Care and instruction of the deaf and dumb were provided in New York City and Buffalo until 1883, when a State institution was completed at Trenton. The blind are taken care of in New York and Pennsylvania institutions. There are a State training school for feeble-minded children and a State institution for feeble-minded women, both at Vineland. The home for disabled soldiers is at Kearney. An industrial school for girls at Trenton is maintained by the State. A State reform school for juvenile delinquents is located at Jamesburg in Middlesex County. The city of Newark also maintains a reformatory home at Verona. The old State lunatic asylum is at Trenton. This institution derives a revenue from the care of private patients. The asylum for the insane near Morristown is one of the finest structures for the purpose in the country, having cost about $2,500,000. It can accommodate upward of 1000 patients. The total expense for the insane and the poor in the fiscal year 1899-1900 was $1,812,962. The State prison is at Trenton. In 1884 the Legislature passed a bill abolishing contract convict labor in the prison. The inmates must now be employed upon goods used in institutions under State control, on the public-account system, or on the piece-price plan. A system of releasing certain inmates of the State prison on parole has been in operation since 1891.

HISTORY. The territory included within the limits of the present State was claimed by the Dutch without any definite boundaries as a part of New Netherland, and between 1614 and 1621 settlements were made in what is now Bergen County. Swedes and Danes also settled on the Delaware River, but were brought under the jurisdiction of the Dutch by Governor Stuyvesant. In 1664 this whole region was granted to James, Duke of York, by Charles II., but before James took possession he conveyed to John, Lord Berkeley, and Sir George Carteret the land between the Delaware and Hudson rivers, bounded on the north by a line drawn from 41° 21′ on the Delaware River to 41° on the Hudson, the present boundaries. In 1664-65 Berkeley and Carteret granted a form of government and settlement, the 'Concessions,' which allowed a popular assembly, and under which the colony was governed until the Revolution. Philip Carteret was sent over as Governor in 1665, and made Elizabeth-Town his capital. On March 18, 1674, Berkeley sold his interest to John Fenwick, in trust for Edward Byllinge, both Quakers, for £1000, and in 1676 the province was divided by a line drawn from Little Egg Harbor to the northwest corner. The Quakers took the western half, known as 'West New Jersey,' while Carteret retained 'East New Jersey.' Soon Byllinge surrendered his title to William Penn and others as trustees for his creditors, and West Jersey was divided into one hundred shares, of which Fenwick retained ten. Each of these shares carried with it the same rights of sovereignty which had been granted to the Duke of York. When the question was raised as to whether the Duke of York, not being a sovereign, could transfer the rights of government, Sir Edmund Andros, then Governor of New York, arrested Philip Carteret and Fenwick, and attempted to assume control. He was forced to give way in 1681, however, and the colonies continued to be governed by the proprietors. In 1682 Carteret's heirs sold East Jersey to William Penn and his associates. The proprietors of both colonies in 1702 ceded their right of government to the Crown, and the colonies were united and placed under the Governor of New York, though New Jersey retained its separate assembly. There was freedom of worship, but political privileges were withheld from Roman Catholics, and even as regards others the possession of at least two hundred acres of land or of property valued at £50 was a necessary qualification for the suffrage. In 1738 the province received a separate Governor. Manufacturing began very early. A paper mill was established at Elizabeth in 1728, and in 1769 forty of these were in operation. By 1750 the population was about 80,000. A glass factory was begun in 1748. In 1791 the Society for the Encouragement of Useful Manufactures was chartered, with the exclusive right of utilizing the falls of the Passaic, and the town of Paterson was founded. The first Provincial Congress met at New Brunswick, July 21, 1774. In 1776 the Royal Governor, William Franklin, was deposed, and on July 2, 1776, the Provincial Congress adopted a 'Constitution' for the 'Colony of New Jersey' without submitting it to the people. Under this instrument the Governor was to be chosen annually, and was to be executive, president of the council, and chancellor, thus combining executive, legislative, and judicial functions. On July 18th the Provincial Congress ratified the national Declaration of Independence, and changed the title of the colony to the 'State of New Jersey.' During the Revolution the State did its full duty, and was the scene of many of the battles of the war. (For military operations during the War of the Revolution, see UNITED STATES.) The State hesitated to enter a Federal union out of fear of the larger States. In the constitutional convention of 1787 William Paterson (q.v.), one of her delegates, proposed the famous 'New Jersey Plan,' which provided for a single legislative House, in which each State should have one vote. The State ratified the Constitution, December 18, 1787. The capital was fixed at Trenton in 1790, and the history of New Jersey for many years after that was one of increasing prosperity. In 1844 a new constitution was adopted, providing for a term of three years for the Governor, and taking away his judicial duties. In 1875 the Constitution was thoroughly revised. The word 'white' was struck from the suffrage clause, though, of course, it had been a dead letter since the adoption of the Fifteenth Amendment to the United States Constitution. Politically, the State has generally inclined toward the Democratic Party. In 1796, 1800, and 1812, it supported the Federalist candidates; from 1836 to 1848 it was Whig; in 1860 it gave four votes to Lincoln and three to Douglas; in 1872 it cast its vote for Grant: and in 1896 and 1900 it went Republican on the money question. The following is a list of the colonial and State Governors of New Jersey:

GOVERNORS OF EAST AND WEST JERSEY AFTER THE UNION

Edward, Lord Cornbury*	1702–08
John, Lord Lovelace*	1708–09
Robert Hunter*	1710–19
William Burnet*	1720–28
John Montgomerie*	1728–31
Lewis Morris (pres. Council)	1731–32
William Cosby*	1732–36
John Anderson (pres. Council)	1736
John Hamilton (pres. Council)	1736–38

* Also Governors of New York.

GOVERNORS OF NEW JERSEY ONLY

Lewis Morris	1738–46
John Hamilton (pres. Council)	1746
John Reading (pres. Council)	1746–47
Jonathan Belcher	1747–57
John Reading (pres. Council)	1757–58
Francis Bernard	1758–60
Thomas Boone	1760–61
Josiah Hardy	1761–62
William Franklin	1762–76

GOVERNORS OF THE STATE

William Livingston	Federalist	1776–90
William Paterson	"	1790–93
Richard Howell	"	1793–1801
Joseph Bloomfield	Democratic-Republican	1801–02
John Lambert (acting).	" "	1802–03
Joseph Bloomfield	" "	1803–12
Aaron Ogden	Federalist	1812–13
William S. Pennington	Democratic-Republican	1813–15
Mahlon Dickerson	" "	1815–17
Isaac H. Williamson	" "	1817–29
Garret D. Wall (declined).	Democrat	1829
Peter D. Vroom	"	1829–32
Samuel L. Southard	Whig	1832–33
Elias P. Seeley	Democrat	1833
Peter D. Vroom	"	1833–36
Philemon Dickerson	"	1836–37
William Pennington	Whig	1837–43
Daniel Haines	Democrat	1843–44
Charles C. Stratton	Whig	1845–48
Daniel Haines	Democrat	1848–51
George F. Fort	"	1851–54
Rodman M. Price	"	1854–57
Wm. A. Newell	American	1857–60
Charles S. Olden	"	1860–63
Joel Parker	Democrat	1863–66
Marcus L. Ward	Republican	1866–69
Theodore F. Randolph	Democrat	1869–72
Joel Parker	"	1872–75
Joseph D. Bedle	"	1875–78
George B. McClellan	"	1878–81
George C. Ludlow	"	1881–84
Leon Abbett	"	1884–87
Robert S. Green	"	1887–90
Leon Abbett	"	1890–93
George T. Werts	"	1893–96
John W. Griggs	Republican	1896–98
David O. Watkins (acting).	"	1898
Foster M. Voorhees	"	1898–1902
Franklin Murphy	"	1902 —

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NEW JERSEY, COLLEGE OF. See PRINCETON UNIVERSITY.

NEW JERSEY TEA. An American shrub. See CEANOTHUS; and Plate of MINT, ETC.

NEW JERUSALEM CHURCH. See SWEDENBORGIANS.

NEW KEN'SINGTON. A borough in Westmoreland County, Pa., 18 miles northeast of Pittsburg; on the Allegheny River, and on the Buffalo and Allegheny River division of the Pennsylvania Railroad (Map: Pennsylvania, B 3). It is known as a centre of large steel and iron industries, and for its brewing interests. There are also in the vicinity manufactories of glass and white lead. Population, in 1900, 4665.

NEW LAN'ARK. A village near Lanark, Scotland, where Robert Owen put into operation his plans for industrial reorganization looking toward the betterment of the workingman. See LANARK and OWEN, ROBERT.

NEW'LANDS, FRANCIS GRIFFITH (1848—). A United States Senator from Nevada, born at Natchez, Miss. He studied at Yale College and the Columbian Law School, practiced law in San Francisco, and, having become a citizen of Nevada, represented that State in the national House of Representatives from 1893 to 1903, when he was elected to the Senate. He has been a strong advocate of Western irrigation and of the free coinage of silver.

NEW LAWS. A code promulgated by Charles V. at Madrid in 1543 for the protection of the Indians in the Spanish colonies. The New Laws (Sp. *Nuevas Ordenanzas*), which were due to the influence of Bartolomé de las Casas, 'the Apostle of the Indies,' restricted slavery and provided for the religious instruction of the Indians. The laws were opposed by the colonists, and in Peru were largely the cause of the rebellion under Gonzalo Pizarro. By 1560 they had ceased to be effective.

NEW LEB'ANON. A town in Columbia County, N. Y., 24 miles southeast of Albany; on the Chatham and Lebanon Valley Railroad (Map: New York, G 3). It includes several villages, among which Lebanon Springs, a popular summer resort, noted for thermal springs, and Mount Lebanon, the site of a Shaker village, are best known. The town is engaged principally in agriculture, and in manufacturing patent medicines, thermometers, and barometers, glass, flour, lumber, chairs, brooms, and baskets. Population, in 1890, 1765; in 1900, 1556.

NEW LEINSTER. The former name of Stewart Island. See NEW ZEALAND.

NEW LEX'INGTON. A village and the county-seat of Perry County, Ohio, 21 miles south by west of Zanesville; on the Toledo and Ohio Central, and the Cincinnati and Muskingum Valley railroads (Map: Ohio, F 6). It has Saint Aloysius Academy and a handsome court house. There are some manufactures, clay works being among the leading establishments, and in the vicinity are extensive coal fields. Population, in 1890, 1470; in 1900, 1701.

NEW LIGHT. A fish. See CRAPPIE.

NEW LON'DON. A city, port of entry, and one of the county-seats of New London County, Conn., 14 miles south of Norwich, the other county-seat, and 51 miles east of New Haven; on the Thames River, about three miles above its entrance into Long Island Sound, and on the New York, New Haven and Hartford and the Central Vermont railroads (Map: Connecticut, G 4). It has direct communication with New York by steamboat, and an excellent harbor defended by Forts Trumbull and Griswold. Just above the city, on the east side of the river, is a small United States naval station. New London is a delightful place of residence and popular resort in summer. Among its features of interest are a fine soldiers' and sailors' monument, a handsome public library, the New London County Historical Society and Library, the Hempstead House, one of the oldest houses in Connecticut, the Old Town Mill, erected in 1646 and still in operation, the little schoolhouse in which Nathan Hale was a teacher, Boulder Park on the Thames, White Beach, a popular and attractive bathing beach, Williams Park, Memorial Park, and the great railroad drawbridge completed in 1890. The annual Yale-Harvard boat race is rowed on the Thames. New London was formerly the seat of extensive whaling and sealing interests, which are still of some importance, though manufacturing is the leading industry. The principal establishments are silk mills, a woolen mill, ship yards, foundries and machine shops, a cotton-gin factory, bed-quilt mills, and printing-press works. The government, under a charter of 1894, is administered by a mayor, chosen every three years, and a unicameral council that controls elections to subordinate departments, excepting that of the schools, which is chosen by popular vote. The waterworks are owned and operated by the municipality. Population, in 1889, 13,757; in 1900, 17,548.

New London was founded in 1646 by John Winthrop, the younger, and until 1658, when it received its present name, was known as Nameag. During the 'Great Awakening' of 1741 there was a remarkable manifestation of religious enthusiasm here. On September 6, 1781, General Arnold, at the head of a large British force, and assisted by a fleet of thirty-two vessels, attacked New London, killed a number of its inhabitants, and burned nearly all of the wharves and stores. (See GROTON.) New London was incorporated in 1784. Consult: Caulkins, *History of New London* (New London, new ed., 1900); Starr, *A Centennial Historical Sketch of the Town of New London* (ib., 1876); and an article, "Historic New London," in *New England Magazine*, vol. v. (Boston, 1887).

NEW MAD'RID. A city and the county-seat of New Madrid County, Mo., 40 miles south by west of Cairo, Ill.; on the Mississippi River, and on the Saint Louis Southwestern Railroad (Map: Missouri, G 5). The centre of a productive region, it has a large river commerce in grain, lumber, cotton, live-stock, etc. There are cotton gins, and manufactories of lumber, veneer, staves, and flour. Population, in 1890, 1193; in 1900, 1489. New Madrid was founded in 1788 as a Spanish settlement, by a few American frontiersmen. For a time during the Civil War it was an important Confederate military station, but on March 14, 1862, it was abandoned and fell into the hands of the Federal forces.

NEWMAN, nū'man, EDWARD (1801-76). An English naturalist and publisher, born at Hampstead, in Middlesex. In boyhood he showed an unusual interest in natural history, and, though engaged in various business enterprises, throughout his life he devoted much time to scientific study. He was one of the four founders of the Entomological Club in London (1826), out of which, largely through his efforts, grew the Entomological Society (1833). In 1840 he established *The Entomologist*, which three years later he incorporated in *The Zoölogist*, and this magazine he edited until 1863. Newman also founded

The Phytologist, to which he contributed from 1841 to 1854, and from 1858 until his death he was the natural history editor of the *Field*. Among his works are: *Grammar of Entomology* (2d ed. 1841); *History of British Ferns* (1840), an accurate work, illustrated by the author and subsequently greatly enlarged; *Birdsnesting* (1861); an edition of Montagu's *Dictionary of British Birds* (1866); *Illustrated History of British Moths* (1869); and of *Butterflies* (1870-71). His contributions to the *Field* contain some of the first work done in economic entomology. Newman was one of the last of those general naturalists who have now given way to the specialist.

NEWMAN, Francis (?-1660). An English colonist in America, Governor of New Haven Colony in 1658-59. He was born in England, and emigrated to New Hampshire in 1638, but after a few months removed to the Connecticut Valley, and became prominent in the affairs of the colony at New Haven. There he served as an ensign and lieutenant in the colonial militia or trained bands (1642-45), as secretary of the colony under Governor Theophilus Eaton (1646-47), and as a magistrate and assistant in 1653. In the latter year he was one of the commissioners sent from the Connecticut River towns to Manhattan to demand satisfaction of Peter Stuyvesant, Governor of New Netherlands, for injuries sustained by the English colonists at the hands of the Dutch. In July, 1654, he became one of the commissioners of the United Colonies of New England, and in May, 1658, he succeeded Eaton as Governor of the New Haven Colony, retaining the office until September, 1659.

NEWMAN, Francis William (1805-97). An English scholar and writer, brother of John Henry Newman. He was born in London, June 27, 1805, and, with his brothers, attended the school at Ealing. Thence he passed to Worcester College, Oxford, and in 1826 obtained a fellowship in Balliol College. He withdrew from the university in 1830, declining the subscription to the Thirty-nine Articles. After a tour in the East he was appointed classical tutor in Bristol College (1834). In 1840 he accepted a similar professorship in Manchester New College, and in 1846 was appointed to the chair of Latin in University College, London, which he held till 1869. During all this time he was an active contributor to literary and scientific periodicals, and maintained a leading part in the controversies on religion, in which he took the line directly opposite to that chosen by his elder brother, being no less ardent as a disciple of the extreme rationalistic school than John Henry Newman of the dogmatical. These opinions, and the system founded upon them, form the subject of his work, *Phases of Faith, or Passages from the History of My Creed* (1850); and the book constitutes a religious autobiography, recounting Newman's transformation from a Calvinist to a rationalistic theist. In 1849 he had published *The Soul, its Sorrows and its Aspirations*, a sympathetic though trenchant examination of man's spiritual nature in its relation to God. Probably for these two books, strongly personal and earnest and less eccentric than most of his other writings, Newman will be best remembered. He was extraordinarily versatile and treated his many subjects with marked enthusiasm and ability. Of his many publications, those regarding religious controversy, besides the two already mentioned, include: *Catholic Union: Essays Towards a Church of the Future* (1844); *A State Church Not Defensible* (1845). Political and social topics are represented by: *Radical Reforms, Financial and Organic* (1848); *Lectures on Political Economy* (1851); *On the State Provision for Vice* (1871); *Remedies for the Great Social Evil* (1889); *Europe of the Near Future* (1871). A large number are devoted to historical, classical, and scientific subjects, the most important of which are: *Contrasts of Ancient and Modern History* (1847); translations into 'unrhymed metre' of the *Odes of Horace* (1853), and the *Iliad of Homer* (1856); a treatise on *Difficulties of Elementary Geometry* (1841); *Handbook of Modern Arabic* (1866); *Orthoepy* (1869); *Miscellanies* (1869-89); *Dictionary of Modern Arabic* (1871); *Early History of Cardinal Newman* (1891). He died at Weston-super-Mare, October 4, 1897.

NEWMAN, Henry Roderick (1833—). An American water-color painter, born in New York City. He gave up the study of Medicine, to become an artist, at the age of eighteen years. He went to France in 1870, and, after traveling through Switzerland, settled in Venice (1871), and later removed his studio to Florence. Ruskin has expressed admiration for his works, which are good in technique. They consist mostly of architectural, landscape, and flower pieces. "Venice," "Tuscan Spring," "The Florence Cathedral," and "The Gulf of Spezia" are among his most celebrated paintings. His other works include: "A Study of Pink and White Oleanders," "Grapes and Olives," "Flowers," and "An Architectural Study."

NEWMAN, John Henry (1801-90). An English religious leader, first in the Church of England and later in the Roman Catholic Church. He was born in London, February 21, 1801, and educated first at a private school at Ealing, then at Trinity College, Oxford, which he entered when he was not quite sixteen. He won a scholarship two years later, and took his degree in 1820. In 1822 he was elected to a fellowship at Oriel, then the highest distinction of Oxford scholarship, which brought him into close relations with many of the most distinguished men of the time; among them was a brother fellow, Edward Bouverie Pusey, with whom he was to be most closely associated in the work of the Oxford Movement. He was ordained deacon in 1824, and combined with his college position the curacy of Saint Clement's Church. A year later, his friend Whately having become principal of Saint Alban's Hall, Newman was made vice-principal, but resigned the appointment on being named tutor in his own college (1826). In 1828, on the election of Hawkins as provost of Oriel (partly through Newman's influence, though Keble was also a candidate), Newman succeeded him as vicar of Saint Mary's, the university church, and the position which he thus gained gave him a commanding power, by the wonderful sermons which he preached in this pulpit, over a whole generation. He resigned his tutorship in 1832, owing to differences with Hawkins as to college arrangements. He made his first visit to the Continent soon afterward and returned in time to hear Keble's famous assize sermon on National Apostasy (July 14, 1833), which he always considered as the actual origin of the

Movement. (For the complete history of its development, see **Oxford Movement**.) Here it is enough to say that from the first Newman was its acknowledged head; the charm of his personality, the ascetic fervor of his life, and the fame of his preaching gave him a tremendous power. He was one of the chief contributors to the *Tracts for the Times*, twenty-nine of which, including the famous No. 90, which proved the end of the series, are from his pen. The same year that witnessed their beginning (1833) saw the publication of his book on *The Arians*, which was followed in 1837 by *The Prophetical Office of the Church;* in 1838 by works on Justification, on the Canon of Scripture, and on Antichrist. In this year also Newman became editor of the *British Critic*, holding the position until 1841, and began in conjunction with Keble and Pusey to publish a Library of Translations from the Greek and Latin Fathers. On a formal request from the Bishop of Oxford, he discontinued the publication of the *Tracts* in 1841, after the storm of opposition which No. 90, "Remarks on Certain Passages in the XXXIX. Articles," had aroused.

Already in 1839 in the course of his study of the history of the Monophysite controversy a doubt had come to him whether, after all, the Anglican position was tenable; and the condemnation of his position by bishops and heads of colleges showed him that his place in the Movement was gone. Parallel reasoning on the history of the Arian controversy, and the curious compromise of the Jerusalem bishopric (see **Jerusalem**), still further shook his allegiance to the Church of England.

In 1842 he retired from Oxford to the neighboring village of Littlemore, where he passed three years in seclusion, with a number of young men who had attached themselves to him, wrestling in silence with the problem thus presented to him. In the early part of 1842 he published a formal retractation of his adverse criticisms of the Roman Catholic Church, and in the following autumn, while he had not yet made up his mind, it seemed to him more honest to resign his living. The train of reasoning which occupied him throughout 1845, when he was engaged in the composition of his *Essay on the Development of Christian Doctrine*, finally brought him to the point, and on October 9th he became a Roman Catholic.

As his influence in Oxford and among thoughtful Anglicans had been tremendous, so the effect of this step was correspondingly great. A year after his reception he went to Rome and was there ordained priest. Soon afterwards he returned to England and introduced the Congregation of the Oratory (q.v.), which he thought specially adapted to the needs of the large towns. The greater part of his later life was spent in the house of the Oratory at Birmingham; from 1854 to 1858, however, he was in Dublin, as rector of the unsuccessful Catholic University there. Always deeply interested in education, he had planned to establish a house of the Oratory at Oxford, which might have allowed the young men of his Church to gain the advantages of the university; the project, opposed by Manning, fell through, but since his death his ideas have been vindicated by the establishment of a Catholic hall there. Constant literary activity marked all these years, of which the most remarkable fruits were his *Letter to the Duke of Norfolk* (1875), in which he explained and defended the position of Catholics as affected by the Vatican decrees in their bearing on civil allegiance, in reply to Gladstone; and his memorable *Apologia pro Vita Sua* (1864), which contained a most striking account of the inner workings of his mind during his whole manhood, and increased the veneration felt for him by all his countrymen, of whatever shade of theological opinion. It grew out of a memorable controversy with Charles Kingsley, who, by general consent, had much the worse of the argument. In 1877 Newman was elected an honorary fellow of Trinity College, Oxford, and revisited his loved *alma mater* for the first time in twenty-two years. Leo XIII. created him a cardinal in 1879, allowing him still to reside in England. He died at Birmingham, August 11, 1890.

Both as a great spiritual force and as a master of literary expression, Newman will always deserve a large space in any history of nineteenth century England. His literary style, always pure, melodious, and elevated, and owing much to years of familiarity with the Authorized Version of the Bible, is full of undecaying beauty. But it was only an expression of his mental habit. The dialectical skill which marks all his controversial work was governed by the conscience whose supremacy he was never tired of enforcing; and the chaste beauty of his style was but the outcome of that intense realization of the spiritual world which is the most characteristic feature of all his teaching.

A complete list of his writings would occupy too much space. A uniform edition of the more important of them was published under his own supervision (London, 1868-81). Besides those already named, mention should be made of his: *Essay in Aid of a Grammar of Assent* (1870); two works of fiction, *Callista, a Sketch of the Third Century* (1856), and *Loss and Gain*, a story of Oxford life in his own day (1848); numerous volumes of sermons, all characterized by his qualities; and some extremely beautiful verse, of which the best, with "The Dream of Gerontius," is included in *Verses on Various Occasions* (1868). Consult, besides most of the books referred to under **Oxford Movement**: *Letters and Correspondence of J. H. Newman During His Life in the English Church* (London, 1891); and sketches by R. H. Hutton (ib., 1891), Walters and Barrow (ib., 1901), and Whyte (New York, 1903); also an admirably thoughtful study of his writings in Shairp, *Studies in Poetry and Philosophy* (Edinburgh, 1866). His earlier life is also told by his brother Francis (London, 1891), and in *The Anglican Career of Cardinal Newman* (ib., 1892); his later, partly in Fitzgerald, *Fifty Years of Catholic Life and Progress* (ib., 1898).

NEWMAN, John Philip (1826-99). An American clergyman, Bishop of the Methodist Episcopal Church. He was born in New York City, and educated at Cazenovia (N. Y.) Seminary, which he quitted in 1848 to enter the ministry. He followed the itinerant life of a Methodist clergyman until 1860, when he went abroad for travel and study, visiting Egypt and Palestine, subsequently embodying the results of this trip in *From Dan to Beersheba, or the Land of Promise as It Now Appears* (1864). After

New Orleans was taken by the Federal army in 1862, he was sent there to organize the Methodist Episcopal Church, and remained until 1869, meanwhile editing, in addition to his other labors, the *New Orleans Advocate.* Leaving New Orleans, he became pastor of the Metropolitan Church at Washington, D. C. His personality was a combination of clergyman and man of the world; his pulpit eloquence, which inclined rather to the grandiose, nevertheless won for him a large popularity both within and outside his denomination. At the end of his first pastorate in Washington in 1872, President Grant appointed him inspector of consulates in Asia, and in this capacity he made a tour of the world, which resulted in another work of travel, *The Thrones and Palaces of Babylon and Nineveh from the Persian Gulf to the Mediterranean* (1876). In 1878 he assumed a pastorate in New York City, and in 1881 was a delegate to the first Ecumenical Methodist Conference in London, where he read the invited essay on *Scriptural Holiness,* said to mark his highest achievement as a writer. From 1882 to 1884 he was acting pastor at the Madison Avenue Congregational Church, New York. In 1885 he returned to the pastorate of the Metropolitan Church, Washington, and in 1888 was elected bishop of the Methodist Episcopal Church, with his official residence at Omaha, Neb. In addition to the works mentioned, he published: *Christianity Triumphant* (1884); *Evenings with the Prophets on the Lost Empires* (1887); *The Supremacy of Law* (1890); *Conversations with Christ* (1901).

NEW'MARKET. A market-town on the border of Suffolk and Cambridgeshire, England, 15 miles northeast of Cambridge (Map: England, G 4). The market-house and the celebrated Jockey Club are the chief edifices. The town owes its prosperity to the horse-races. The race-course of Newmarket, upward of four miles in length, is said to be the finest in the world, and the training ground bears a similar reputation for excellence. There are eight race-meetings held here annually. Population, in 1891, 8631; in 1901, 10,686. Consult Hore, *History of Newmarket and Annals of the Turf* (3 vols., London, 1886).

NEWMARKET. A town of York County, Ontario, Canada, 34 miles north of Toronto on the Northern Railway (Map: Ontario, D 3). It has busy trading interests and some manufactures. Population, in 1891, 2143; in 1901, 2125.

NEW MECK'LENBURG (formerly NEW IRELAND). The second largest of the Bismarck Archipelago (q.v.), situated in the Pacific Ocean, 350 miles northeast of New Guinea, and separated from New Pomerania, the largest of the group, by Saint George Channel (Map: Australasia, H 3). It is elongated, has an area of 4920 square miles, and consists for the most part of mountains covered with forests of large trees. Little is known of the interior of the island, but the coast lands are very fertile. Colonization of the island has been unsuccessful; there is a trading station on the north coast, but in 1897 there were only nine European inhabitants, the bulk of the population, whose number is unknown, being savage Melanesians.

NEW MEX'ICO. A southwestern Territory of the United States. It lies between latitudes 31° 20′ and 37° north, longitudes 103° 2′ and 109° 2′ west, and is bounded on the north by Colorado, on the east by Oklahoma and Texas, on the south by Texas and Mexico, and on the west by Arizona. It forms almost a perfect square, the line being somewhat broken on the southern boundary. The length along the western boundary is 400 miles; the greatest width, 358 miles. Area, 122,580 square miles. New Mexico exceeds in size every State in the Union except Texas, California, and Montana.

TOPOGRAPHY. The whole Territory is very elevated, only a small portion in the south lying below 4000 feet. The topography may be divided into several more or less well marked regions, running north and south. The eastern third of the Territory belongs to the Great Plains, which skirt the whole eastern base of the Rocky Mountains. In the northeastern part of the Territory this plain is watered by the Canadian River, south of which it slopes gradually into the level and arid plateau known as the Llano Estacado. West of this is the valley of the Pecos River, the lowest part of the Territory, falling near the southern boundary below 3000 feet. From the Pecos Valley the land rises westward into the Front Range of the Rocky Mountains, which issues from Colorado in a continuous line of lofty peaks, several of which are over 12,000 feet high. Toward the centre of the Territory the range becomes broken into isolated groups and mesas inclosing in the north park-like grassy plains, but toward the south arid and desolate valleys filled with lava beds and salt marshes. West of the Front Range is the narrow valley of the Rio Grande, traversing the whole length of the Territory. Finally, through the western part of the Territory stretches the great, broad plateau, the Continental Divide, which extends into Mexico as the Sierra Madre. Its average height is 7000 feet, though it sinks to 5000 feet in the south, and it is diversified by a number of mesas and isolated ranges from 8000 to 11,000 feet high.

CLIMATE AND VEGETATION. The climate is remarkably dry and healthful, and the air pure and clear. In the lower regions of the south the climate is mild throughout the year, but in the north the temperature sometimes falls below zero. At Santa Fe the mean temperature for the year is about 50°, for the warmest month 70°, and for the coldest 30°. The average rainfall for the whole Territory is about 15 inches, being nowhere sufficient for the needs of agriculture. Many of the mountain basins and river valleys are covered with nutritious grasses, one of the most common genera being the grama-grass (*Bouteloua*). The salt-grass (*Distichlis spicata*) often forms a dense sod over the alkali flats which abound especially on the western plateau. Bunch grasses cover many of the mesas and mountain slopes, but the sage brush is predominant in many of the plains, and the plateau toward the west becomes arid and desolate. Sycamore, cottonwood, oak, and other deciduous trees grow in the river-valleys, and some of the foothills carry growths of piñon and dwarf cedar, while extensive forests of pine, spruce, and cedar cover the higher mountains. With the possible exception of the alkali flats, the soil, wherever there is any, is said to be fertile and capable of becoming productive when irrigated.

For flora and fauna, see these sections in the article UNITED STATES.

Geology. The mountain ranges are generally upheavals of a nucleus of granite and syenite which has broken through the Paleozoic sandstones and Carboniferous limestone, these strata being upturned and exposed along their bases and slopes. The eastern plains are almost wholly Cretaceous, and the same formation occurs in the northern part of the western plateau. Intrusions of eruptive rocks are found in profusion in many parts of the Territory; these range from ancient volcanic rocks and dikes of porphyry to more recent lava flows which cover considerable areas both on the plateaus and in the valleys.

Mining. This industry is but little developed in comparison with its great possibilities. The mineral region is almost co-extensive with the mountain region. Coal and gold are among the minerals most mined. The output of the former increased from 157,092 short tons in 1882 to 1,086,546 short tons in 1901. The output of the latter shows an increase from 26,074 fine ounces in 1898 to 33,302 in 1901. The output of silver and copper, which had decreased for a number of years, has grown extraordinarily, the output of the former in 1901 being 563,400 fine ounces, as against 425,300 in 1898, and that of the latter having increased from 31,884 pounds in 1894 to 9,629,884 in 1901. Emeralds, turquoise, and other precious stones are being mined in increasing quantities. Other minerals produced are lead, iron, gypsum, kaolin, and fire clays.

Forests. The wooded area is given as 23,700 square miles. The United States has reserved tracts amounting to 4299 square miles, mostly about the head of the Gila River. The merchantable timber is found only in the mountainous regions, and is mainly yellow pine and spruce.

Agriculture. Irrigation is practicable and in practice along the water-courses. However, the possibilities of irrigation in New Mexico are not as vast as in some other Western commonwealths, owing to the comparative lack of large rivers and lakes. The irrigated areas are scattered throughout the Territory and are not large in any particular region. The Rio Grande River supplies water for a greater area than any other stream. Owing to evaporation and the use of the water in irrigation, this stream becomes dry in the southern part of the Territory during the irrigation season. Much water is wasted by the primitive system of irrigation employed by the Indians and Mexicans. There is a considerable irrigated area on the San Juan River in the northwest. Irrigation has not been introduced until recently in the eastern plain region. In 1899 there were 975 irrigation ditches with an aggregate length of 2382 miles. Their construction cost $4,140,319. There were under ditch 646,784 acres, of which 203,893 acres were irrigated, and 182,804 acres were in crops. The total area included in farms (both agricultural and stock) in 1900 was 5,130,878 acres, more than six times as great as the corresponding area in 1890.

Alfalfa is the most important crop. Wheat, corn, and other cereals are grown in fair quantities. The Rio Grande Valley produces a superior quality of grapes. Most of the temperate zone fruits are grown. New Mexico can produce sugar beets of the highest grade. The following table of acreages explains itself:

	1900	1890
Corn	41,345	28,589
Wheat	37,907	21,853
Oats	15,848	9,314
Beans	3,349	
Pease	2,220	
Hay and forage	87,358	26,375

Stock-Raising. New Mexico claims the possession of a combination of favorable conditions—mild climate, etc.—unrivaled for purposes of sheep-raising. This industry, ever since the advent of the Spaniards, has been of first importance. The number of sheep decreased between 1880 and 1890, but increased enormously in the following decade. There has also been a marked gain in the number of cattle and of horses. The grazing region is chiefly in the eastern part, where there is an abundance of 'mesquite' and other varieties of native grasses. Very little grazing is afforded in the arid tablelands west of the Rio Grande Valley. The following table shows the leading stock holdings:

	1900	1890
Dairy cows	16,775	18,507
Other cattle	975,084	559,004
Horses	131,153	38,130
Mules and asses	21,213	8,367
Sheep	3,333,743	1,248,970
Swine	20,426	10,471

Manufactures. The manufacturing interests are small, but had a marked growth between 1890 and 1900. In 1890 there were 127 establishments with $965,938 capital, as against 420 with $2,698,786 capital in 1900. Railroad repair shops were the most important establishments. The large sheep-raising interests explain the introduction of wool-scouring establishments, of which four were erected during the decade.

Transportation. The Atchison, Topeka and Santa Fe Railroad traverses the Territory from north to south, following the course of the Rio Grande. The Santa Fe Pacific branch of the above railroad connects the Territory with the Pacific Coast. The Southern Pacific crosses the southern portion of the Territory, and the Pecos Valley and the El Paso and Northeastern railroads have recently been constructed through the eastern part. In 1900 the total number of miles was 1779. There are no navigable streams.

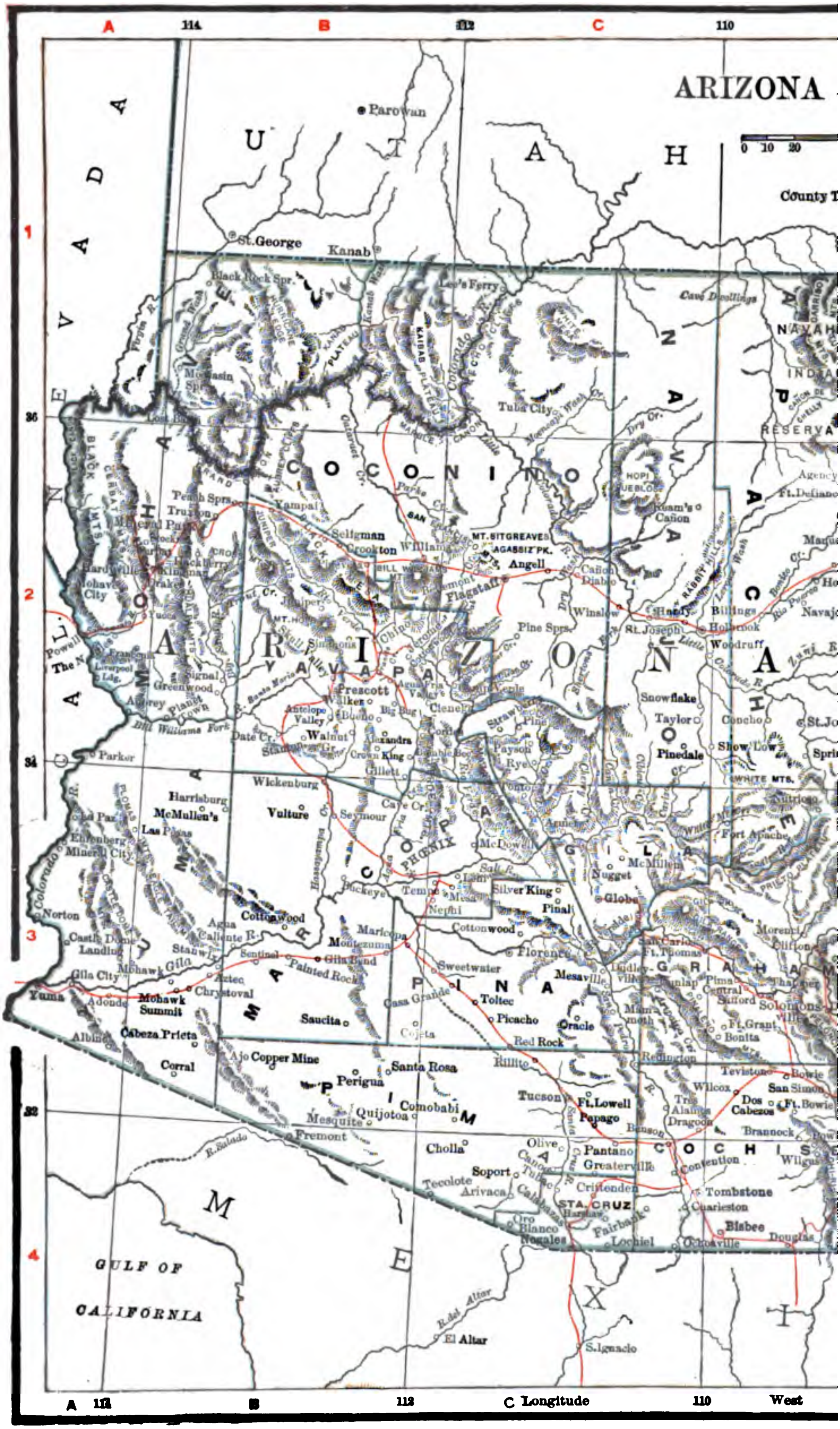
Banks. The first bank in the Territory was a national bank organized in 1871. In 1888 some banks were organized under the Territorial laws. The Territorial banking law provides for yearly reports and examinations. In 1902 there were 15 national banks, with a capital of $1,012,000; surplus, $171,000; cash, etc., $430,000; deposits, $5,033,000; and loans, $3,688,000; and 12 Territorial banks, with capital of $417,000; surplus, $52,000; cash, etc., $148,000; deposits, $1,783,000; and loans, $1,354,000.

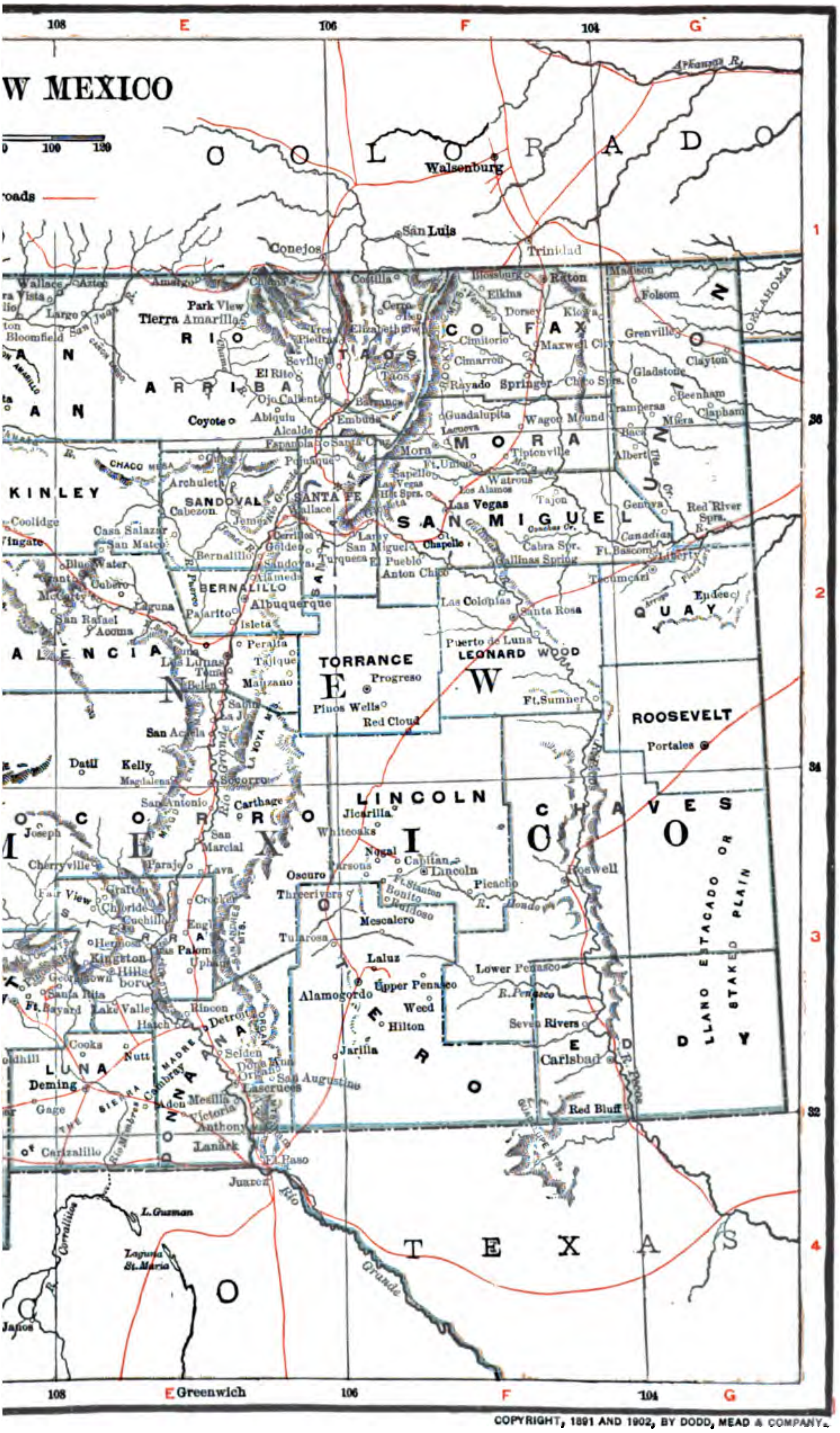
Government. New Mexico has the usual Territorial form of government. See Territories.

Finances. A public debt of $200,000 was created in 1884 to construct the Capitol. Later more bonds were issued for the erection of a penitentiary and other public buildings. There was also a constant deficit due to high expenditures, and also to the difficulty of collecting taxes, of which about 25 per cent. usually remain unpaid. In 1889 a movement for financial reform gained headway, and the expenditures

AREA AND POPULATION OF ARIZONA BY COUNTIES.

County.	Map Index.	County Seat.	Area in square miles.	Population.	
				1890.	1900.
Apache	D 2	Saint Johns	10,736	4,281	8,297
Cochise	D 4	Tombstone	6,147	6,938	9,251
Coconino	B 2	Flagstaff	19,322		5.514
Gila	C 3	Globe	4.542	2,021	4,973
Graham	D 3	Solomonsville	6,500	5,970	14,162
Maricopa	B 3	Phoenix	8,816	10,986	20.457
Mohave	A 2	Kingman	13,421	1,444	3,426
Navajo	C 2	Holbrook	9,826		8.829
Pima	A 4	Tucson	9.424	12,673	14,689
Pinal	C 3	Florence	5,324	4,251	7,779
Santa Cruz	C 4	Nogales	1,212		4,545
Yavapai	B 2	Prescott	7,863	8,685	13,799
Yuma	A 3	Yuma	9,787	2,671	4,145
San Carlos Indian reservation	C 1				3,065


ARIZONA
0 10 20
County T
A
114
B
112
C
110
1
2
3
4
36
34
32
A 114
B
112
C Longitude
110
West
U T A H
N E V A D A
C A L.
M E X
GULF OF CALIFORNIA
A R I Z O N A
COCONINO
MOHAVE
YAVAPAI
MARICOPA
PINAL
PIMA
GILA
GRAHAM
COCHISE
STA. CRUZ
NAVAJO
APACHE
YUMA
Parowan
St. George
Kanab
Black Rock Spr.
Lee's Ferry
Cave Dwellings
KAIBAB PLATEAU
KANAB PLATEAU
Moccasin Spr.
Tuba City
Moenkopi Wash
Colorado R.
Little Colorado
Dry Cr.
HOPI PUEBLOS
Keam's Cañon
NAVAHO INDIAN RESERVATION
Agency
Ft. Defiance
Peach Sprs.
Truxton
Mineral Park
Hackberry
Kingman
Hardyville
Mohave City
Yampai
Seligman
Crookton
Williams
Bill Williams Mt.
SAN FRANCISCO MTS.
MT. SITGREAVES
AGASSIZ PK.
Angell
Flagstaff
Cañon Diablo
Winslow
Hardy
Billings
Holbrook
St. Joseph
Woodruff
Navajo
Zuni R.
Puerco R.
Manuelito
Pine Sprs.
Powell
The Needles
Signal
Greenwood
Aubrey
Planet
Prescott
Walker
Antelope Valley
Bueno
Big Bug
Walnut Gr.
Alexandra
Crown King
Gillett
Verde
Chino Valley
Skull Valley
Simmons
Jerome
Camp Verde
Strawberry
Pine
Payson
Rye
Tonto
Snowflake
Taylor
Pinedale
Concho
Show Low
St. Johns
WHITE MTS.
Fort Apache
Wickenburg
Vulture
Seymour
Harrisburg
McMullen's
Las Plomas
La Paz
Ehrenberg
Mineral City
Parker
Bill Williams Fork
Cave Cr.
PHŒNIX
McDowell
Tempe
Mesa
Nephi
Buckeye
Silver King
Pinal
Globe
Nugget
McMillen
Cottonwood
Norton
Castle Dome Landing
Agua Caliente
Stanwix
Sentinel
Gila Bend
Painted Rock
Montezuma
Maricopa
Sweetwater
Florence
Mesaville
Dudleyville
San Carlos
Ft. Thomas
Pima
Central
Safford
Solomonsville
Clifton
Morenci
Gila City
Mohawk
Aztec
Chrystoval
Yuma
Adonde
Mohawk Summit
Casa Grande
Toltec
Picacho
Oracle
Red Rock
Saucita
Cojeta
Ft. Grant
Bonita
Albina
Cabeza Prieta
Corral
Ajo Copper Mine
Perigua
Santa Rosa
Rillito
Tucson
Ft. Lowell
Papago
Comobabi
Quijotoa
Mesquite
Fremont
R. Salado
Cholla
Olive
Pantano
Greaterville
Soport
Tecolote
Arivaca
Crittenden
Calabasas
Harshaw
Oro Blanco
Nogales
Fairbank
Lochiel
Benson
Tres Alamos
Dragoon
Wilcox
Dos Cabezos
Ft. Bowie
San Simon
Bowie
Teviston
Redington
Brannock
Contention
Tombstone
Charleston
Bisbee
Douglas
Ochoaville
Wilgus
R. del Altar
El Altar
S. Ignacio



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AREA AND POPULATION OF NEW MEXICO BY COUNTIES.

County.	Map Index.	County Seat.	Area in square miles.	Population.	
				1890.	1900.
Bernalillo	E 2	Albuquerque	8,842	20,913	28.630
Chaves	F 3	Roswell	11,520	.....	4,773
Colfax	F 1	Raton	3,784	7,974	10,150
Donna Ana	E 3	Lascruces	5,001	9,191	10,187
Eddy	G 3	Carlsbad	6,613	.....	3,229
Grant	D 4	Silver City	9,327	9,657	12,883
Guadalupe	G 2	Puerto de Luna	6,967	.....	5,429
*Leonard Wood	F 2	Santa Rosa	.....	.....	.....
Lincoln	F 3	Lincoln	4,984	7,081	4,953
*Luna	E 3		.....	.....	.....
*McKinley	D 2		.....	.....	.....
Mora	F 2	Mora	2,583	10,618	10,304
Otero	E 3	Alamogordo	6,874	.....	4,791
*Quay	G 2	Tecumcari	.....	.....	.....
Rio Arriba	E 1	Tierra Amarilla	6,655	11,534	13,777
*Roosevelt	G 2	Portales	.....	.....	.....
*Sandoval	E 2	Sandoval	.....	.....	.....
San Juan	D 1	Aztec	5,742	1,890	4,828
San Miguel	F 2	Las Vegas	4,833	24,204	22,053
Santa Fé	E 2	Santa Fé.	2,212	13.562	14.658
Sierra	E 3	Hillsboro	3,129	3,630	3,158
Socorro	E 3	Socorro	15,386	9,595	12,195
Taos	F 1	Taos	2,265	9,868	10,889
†Torrance	F 2	Progreso	.....	.....	.....
Union	G 1	Clayton	6,302	.....	4,528
Valencia	E 2	Los Lunas	9,472	13,876	13,895

* Established since the last census was taken.

† The organization of Torrance County is to be completed January 1, 1905.

were decreased by about 50 per cent. Since then the public debt has been somewhat diminished. At the end of 1901 it was $1,180,000. The receipts for 1901 were $540,795, and disbursements $465,815, leaving a surplus of $74,920.

Militia. In 1900 the men of militia age numbered 41,464. The number of militia in 1901 was 612.

Population. The population increased from 61,547 in 1850 to 91,874 in 1870, 153,953 in 1890, and 195,310 in 1900. The foreign-born in the last year numbered 13,625, of whom 6649 were Mexicans. The Indian population numbered 13,144, and the negroes 1610. A large part of the population are descendants of the original settlers, who were of Spanish or of mixed blood. Albuquerque, the largest town, had in 1900 a population of 6238; Santa Fe, the capital, 5603; and Las Vegas, 3552.

Religion and Education. The bulk of the population belong to the Roman Catholic Church. According to the census of 1900 the percentage of illiteracy was greater than that of any other State or Territory. With a compulsory school law, and greatly increased expenditures for school purposes, and the lengthening of the school year, illiteracy is diminishing. The percentage decreased from 44.5 in 1890 to 33.2 in 1900. In 1890 61 per cent. of the population could not speak English. This figure for 1900 became also greatly reduced. In 1898-99 there was raised $414,653 for Territorial schools and institutions, as against $85,129 in 1891; the number of teachers increased from 407 to 706; and the school term lengthened from three months in 1891 to four months in 1899. The Territorial institutions for advanced learning are: University of New Mexico, at Albuquerque; New Mexico College of Agriculture and Mechanic Arts, at Mesilla Park; School of Mines, at Socorro; Normal School of Silver City, at Silver City; New Mexico Military Institute, at Roswell; New Mexico Normal University, at Las Vegas. The Catholic Church supports eighteen schools; the Methodist Church, eleven; the New West Educational Commission, five; and the Presbyterian Church, twenty-five. Furthermore, the United States has schools for Indians, including the Indian Industrial School at Santa Fe.

Charitable and Penal Institutions. There are a school for deaf, dumb, and blind, and a penitentiary at Santa Fe, and an insane asylum at East Las Vegas.

History. The first explorers of the region were Spanish. Cabeça de Vaca visited it in 1536, and Coronado (q.v.) in 1540-42. Espejo wandered over much of it in 1582-83. In 1598 Juan de Oñate conquered the inhabitants, who were Pueblo Indians, and not Aztecs, as often erroneously stated. Santa Fe was founded between 1605 and 1616. The Indians revolted about 1680, and kept their independence for ten years. The mines were worked and towns and missions were founded. This region became a province of Mexico when that country gained its independence of Spain in 1821. In June. 1846. Col. Stephen W. Kearny marched from Fort Leavenworth with a force composed of United States dragoons and Missouri volunteers, and occupied Santa Fe on August 18th. The whole Territory was declared a part of the United States. (See Price, Sterling.) The Territory of New Mexico formed a part of the Mexican cession by the Treaty of Guadalupe Hidalgo, February 2, 1848. The act of organization was passed September 9, 1850, and went into effect in March, 1851. The original boundaries included that part of the territory of the United States north of the Mexican line, west of Texas, east of California, and south of 37°, including, however, the territory north of 37° and south of the Arkansas River. In 1853 the Gadsden Purchase (q.v.) was added and Arizona was set off in 1863. The portion north of 37° was added to Colorado in 1867. In 1850 a convention was held and a State constitution adopted, but the dread on the part of the North of another slave State prevented the admission of New Mexico. Frequent efforts to secure admission have been made since. In 1894 Congress passed an enabling act, and in the Fifty-seventh Congress (1901-03) an act of admission passed the House, but did not reach a vote in the Senate. During the Civil War New Mexico was invaded in December, 1861, by Texas Rangers, who took possession of the Territory, but were forced to retire in April, 1862, by regular troops under Colonel Canby and a regiment of Colorado volunteers. Since that time there have been Indian outbreaks, which have been suppressed with difficulty. The following have been Governors of the Territory of New Mexico:

GOVERNORS

James S. Colhoun	1851-52
Edwin V. Sumner, U. S. A., Commandant	1852
John Greiner, Secretary (acting)	1852
William C. Lane	1852-53
William S. Messery (acting)	1853-54
David Merriwether	1853-57
W. H. H. Davis (acting)	1854-57
Abraham Rencher	1857-61
Henry Connelly	1861-65
W. F. M. Arny (acting)	1865-66
Robert B. Mitchell	1866-69
William A. Pile	1869-71
Marsh Giddings	1871-75
William G. Ritch (acting)	1875
Samuel B. Axtell	1875-78
Lewis Wallace	1878-81
Lionel A. Sheldon	1881-85
Edmund G. Ross	1885-89
L. Bradford Prince	1889-93
W. L. Thornton	1893-97
Miguel A. Otero	1897 —

Bibliography. Brackenridge, *Early Discoveries by Spaniards in New Mexico* (Pittsburg, 1857); Davis, *El Gringo; or, New Mexico and Her People* (New York, 1857); id., *The Spanish Conquest of New Mexico* (Doylestown, 1869); McParlin, "Notes on the History and Climate of New Mexico," in *Smithsonian Report for 1877* (Washington, 1878); *The Resources of New Mexico* (Santa Fe, 1881); Ritch, *Aztlan: History, Resources and Attractions of New Mexico* (6th ed., Boston, 1885); Lummis, *The Land of Poco Tiempo* (New York, 1893); Schwatka, *In the Land of Cave and Cliff Dwellers* (ib., 1894); Frost, *New Mexico: Its Resources, Climate, Geography*, etc. (Santa Fe, 1894); Bancroft, *Arizona and New Mexico* (San Francisco, 1888); Villagra, *Historia de la Nueva Mexico* (Mexico, 1900).

NEW MEXICO, University of. A coeducational institution of higher learning at Albuquerque, New Mexico, incorporated by an act of the Territorial Legislature in 1889, and indicated by statute as the future State university. The collegiate, normal, and preparatory departments were opened in 1892. Science, music, art, and commercial schools were afterwards added. The degrees of bachelor of arts and pedagogy, of master of arts and sciences, and of doctor of philosophy are conferred. The Hadley Climatological Laboratory is an organization for research especially with reference to the influence of the climate of the arid and plateau region of the United States upon disease. The students in 1902 numbered 150 and the faculty twelve. The library contained about 5000 volumes. The campus contains the Administration Hall, Hadley Science Hall, the gymnasium, and the Ladies' Cottage. The total value of property under control of the college in 1902 was $75,000. Its endowment consisted of 243,000 acres of public land and 150,000 acres of saline land, and the income was $15,000.

NEW MEXICO COLLEGE OF AGRICULTURE AND MECHANIC ARTS. A coeducational State institution at Mesilla Park, N. M., established in 1889. It is supported mainly by a Territorial tax and by the Morrill and Hatch funds. The moneys received from the Federal Government amount to $40,000 annually. In 1902 its income from all sources was $48,147, its grounds and buildings were valued at $45,000 and the whole amount of college property at $100,500. The library contained 10,000 volumes. The instructors, of whom six were women, numbered twenty-five, and there were 163 collegiate and special students; and 144 in the preparatory department.

NEW MIL'FORD. A town, including several villages, and a county-seat of Litchfield County, Conn., 15 miles north of Danbury; on the Housatonic River, and on the New York, New Haven and Hartford Railroad (Map: Connecticut, B 3). It has a public library with about 3400 volumes, and Rectory and Ingleside schools, both Protestant Episcopal. There are several large tobacco warehouses, and manufactories of hats, carbonized stone and sewer pipe, lime, pottery, and paints. Population, in 1890, 3917; in 1900, 4804.

NEW MODEL, The. The name of the Parliamentary Army in the great English Civil War, after its reorganization under the ordinance of February 15, 1645. The pattern was provided by Cromwell's Ironsides. There was no longer to be a division of responsibility, but all authority was concentrated in the hands of the new commander-in-chief, Lord Thomas Fairfax (q.v.). Cromwell became the lieutenant-general. Parliament had freed the army from Essex and Manchester by the Self-Denying Ordinance (q.v.). Consult Gardiner, *History of the Great Civil War*, vol. i. (London, 1886). See CROMWELL, OLIVER.

NEWNAN, nū'*na*n. A city and the county-seat of Coweta County, Ga., 39 miles south by west of Atlanta; on the Atlanta and West Point and the Central of Georgia railroads (Map: Georgia, B 2). It is the centre of a productive fruit-growing and farming region, and has a large trade in cotton. The chief industrial establishments include canning and cigar factories, cotton and cottonseed-oil mills, foundries and machine shops, and manufactories of phosphates, fertilizers, etc. The water-works are owned by the municipality. Population, in 1890, 2859; in 1900, 3654.

NEW NETH'ERLAND. The original name of the Dutch colony afterwards called New York.

NEWNHAM COLLEGE. An institution for the higher education of women, situated at Cambridge, England. It had its inception in the amalgamation in 1880 of the Association for Promoting the Higher Education of Women in Cambridge, organized in 1873, with the Newnham Hall Company, opened in 1875. As early as 1871 five women students came to Cambridge to study under the direction of Miss Clough, subsequently principal of Newnham College. This number increased to twenty-five by 1874. The growth of the college has continued steadily, and in 1902 it included North Hall, established in 1880; Clough Hall, 1888; and the Pfeiffer Building, 1893. The library contains about 8000 volumes. The attendance in 1902 was 174. The faculty included 15 resident and 37 non-resident tutors. With certain restrictions the students have since 1881 enjoyed all the scholastic privileges offered at the University of Cambridge. Their names appear in the tripos or honor list in the university calendar. They do not, however, receive degrees, but are granted certificates instead.

NEW ORLEANS, ōr'lē-*a*nz. The largest city in Louisiana, and, with the exception of Natchitoches, the oldest. It is situated on both banks of the Mississippi, 107 miles from its mouth, in latitude 29° 58′ N., and longitude 90° 04′ W. (Map: Louisiana, F 4). Its distance from Washington in direct line is 960 miles; from Saint Louis by rail, 639; and from Chicago by rail, 923. The city proper occupies a strip of land between the river and Lakes Maurepas and Pontchartrain, with the latter of which it is connected by two canals. The corporate limits of the city embrace the whole parish of Orleans and a portion of Jefferson on the right bank (the town of Algiers, or Fifth District). The official boundaries thus inclose an area of 191 square miles, though the inhabited portion covers only about 37 square miles. The city lies about ten feet below the level of the Gulf, and is so far below the level of high water in the Mississippi that it is protected from overflows by levees twenty feet high in places. Its sobriquet, the 'Crescent City,' is derived from the fact that the original city followed the curve of the river in front of the old Place D'Armes; but as the inhabited portion has been gradually extended, its shape more nearly resembles the letter S. It has a frontage of more than twelve miles on the river, which is about half a mile wide in front of Canal Street and from 40 to 200 feet deep.

Canal Street, 200 feet broad, is the great business thoroughfare, and cuts the city in two, the portion below being known as the French Quarter, or *Vieux Carré*, and the portion above as the American Quarter. The French portion, with its narrow streets, its occasional tiled roofs, its old cathedral, its Spanish city hall or Cabildo, and its porte-cochères, is far more picturesque than the American Quarter, which contains the great business houses, the banks, and also the handsomest private dwellings. In the French Quarter, however, many beautiful residences, surrounded by flowers and semi-tropical plants, are to be seen on Esplanade Avenue. Here dwell the old Creole families, descendants of the early French or Spanish settlers; here French is still spoken as a mother tongue, and though there has been much intermarrying and social intercourse with Americans, French customs are still observed, and visitors feel as if they had happened upon an aristocratic faubourg of Paris. Traces, also, of the Spanish régime are to be found in many interesting specimens of the Hispano-Moresque style of architecture, which, with the red-tiled Spanish houses and the exquisite wrought-iron of the balconies, make this portion of the city unique. Above Canal Street the principal residence streets are Saint Charles Avenue and Prytania Street. These stretch for miles through the prettiest section of the city. Here are the most beautiful gardens. The palm, the palmetto, the fig, the orange, and the magnolia grow in tropical abundance, and even in winter the atmosphere is often perfumed with the odor of roses, violets, and sweet olive. Owing to the curve of the river, the streets do not run at right angles; they follow what is sometimes called 'the line of beauty.' Between the main thoroughfares of this portion of the city are interpolated a number of small streets, which, seeming to begin nowhere and end nowhere, cause great perplexity to strangers. The total extent of streets is 700 miles, of which only 204 miles are paved at all. The lack of paving, resulting in the disuse of the unpaved streets, which in bad weather become almost impassable, has a tendency to congest traffic on the few streets that are paved. The street railways cover a total mileage of 176. Recently they have been consolidated under one company. A belt line, twelve miles long, extends around the most attractive portion of the city. There is also an electric line connecting with West End, a suburban resort, nearly seven miles from the head of Canal Street.

Climate. The Weather Bureau reports have been carefully kept for the last thirty-two years. They show that the average rainfall is 58.01 inches. In winter there is generally some ice and occasionally snow. The summers are long, but the heat is seldom excessive, and prostrations are rare. The average annual relative humidity is 74 per cent. The large surrounding bodies of water render the climate more equable than in the interior. The annual mean temperature is 69°. In thirty-two years the temperature has never reached 100°, except in 1901.

Buildings. Among the secular buildings of New Orleans, the most interesting is the Cabildo (now the Supreme Court building). It was built at the expense of the Government near the close of the eighteenth century, during the Spanish régime. In it the formal transfer of the Province of Louisiana from Spain to France and from France to the United States took place with elaborate ceremonies in 1803. Other notable structures are the Custom House and Post Office building (cost $5,000,000), which is of massive granite, but not beautiful as to architecture; the City Hall, of Ionic order, and modeled after a Greek temple; the new Court House; the New Saint Charles Hotel, one of the most famous hostelries in the South; the Howard Memorial Library; Gibson Hall (a part of Tulane University); the Charity Hospital; the Medical College; the Milliken Memorial Hospital; the Harmony Club (an aristocratic Jewish association); the Cotton Exchange; the Sugar Exchange; the Athenæum; the Jewish Orphans' Home; and the new Tilton Memorial Library (also a portion of Tulane University). Among the splendid office buildings that are rapidly rising in the business centre of the city may be mentioned the Hennen building, the Liverpool and London and Globe, the Morris, the Masonic Temple, and the Tulane-Newcomb. Of the ecclesiastical edifices the most prominent are the Saint Louis Cathedral (Catholic), in which General Jackson attended services after his great victory at Chalmette in 1815; the Archiepiscopal Palace (1730), the oldest building in the Mississippi Valley; the Church of the Immaculate Conception, Saint Joseph's Church, the First Presbyterian, Christ Church Cathedral (Episcopal), Trinity Church, Saint Paul's, Temple Sinai and Touro synagogues, the Prytania Street (Presbyterian) Church, and the Coliseum Place (Baptist) Church.

Parks. The total park area of the city is 742.66 acres. The two largest and most interesting parks are the City Park and Audubon Park, which are both being rapidly improved. City Park, which is situated on Metairie road, between the city and the lake, contains 160 acres. It was formerly a plantation, and beneath its ancestral oaks, draped with festoons of Spanish moss, occurred nearly all the famous duels which were a marked feature of Creole life before the Civil War. Dueling has now passed away. In this park young men find amusement in golf and polo. Portions of it are still wild. Audubon Park, in the upper portion of the city, contains 249 acres, and was also a plantation in days gone by. It was here that in 1796 the first successful attempt was made to granulate sugar—marking an epoch in the industrial history of the State. Its superb live oaks, its miniature lakes, and its great greenhouse, 300 feet long, and full of rare tropical plants, make this park a favorite resort. It also contains an interesting sugar experiment station, supported by the State. Besides these parks, there are two squares that attract attention on account of historical associations. These are Congo Square (now Beauregard Square) and Jackson Square. The former was in old times the resort of the slaves, and here they assembled for their wild dances to the sound of bones and drums. Jackson Square was not only associated with the exciting events that occurred in connection with the two transfers of the province in 1803, but was also the scene of the triumphal entry into the city of General Jackson after the Battle of New Orleans. The square contains a fine equestrian statue of General Jackson, by Clark Mills. Flanked by the old cathedral and the court buildings on one side and by the fine Pontalba rows on the other two sides, this square is regarded as one of the most symmetrical and beautiful public places in the United States. Near the square is the French market, which is one of the 'sights' of New Orleans. Visitors crowd to it early Sunday mornings to listen to the babel of tongues—French, Spanish, Italian, Creole patois, and English—to drink 'café noir,' and to buy *gombo filé* (pounded sassafras) and baskets of the Choctaw Indians, who still frequent it.

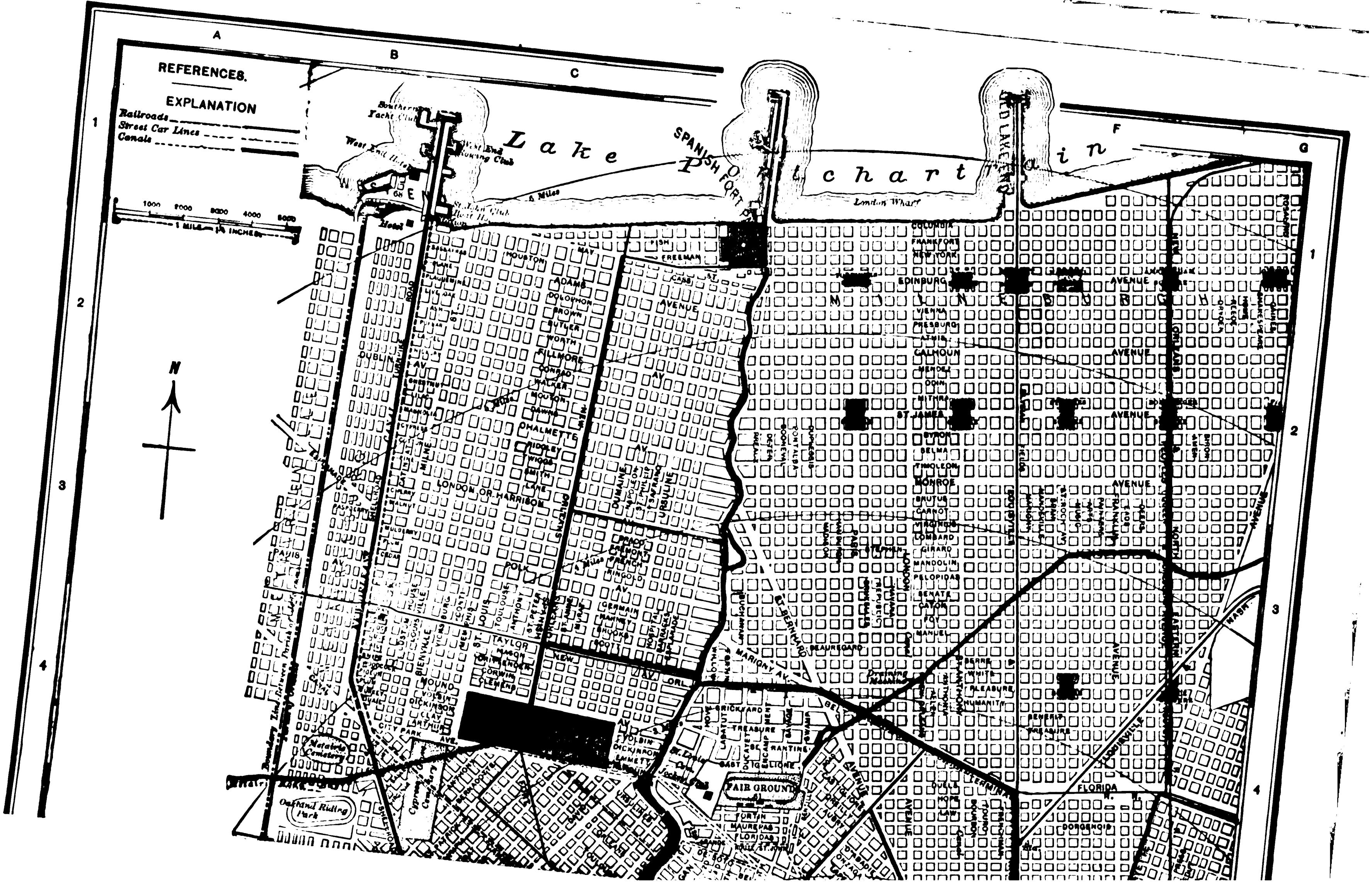
Cemeteries. There are a number of cemeteries in various portions of the city. The most interesting are the Catholic cemeteries, of which the oldest is Saint Louis No. 1, and the most curious is Saint Roch's Campo Santo. The handsomest cemetery is the Metairie, which contains, among its fine monuments, the tomb of the Army of Tennessee, surmounted by the splendid equestrian statute of Gen. Albert Sidney Johnston. As it is not possible in New Orleans to dig much below the surface without finding water, the curious custom prevails of burying in vaults, or 'ovens,' rising in tiers sometimes eight feet above the ground line. Jews, however, bury beneath the ground, as do some of the poorer classes. On All Saints' Day (November 1st), which is a general holiday in the city, the Catholics visit the cemeteries and decorate the tombs of the dead.

PUBLIC INSTITUTIONS. While New Orleans has no such enormous libraries as are found in some of the Northern cities, it is fortunate in possessing several of importance. Among the smaller ones of a quasi-public character should be mentioned those owned by the Jesuits' College, the Tulane Medical College, the Parish Medical Society, the New Orleans Bar Association, and the H. Sophie Newcomb Memorial College. The larger libraries are the State Library, with about 25,000 volumes; the Tilton Memorial Library of Tulane University, with 20,000 volumes and 2000 pamphlets; the Howard Memorial, with 45,000 volumes and 12,000 pamphlets; and the New Orleans Public Library, with 52,000 catalogued and 10,000 uncatalogued books. The Howard Memorial, which is privately endowed, is a reference library, and has perhaps the best collection in the world of books concerning the history of the Mississippi Valley. The Public Library, embracing the former Fisk and Lyceum libraries, has an increasing circulation, amounting in 1902 to 110,000 volumes. There are also in the city three private libraries containing valuable collections of original documents on American history. In the Howard Memorial Hall are a number of interesting relics of the Civil War. Andrew Carnegie offered the city $250,000 to erect a new library building with branches, and the offer has been accepted.

CHARITABLE INSTITUTIONS. The city is rich in such institutions. The principal one is the Charity Hospital, built in 1832. It treats about 5000 patients every year, without charge. It receives from the State $95,000 annually, with additional sums for improvement of buildings, etc., and is controlled by a board appointed by the Governor. The city supports a home for aged and infirm, a house of refuge for boys, and an insane asylum. There is also an eye, ear, nose, and throat hospital, maintained by private contributions. The Jews have several well-organized charitable institutions, among which the principal are the Jewish Orphans' Home and the Home for Aged and Infirm Jews. The Touro Infirmary, endowed by a wealthy Hebrew philanthropist, has a free clinic, where the poor of all sects are treated. The Catholics have the most numerous charitable institutions under their control. The most prominent are the Poydras Asylum, the New Orleans Female Orphan Asylum, Saint Vincent's Infant Asylum, and the House of the Good Shepherd. There are also for colored people a Boys' Home and a Home for the Aged, founded by a colored philanthropist. Of recent foundation is the Kingsley House, modeled after the famous Hull House of Chicago. It is supported by private subscriptions. Finally, the Charity Organization Society has undertaken to organize the many charities of the city, and by the careful investigation of its agents to prevent pauperization.

EDUCATIONAL INSTITUTIONS. The organization of the public school system is thorough and complete. A large number of the handsome schoolhouses of the city were built from the income of a fund given by a former citizen, John McDonogh, which now amounts to about $800,000. The city makes such appropriations for the public schools as it thinks proper, but it cannot appropriate less than eight-tenths of a mill for any one year. Besides this appropriation it receives its share of the current school fund collected by the State. There are no 'mixed' schools. The number of public schools for whites is 61, and for negroes 12. The number of teachers is 800 white and colored. The total enrollment for 1902 was 31,205, of whom 26,133 were white and 5072 were colored. The public school system consists of one normal, three high, 68 grammar and primary, 18 kindergarten, one teachers' practice school, and one teachers' kindergarten training school. These schools occupy 69 buildings, 32 of which were erected by the city, 28 by the commissioners of the McDonogh fund, and two donated. The total cost of maintaining the schools per annum is $510,573. The estimated expenditure for each pupil is $16.36. Free instruction is also given to young children by six kindergartens, supported partly by churches and partly by private funds. The number of private schools in the city is 145 for whites and 14 for negroes. Among the most prominent colleges may be mentioned the College of the Immaculate Conception (established by the Jesuit Fathers in 1847); the Soulé Commercial and Literary Institute (established 1856); Spencer's Business College and Institute of Shorthand (established 1897); the Blake Institute; and the Home Institute (established in 1883). The last-named institution, besides its regular work, conducts a free night school, in which instruction is given to nearly 1300 men and boys. For the education of the colored youth there are four universities, or more properly colleges: Leland University (1870), Straight University (1870), New Orleans University (1873), and the Southern University (1881). Only the last of these is supported by the funds of the State. For the whites there is only one university, the Tulane University of Louisiana (q.v.), with the H. Sophie Newcomb Memorial College for Women.

AMUSEMENTS. New Orleans is famous for its French opera. For forty years before the Civil War troupes were brought over from France to furnish this entertainment, and with brief intervals the custom has prevailed ever since. Such is the passion for music and singing, especially among the Creoles, that even in times of great financial depression the city has managed by private subscription to support these foreign companies. No other city in the Union has shown equal enthusiasm. Thousands of visitors are attracted to the city during the winter season by the opera; but a still greater attraction for many years has been the Carnival celebration. As early as 1840 tableaux on floats were drawn through the streets, and, except during the Civil War, the custom has continued to the present day. These superb pageants are now given by four secret organizations—Momus, Proteus, Rex, and Comus—and each is followed at night by a gorgeous ball. Other secret organizations have sprung into being of late years, and the series of masked balls now extends with brief intervals from Twelfth Night


REFERENCES.
EXPLANATION
Railroads
Street Car Lines
Canals
1000 2000 3000 4000 5000
1 MILE = 1½ INCHES
N
A
B
C
F
G
1
2
3
4
Lake Pontchartrain
SPANISH FORT
OLD LAKE END
West End
West End Hotel
Southern Yacht Club
West End Rowing Club
St. John Club
London Wharf
6 Miles
Hotel
Metairie Cemetery
Oakland Riding Park
Cypress Grove Cemetery
FAIR GROUND
Draining Machine
Canal
COLUMBIA
FRANKFORT
NEW YORK
EDINBURG
VIENNA
PRESBURG
ATHIS
CALHOUN
MENDEZ
ODIN
MITHRA
ST JAMES
BYRON
SELMA
TIMOLEON
MONROE
BRUTUS
CARNOT
VIRONCIO
LOMBARD
GIRARD
MANDOLIN
PELOPIDAS
SENATE
CATOR
MANUEL
LONDON
PARIS
REPUBLIC
AVENUE
ORLEANS
NORTH
EASTERN
FLORIDA
DORGENOIS
ST BERNARD
MARIGNY AV
BEAUREGARD
ST ANTHONY
PLEASURE
HUMANITY
BENEFIT
TREASURE
LAFAYETTE
DUCATEL
GENTILLY
TOURO
BOURBON
LAW
DUELL
HOPE
NASH
DUPLESSIS
PONTALBA
BONNEVAL
DETER
FISH
FREEMAN
CASS
HOUSTON
MAY
ADAMS
DOLOPHON
BROWN
BUTLER
WORTH
FILLMORE
CONRAD
WALKER
MOUTON
DAWNS
CHALMETTE
RIDDLEY
WIGGS
SMITH
LANE
LONDON OR HARRISON
DUMAINE
ST PHILIP
ST ANN
URSULINE
ORLEANS
ST PETER
TOULOUSE
ST LOUIS
CONTI
ST ANTHONY
BIENVILLE
TAYLOR
MASON
CRITTENDEN
CORWIN
CLEMENS
MOUND
VOISIN
DICKINSON
CLAY
ARTHUR
CITY PARK AVE.
POLK
PRICE
FREMONT
FRENCH
RINGGOLD
GERMAIN
HARDY
BROOKS
SCOTT
DUBLIN
PARIS
AV
ROAD
CANAL
TOLBIN
DICKINSON
EMMETT
FORTIN
MAUREPAS
FLORIDAS
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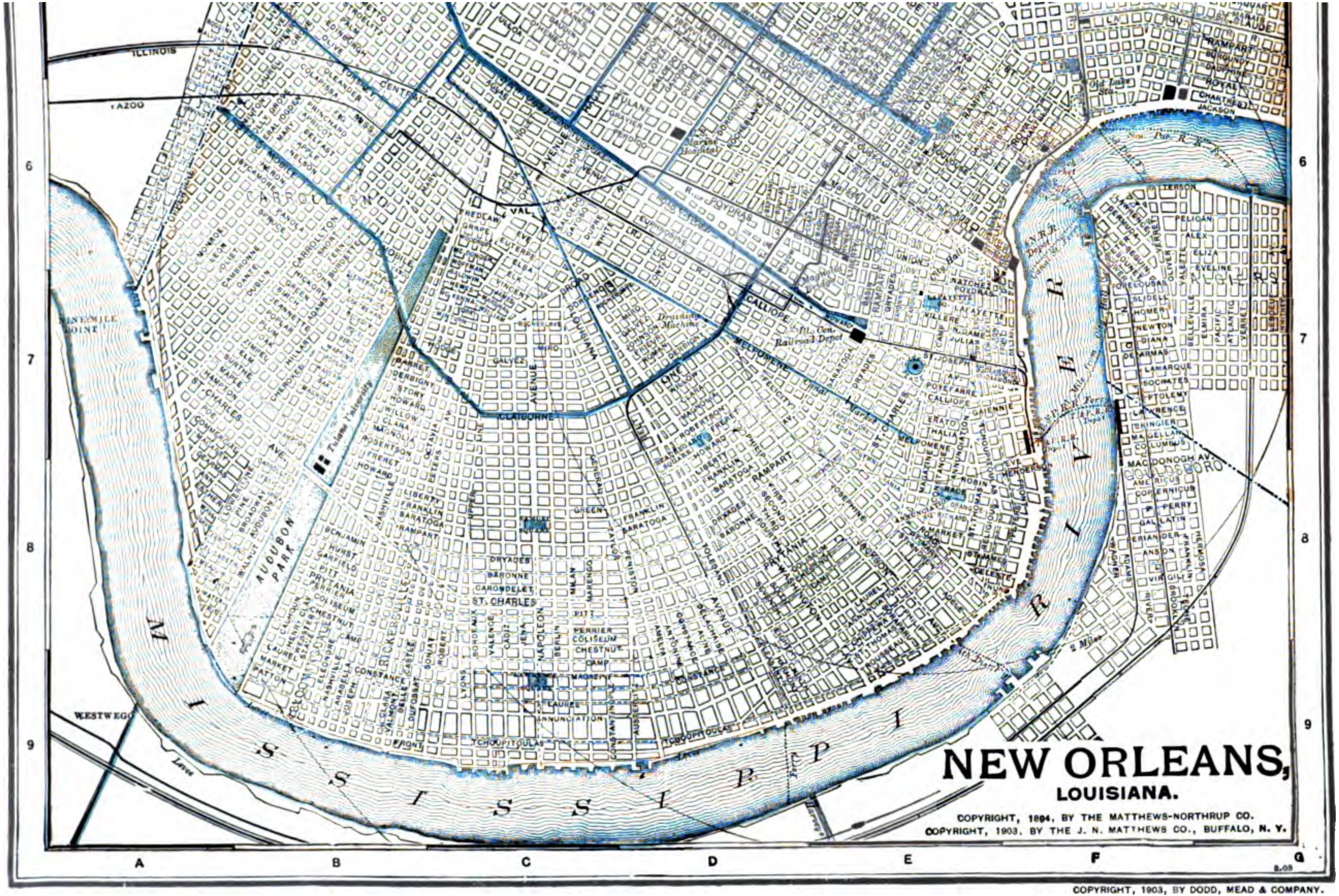

NEW ORLEANS,

LOUISIANA.

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to Mardi Gras, or Shrove Tuesday. When the morning of Ash Wednesday dawns every vestige of this prolonged revelry has vanished. The subjects represented in the parades are drawn from mythology, romance, and history. The floats are designed by artists of established reputation, who, with their assistants, spend many months in elaborating them. The expense of these parades is about $200,000 a year. Nowhere else in the world are similar pageants to be seen.

CLUBS. The principal social clubs of New Orleans are the Boston, the Pickwick, the Chess, Checkers and Whist, the Harmony, the Louisiana, the Era (a women's club), the Round Table, the Variété, and the Southern Yacht Club. The Louisiana Historical Society devotes itself to the investigation and preservation of the history of the State, while the Athénée Louisianais was founded for the study and preservation of the French language.

DRAINAGE AND SEWERAGE. The surface of the city being entirely flat, with the exception of Metairie Ridge, which has an elevation of about two feet, the problem of drainage and sewerage has been a perplexing one ever since the founding of New Orleans. The average rainfall being 58 inches, tropical downpours are not infrequent, and they sometimes flood the principal streets to the depth of several feet. To this inconvenience is added the fact that strong winds often force the waters of Lake Pontchartrain over the rear of the city, and keep it submerged for several days. Various plans for draining the city were tried, but they all failed. Finally the city appropriated for this purpose a large amount of money derived from the sale of street railway franchises, and under a drainage board appointed in 1896 the immense work of digging canals and establishing pumping stations was begun. Much yet remains to be done, but the system as far as completed was put into practical operation in March, 1900. Meanwhile (1899), the property owners of the city voted a special tax of two mills to run forty-two years to provide the necessary funds for "sewerage, drainage, and municipal water-works." A new board was then appointed, but a troublesome litigation in the courts tied its hands for many months. Recent decisions of the courts, however, in favor of the city give promise of speedy and successful execution of this great work. At present New Orleans is insufficiently supplied with river water, and a large majority of the inhabitants depend upon rain water, collected in great wooden vats or cisterns, which, rising nearly as high as the houses, form a unique feature of the city.

HEALTH. New Orleans has always been subject, at intervals, to visitations of yellow fever, and its sanitary reputation has been thereby seriously impaired. Before the Civil War the worst epidemics were those of 1832, when more than 8000, out of a population of about 55,000, died of yellow fever and cholera; of 1847, when nearly 2500 died of yellow fever alone; and of 1853—the 'Great Epidemic'—when fully 16,000 died from yellow fever and other causes. In 1878 there was one which carried off 4000 persons in Louisiana. In 1882, however, a thorough system of disinfecting vessels was established at the mouth of the Mississippi, and for fifteen years the fever was kept outside the boundaries of the State. In 1897 it was again introduced from a town in a neighboring State, where the disease had prevailed for some time without being recognized. In that year, according to the official report, there were in Louisiana 1935 cases, most of them in New Orleans, but the total number of deaths was only 306. In the two subsequent years the disease appeared again, but still in a very mild form and with a low rate of mortality. In 1853 the death rate per 1000 of the population from yellow fever alone was 50.9; in 1854 it was 15.4; in 1878, 19.20; in 1897, 1.90; in 1898, .20; and in 1899, only .07. Hence the city board of health has declared that "this once dreaded disease is no longer worthy of a place of dignity in our statistics as a life destroyer." It may be added that the general cleaning up that has been given by the United States to the city of Havana is regarded as an important protective measure for New Orleans. Finally, the mildness of the climate of New Orleans, and the outdoor life which such a climate renders possible, preserve the inhabitants to a large extent from many of the terrible diseases common in other cities. The mortality among the colored population, which is generally improvident and careless of sanitation, is much higher than among the whites.

INDUSTRY AND COMMERCE. As a manufacturing centre New Orleans has many advantages, among which may be mentioned the following: The climate is moist enough for cotton manufacture and favorable for continuous labor throughout the year; the raw materials need but short transportation; the laboring class is numerous and contented; fuel is brought cheaply by water; and the exporting facilities are excellent. It is estimated that in the last twenty-five years the value of the products of factories in the city has increased six fold. The chief industries are rice cleaning and sugar refining, and the manufacturing of boots and shoes, furniture, men's clothing, cotton goods, tobacco, cigars, and cigarettes, cottonseed oil, and planing-mill products. The last census (1900) gives the number of wage-earners in all industries as 19,435; the total wages paid as $7,645,167; and the value of the total output as $63,514,505. The value of all products in 1890 was only $48,234,924. There are in the city 1624 manufacturing enterprises, devoted to 150 different industries, with a total capital of $52,000,000. The United States Government recently constructed at New Orleans one of the largest floating dry docks in the world. This has shown its ability to lift and sustain the largest ship in the American Navy. New Orleans is the second export city in the Union, being excelled only by New York. Six great railroad lines, with a total mileage of 26,881, have their terminus here. These are the Southern Pacific, Illinois Central, Louisville and Nashville, Texas and Pacific, Southern, and the Queen and Crescent. The last two enter New Orleans over the tracks of another line. There are six great grain elevators along the docks. The docks, which are for the most part uncovered, extend for six miles along the left bank. As the gateway of the Mississippi Valley the city is well situated for foreign commerce. The jetties at the mouth of the river give a channel of about thirty feet, and the depth of the river in front of the city is ample for the largest vessels. Direct lines of steamships connect with New York, the West Indies, Central America, and Europe, and there is even a direct line via the Suez Canal to Japanese ports, carrying raw cotton for manufacture. At present there are thirty steamship lines connecting New Orleans with the principal ports of the world. As soon as the Isthmian Canal is built a great impetus will be given to the commerce of the city. The foreign trade consists very largely of exports, the annual value of which is about $150,000,000. The imports, however, are increasing, being over $23,000,000 for the ten months ending April, 1903.

Government. In 1896 the present charter of the city was granted by the Legislature. It is largely in accord with the suggestions of the Municipal Reform League of America, and is in many respects a radical departure from the previous charters. The executive powers are vested in a mayor, a controller, a treasurer, a commissioner of police and public works, and a city engineer. The first three are elected for four years, while the rest are appointed by the mayor with the consent of the council. As has been the custom in other great cities of late years, large appointive power is vested in the mayor, who is held responsible for his appointees. The only exception made is in the case of the keepers of the people's money. The council, which is unicameral, is elected for four years. By an unusual provision, each member receives a salary of $20 a month if he has attended all meetings. The granting of franchises, the usual pitfall of councils, is carefully safeguarded. Connected with the city government proper, but in some respects largely independent of it, are a number of boards, with various functions, such as the civil service commission, the board of liquidation of the city debt, the police board, the board of fire commissioners, the school board, the board of health, the New Orleans levee board, the port commission, the drainage commission, and the water and sewerage board. Besides the numerous city courts, the State Supreme Court, the United States District, the Circuit Court, and the Circuit Court of Appeals hold sessions in New Orleans.

Finance. The report of the city controller for 1902 gives the bonded debt of the city as $17,286,490, and the valuation of real and personal property as $147,201,984. The rate of taxation was 22 mills, consisting of: city expense tax, 10 mills; interest and redemption city bonds, 10 mills; special tax for water, sewerage, and drainage, 2 mills. To this tax of 22 mills should be added the State tax of 6 mills and the tax of 1 mill for the maintenance of levees, making the total rate 29 mills. There is also a poll tax of $1, which is devoted to the support of public schools.

Population. The census of 1900 gave New Orleans a population of 287,104, making it the twelfth largest city in the United States. This total included 30,325 persons of foreign birth and 77,714 of negro descent. The increase in population, according to the censuses of former years, is shown as follows: in 1870, 191,418; 1880, 216,090; 1890, 242,039.

History. New Orleans was laid out in 1718 by Jean Baptiste Le Moyne, Sieur de Bienville, then Governor of Louisiana, and it was named in honor of the Duke of Orleans, Regent of France. The centre of the new settlement was the old Place d'Armes, now called Jackson Square. In 1722, when New Orleans became the capital of the French territory in this vicinity, its low, marshy site was visited by Père Charlevoix, who records in his journal that he found only a hundred barrack-like buildings, with a large wooden storehouse, and "two or three residences that would be no ornament to a village in France." With prophetic eye, however, he added: "I have a well-grounded hope that this wild and desert place, which the reeds and trees do yet almost wholly cover, will be one day—and perhaps that day is not far distant—an opulent city and the metropolis of a great and rich colony." In November, 1762, France ceded the whole of Louisiana to Spain, but the people in New Orleans, who first heard of the transaction in 1764, strenuously objected to the change and forcibly expelled the first Spanish Governor, who came in 1766. In 1769 Alexander O'Reilly (q.v.), who had just been appointed Governor of Louisiana, punished with unsparing severity those who had been prominent in the uprising. In the same year the census taken by Governor O'Reilly shows that the city possessed only 468 houses, with a population of 3191. Of these the free persons numbered 1901, the slaves 1230, and the domesticated Indians 60. During the rest of the Spanish period there was but slow growth, perhaps on account of the burdensome commercial restrictions of the Spanish régime. During the American Revolution New Orleans was the headquarters of the Spanish forces on the North American continent, and the place from which a number of expeditions were sent out by Governor Bernardo Galvez (q.v.) against the British. In 1800, by the secret Treaty of San Ildefonso (q.v.), Louisiana was retroceded to France, but the French Government did not take formal possession until November 30, 1803, just twenty days before American deputies came to take possession for the United States in pursuance of the Louisiana Purchase. By this year the population had increased to a little over 8000. In 1802 the products shipped from New Orleans consisted of flour, 50,000 pounds; tobacco, 2000 hogsheads; cotton, 34,000 bales. Some 5000 casks of rum were produced in the distilleries around the city, but the manufactures were mostly confined to cordage, hair-powder, vermicelli, and shot.

As for the government during the French and Spanish régime, the whole province was nominally in the hands of a Superior Council, which was a judicial body and theoretically a legislative one. In truth, however, this body, which was appointive, not elective, had very little power. All laws for Louisiana were made in France. There was no self-government either under the French or the Spanish. Under the Spanish a Cabildo (assembly) was substituted for the Superior Council. It was composed of six perpetual regidores, two ordinary alcaldes, an attorney-general syndic, and a clerk. The Governor presided. By a curious provision, the offices of regidor and clerk were obtained by purchase, and in the first instance at auction. The ordinary alcaldes and the attorney were elected annually by the Cabildo. The ordinary alcaldes were judges within the city for criminal and civil cases. The regidores were the standard-bearer, the high sheriff, the receiver of fines, etc. There was an appeal from this tribunal to the Captain-General of Cuba, and from him to the Royal Audience in Santo Domingo, and thence to the Council of the Indies in Madrid. As under the French, the laws were issued by the

Governor in the name of the King. Even the police regulations were issued by the same official.

In 1804, the year after the United States obtained possession, President Jefferson said that "the position of New Orleans certainly destines it to be the greatest city the world has ever seen;" but the growth for many years, though rapid, did not come up to the general expectations. In 1805 New Orleans was regularly incorporated, and the inhabitants elected a city council. This was the first occasion on which the right of public suffrage was ever exercised in Louisiana. Americans now crowded into the newly acquired city. In the winter of 1806-07 wild rumors were abroad that Burr intended to make New Orleans the capital of a new empire. The city was placed under martial law by General Wilkinson, and it was some time before the excitement subsided.

A great impetus to the prosperity of the city was given in 1812, when the first steamboat arrived from Pittsburg. The Mississippi was now to become a great highway of commerce, and New Orleans was to flourish accordingly. Growth was checked for a time by the war with Great Britain, which followed soon. When, however, General Jackson won his great victory at Chalmette in 1815 (see New Orleans, Battle of), attention was speedily directed to the city that he had saved, and its population increased more rapidly than ever before. By 1830 it had risen to 46,000, and in 1840 to 102,000. The city was extended beyond its old boundaries, gas and other improvements were introduced, and a more cosmopolitan spirit began to appear. In 1837 the city became involved in the speculative mania of the day and suffered severely from the ensuing panic. Nothing, however, could permanently check the prosperity of New Orleans, not even the terrible ravages of the yellow fever, which in the decade before the Civil War were more fatal than ever before. In 1836 the Creoles were so little in accord with the Americans that a novel form of government was tried. The city was divided into three municipalities, each with a recorder and a council of aldermen. There were a mayor and a general council (embracing the councils of the different municipalities) to control the affairs of general interest, but each municipality could tax itself and manage its local affairs. This anomalous state of things continued until 1852. In 1849 the State capital was transferred to Baton Rouge, but later New Orleans was again for a time the capital (1868-80).

In the Civil War New Orleans was an important centre of Confederate military and commercial operations until captured by a Federal fleet under Admiral Farragut in April, 1862. (See Fort Jackson.) Thereafter it proved an important strategic point for attacks upon other parts of the Confederacy. Under the administration of Gen. B. F. Butler (q.v.), which lasted from May to December, 1862, the city suffered the extreme rigor of martial law. Butler's successor, Gen. N. P. Banks, was far more conciliatory. During the period of reconstruction New Orleans was the headquarters of the politicians and of the 'carpetbaggers' who, with their freedmen allies, governed the State during this stormy period. In 1866 there was a serious riot at Mechanics' Institute (now Tulane Hall), in which a constitutional convention was broken up by the Democrats and a number of persons killed. In 1874 the Republican Governor, William Pitt Kellogg, fearing an uprising of the people, denied the inhabitants the right to bear arms, and whenever arms were found on any person they were seized by the police. 'The White League,' a Democratic organization, determined to procure arms at all hazards. Arms were ordered by steamer from the North, and when the steamer arrived at the levee, the League, arming itself as best it could, marched down to the dock on Canal Street to receive them. Here a conflict was precipitated with the metropolitan police of the Governor. The police were scattered, and the artillery which they had placed upon the levee was turned against themselves. The White Leaguers lost sixteen men. Seventeen years later a monument was erected to their memory on the spot where they fell. While an appeal to the President once more restored the Governor to power, this affair of September 14, 1874, is generally regarded as the beginning of the end of reconstruction in Louisiana. In 1877 the United States troops were withdrawn, and with them the 'carpetbag' rule disappeared. With a free government restored, the city turned its attention to the development of its great opportunities, and steady progress has marked its subsequent history. In 1884 a Cotton Centennial Exposition was held here—the first bale of cotton exported from this country having been shipped from Charleston in 1784. In 1880 the capital of the State was removed from New Orleans. In 1891 nine Italians, members of the Mafia (q.v.), who had been arrested for the murder of the chief of police, David C. Hennessy, were lynched by a mob, after being acquitted by the courts. This gave rise to considerable controversy between the United States and the Italian governments.

Consult: *Standard History of New Orleans* (Chicago, 1900); King, *New Orleans, the Place and the People* (New York, 1896); Martin, *History of Louisiana* (New Orleans, 1882); Gayarré, *History of Louisiana* (ib., 1903); King and Ficklen, *History of Louisiana* (ib., 1893); Waring and Cable, "Social Statistics of Cities, History and Present Condition," in *Tenth United States Census* (Washington, 1881); Howe, "Municipal History of New Orleans," in *Johns Hopkins University Studies*, ser. vii., No. 4 (Baltimore, 1889); *Commercial, Industrial, and Financial Outlook for New Orleans* (Cedar Rapids, Iowa, 1894).

NEW ORLEANS, Battle of. The last battle of the War of 1812 between the United States and Great Britain, fought at Chalmette, near New Orleans, La., January 8, 1815. On December 10, 1814, a British fleet of more than fifty sail with about 7000 troops on board arrived off the eastern coast of Louisiana and came to anchor near the entrance to Lake Borgne. Twelve days later a division of the troops, by the aid of treacherous Spanish fishermen, made its way up Bayou Bienvenu, and on the afternoon of the 23d reached the right bank of the Mississippi, some miles below New Orleans. A few hours later the Americans, who for some weeks had, under the leadership of Major-Gen. Andrew Jackson, been preparing to resist the invasion, made a night attack upon the division and inflicted considerable loss, but did not succeed in overwhelming it. Next morning General Jackson fell back behind an old disused mill-race that stretched across the strip of solid ground from the river to a cypress swamp, and there threw up a breastwork. This breastwork was composed chiefly of earth, and not of cotton bales, as was once believed; as a matter of fact, 277 bales were originally used in the embrasures of some of the batteries and in building a magazine. On New Year's Day Major-Gen. Sir Edward Pakenham, who had now arrived with reënforcements and taken command of the English, attempted to batter down the American lines by a cannonade; but this attempt failed, and he then decided to try an assault. The plan he adopted was for Lieutenant-Colonel Thornton to cross the river and storm an American battery on the right bank; while on the left bank two columns were to assault the American main position. The assault was made on the morning of January 8, 1815. On the left bank the British attacked with spirit, but were met with such a heavy cannonade and with such a storm of bullets from the rifles of the American troops, mainly backwoodsmen from Tennessee and Kentucky, that in less than half an hour about 2500 men, including Major-Generals Pakenham, Gibbs, and Keane, were shot down, and the assault failed. The American loss in this main engagement was but eight killed and thirteen wounded. On the right bank Thornton was successful, but, owing to the defeat of the main army, was unable to follow up his advantage. Ten days later the British retreated to their ships. Although the battle was fought after the Treaty of Ghent (q.v.) had been signed, it had results of importance. It was, says the historian Schouler, the only battle of the war that made an impression on Europe, and it served also to help quicken the yet feeble sense of American nationality. By giving a sunset glow of success to an otherwise somewhat inglorious war, it greatly strengthened the position of the Administration and hastened the "deathbed scene of the Federalist Party." Most important of all, it made General Jackson, who had displayed military talents of a high order, the idol of the American people and was an important factor in causing his subsequent elevation to the Presidency. Consult: Latour, *Historical Memoir of the War in West Florida and Louisiana in 1814-15* (Philadelphia, 1816); Walker, *Jackson and New Orleans* (New York, 1856); Parton, *Life of Andrew Jackson* (ib., 1860); James, *Military Occurrences* (London, 1818); Cook, *Narrative of Events in the South of France and of the Attack on New Orleans in 1814-15* (ib., 1834); and Gleig, *Campaigns of the British Army at Washington and New Orleans* (Am. ed., Philadelphia, 1821 and 1833).

NEW PHILADELPHIA. A city and the county-seat of Tuscarawas County, Ohio, 100 miles south of Cleveland; on the Tuscarawas River, the Ohio Canal, and the Cleveland, Lorain and Wheeling and the Pennsylvania railroads (Map: Ohio, H 4). There are mining interests, and manufactures of steel, canned goods, roofing tile, woolen goods, carriages, flour, brooms, and pressed, stamped, and enameled goods. The principal attractions of the city are Springer's Park and Shorenbraun Springs. Settled in 1805, New Philadelphia was first incorporated three years later. The government is vested in a mayor, who holds office for two years, and a unicameral council. Town meetings are held when required by matters of general interest. Population, in 1890, 4456; in 1900, 6213.

NEW PHIL'IPPINES. Another name for the Caroline Islands (q.v.).

NEW PLYM'OUTH. The capital and seaport of Taranaki County, North Island, New Zealand, on the west coast, 160 miles southwest of Auckland (Map: New Zealand, D 3). It has an extensive harbor and is a terminal of railway lines to Wellington and Napier. Population, in 1901, 4405. Consult Wells, *History of Taranaki* (New Plymouth, 1878).

NEW POM'ERA'NIA (Ger. *Neu Pommern*), formerly New Britain. The largest island of the Bismarck Archipelago, in Melanesia. It lies 50 miles from the northeast coast of New Guinea, and stretches east and northward in a narrow crescent, 300 miles long and 90 miles in greatest breadth, but in several places contracted to a strip only a few miles wide (Map: Australasia, H 3). Its area is about 9500 square miles. The interior is still but little known; it is mountainous, with several active or half extinct volcanoes in the northeastern part, one of which has an altitude of 3600 feet, while in the western extremity Hunstein Mountain reaches a height of 6000 feet. The rainfall on the island is abundant, and the vegetation is luxuriant, the interior being covered with immense forests reaching to the summits of the mountains, while the coastal districts are very fertile. The natives, whose numbers are unknown, are Melanesian savages. The European inhabitants number less than 100, and reside in a missionary and a trading station on the northeastern coast. For statistics and history, see Bismarck Archipelago.

NEW'PORT. A market-town and river-port in Monmouthshire, England, 20 miles southwest of Monmouth, on the Usk, four miles from the Bristol Channel, and 12 miles northeast of Cardiff (Map: England, C 5). It has brass and iron foundries, breweries and pottery works, and manufactures of telegraph and railway supplies and wagons, india-rubber, and gutta percha. Iron ships are also built here. The dock accommodation covers 80 acres, and it has an important shipping trade in coal and iron. The town has fine buildings. Prominent among them are the town hall and Saint Woollos, one of the most curious churches in England. The municipality owns much real estate, the water-works, electric lighting plant, tramways, baths, slaughter houses, markets, cemeteries, provides technical instruction and cottage allotments, and maintains a free library, museum, parks, isolation hospital, and a fire brigade. The town is first mentioned at the beginning of the tenth century, and received its first charter from Edward II. The towers and the central mass remain of the castle, built about 1130 by Robert, Earl of Gloucester. Population, in 1891, 54,707; in 1901, 67,290.

NEWPORT. The chief town of the Isle of Wight, England, situated near the centre of the island, on the Medina (Map: England, E 6). It is the commercial centre of supply for the island, has breweries, cement factories, and trade in malt, wheat, and flour. Saint Thomas's Church, founded in 1854, is a handsome edifice, and contains a monument erected by Queen Victoria to the Princess Elizabeth, daughter of Charles I. Its grammar school, founded in 1612, was the scene of negotiations between Charles I. and the Parliament. The town, already favored with charters and privileges, was incorporated by James I. It owns the water supply and markets. Population, in 1891, 10,216; in 1901, 10,911.

NEWPORT. A city in Campbell County, Ky., at the junction of the Ohio and Licking rivers, which separate it from Cincinnati, Ohio, and Covington, Ky.; and on the Chesapeake and Ohio and the Louisville and Nashville railroads (Map: Kentucky, G 1). There are bridges across both rivers, and the cities of Cincinnati, Newport, and Covington are connected by electric railroad, the Kentucky cities being popular as places of residence for Cincinnati business men. A few miles distant, in the hills back of Newport, is the United States military post, Fort Thomas. Newport has a city park, and a public library, the library building ranking with other prominent edifices of the city—the court house, municipal building, and in addition the post office, Masonic Temple, and Newport and German national banks. The chief manufactured products are watch-cases, cast iron pipes, sheet iron, rails, carriage supplies, and cigar-box material. Settled about 1791, Newport was incorporated in 1795 as a town, and in 1850 received a city charter. The government, under a charter of 1894, is administered by a bicameral council and by a mayor, elected every four years. The executive appoints fire, police, and water-works commissioners, and, with the consent of the board of aldermen, the city auditor and superintendent of public works. The council is selected from the wards, but elected at large, and appoints bridge commissioners. Other municipal officials and the board of education are chosen by popular vote. Members of the municipal council and board of education hold office for two years, all other officers for four years. The city owns and operates the water-works. Population, in 1890, 24,918; in 1900, 28,301.

NEWPORT. A town and the county-seat of Sullivan County, N. H., 42 miles west-northwest of Concord; on the Sugar River, and on the Boston and Maine Railroad (Map: New Hampshire, F 8). The beautiful surroundings of the town make it of considerable importance as a summer resort. There is a public library of 7000 volumes. Newport has extensive manufactures of flannels, cotton underwear, shoes, agricultural implements, and lumber products. The water-works are owned by the municipality. Population, in 1890, 2623; in 1900, 3126. Consult Wheeler, *The History of Newport, N. H.* (Concord, 1879).

NEWPORT. A port of entry and the county-seat of Newport County, R. I., and until 1900 one of the capitals of the State, 17 miles south by west of Fall River, Mass., and 30 miles south of Providence; on Rhode Island in Narragansett Bay, and on the New York, New Haven and Hartford Railroad (Map: Rhode Island, C 4). It has also regular steamboat communication with New York, Providence, and other cities, with increased transportation facilities in summer. Newport is an important United States naval station, but has far greater reputation as a summer resort. Its splendid harbor, defended by Fort Adams and Fort Greble, admits the largest vessels and usually presents a scene of great animation, while its varied scenery, its points of historic interest, equable climate, and excellent facilities for boating, bathing, and driving have combined to establish Newport as the most exclusive and fashionable watering place in the United States. The narrow streets and quaint houses of the old town adjoin the harbor; the 'society' quarters with their new and more elaborate architecture reach over to the ocean side of the island. Among the popular objects of interest are First or Easton's Beach, and Bailey's Beach, the bathing resorts; Cliff Walk and the ten-mile Ocean Drive; the Hanging Rocks; the rocky fissure, fifty feet deep, locally known as Purgatory; and Spouting Rock, where the water, when disturbed by a storm, is forced through an opening in the rock, sometimes to a height of fifty feet. On Coaster Harbor Island is the United States Naval Training Station and War College, and on Goat Island, a United States torpedo station. The naval hospital on the mainland was opened in 1897. On Canonicut Island, opposite Newport, is the town of Jamestown, which has an individual reputation as a summer resort. There are numerous public fountains, statues and monuments, and public parks, notably Touro and Morton parks; several libraries—Redwood and People's together containing more than 60,000 volumes, and the Newport Historical Society, which has an interesting collection of relics; Saint George's and Cloyne House schools. Other attractive features of Newport are its historic buildings: the State House, erected in 1742; the old city hall, in 1763; the synagogue (1763), said to be the oldest in the United States; Redwood Library, in 1748; Trinity Church (Protestant Episcopal), in 1725; the Sayer House, headquarters of the British army in 1777; and the Vernon House, Rochambeau's headquarters in 1780. In commerce and industry Newport is comparatively of small importance; there is, however, a large trade in fish. The government is administered under a charter of 1853, which provides for a mayor, annually elected, and a bicameral city council that has important elective powers in municipal offices. Population, in 1890, 19,457; in 1900, 22,034.

Newport was settled in 1639 by William Coddington and a few followers, who in the previous year had been driven from Boston for sympathizing with Antinomianism. In 1647 it was united for governmental purposes with Providence, Portsmouth, and Warwick, under the charter of 1643, but there was much dissatisfaction until a second charter was issued in 1663. Here, in 1640, one of the first public schools in America was begun; and here, in 1656, came some of the first Quakers who emigrated to this country. In 1729 Bishop Berkeley came to Newport, and remained in the vicinity for nearly three years, the house, Whitehall, occupied by him, being still in fairly good condition. Here he wrote much of his *Alciphron* and his ode on Western progress. In the latter half of the eighteenth century Newport was a great trading centre, and by 1769 its commerce exceeded that of New York. On May 17, 1769, the British sloop *Liberty*, engaged in enforcing the smuggling laws, was destroyed here—this being one of the earliest acts of American resistance to England. From December, 1776, to November, 1779, Newport was occupied by British troops, by whom 480 of its houses were destroyed and its shipping so crippled that the town never recovered its commercial prestige. Rochambeau with his French troops was stationed here in 1780. First incorporated in 1784, Newport surrendered its charter two years later, and was not re-incorporated until 1853. It was the birthplace of Commodore M. C. Perry and of William Ellery Channing. In Touro Park stands the famous 'Old Stone Mill,' formerly supposed to have been built by the Northmen in the eleventh century, but now very generally believed to have been erected by Gov. Benedict Arnold about 1675. The Newport *Mercury*, founded in 1758 by James Franklin, is still published. Consult: Greene, *The Providence Plantation* (Providence, 1886); "Newport in the Revolution," an article in the *New England Magazine*, n. s., vol. ii. (Boston, 1890); Brooks, *The Controversy Touching the Stone Mill* (Newport, 1851).

NEWPORT. A village and the county-seat of Orleans County, Vt., 49 miles north by east of Montpelier; on Lake Memphremagog, and on the Canadian Pacific and the Boston and Maine railroads (Map: Vermont, F 2). It has the Goodrich Memorial Library (public), with 6500 volumes, and is a well-known summer resort. The village is surrounded by a farming region. There are some manufactures. Population, in 1890, 1730; in 1900, 1874.

NEWPORT, Christopher (c.1565-1617). An English navigator. In 1591 he sailed from London as captain of the *Golden Dragon* with three other ships, on an expedition to the West Indies. After sacking four Spanish towns and capturing and sinking twenty Spanish merchantmen, the expedition turned back across the Atlantic laden with spoil. At Flores they joined Sir John Burgh and took part with him in the capture of the *Madre de Dios*, August 3, 1592. In 1606 Newport commanded the fleet of three ships which conveyed John Smith and his fellow colonists to Virginia. He spent some time in Virginia, and took part in an exploring expedition up the James River with Smith. In 1607-08 he made another voyage to Virginia, and in 1609 commanded the first expedition sent out under the second charter, which conveyed Sir Thomas Gates and Lord Somers to Virginia. Newport's ship, the *Sea Venture*, was cast ashore on the Bermudas, whence the colonists proceeded to Virginia in two small pinnaces, which they constructed from the wrecked ship. In 1611 he made a last voyage to Virginia. In the year following he entered the service of the East India Company. Between 1613 and 1617 he made four voyages to India for the company, finally dying at Bantam of a fever. An account of his voyages to America, entitled *Newport's Discoveries in Virginia*, and purporting to have been written by "a gentleman of the colony," was published in the *Archæologia Americana*, vol. iv. (Boston, 1860).

NEWPORT, George (1803-54). An English naturalist and physician, born at Canterbury, and educated at London University and at the College of Surgeons. He was one of the most skilled anatomists of his time, and his researches on the structure of insects and other arthropods are very important. His publications include: *On the Respiration of Insects* (1836); article on "Insecta" in Todd's *Cyclopedia of Anatomy and Physiology* (1839); *On the Use of Antennæ of Insects* (1840); *List of Specimens of Myriopoda in the British Museum* (1844); *Monograph of the Class Myriopoda, Order Chilopoda* (1845); and *On the Impregnation of the Ovum in the Amphibia* (1851).

NEWPORT NEWS. A city and port of entry in Warwick County, Va., 12 miles north by west of Norfolk, and 75 miles southeast of Richmond; on the James River and Hampton Roads, and the terminus of the Chesapeake and Ohio Railroad (Map: Virginia, H 5). It has also several coastwise and foreign steamship lines. A fine harbor and excellent shipping facilities have made Newport News the centre of large commercial interests, its foreign trade in 1901 being valued at $36,658,000, including exports to the amount of $32,568,000. Its industrial interests, too, are well developed. There is a shipyard employing 6000 men, with two dry docks, 600 and 900 feet in length; also grain elevators, lumber mills, iron works, and coal wharves. Casino Park, in the heart of the city and on the James River, is a popular place of resort. The government, under the original charter of incorporation, is vested in a mayor, elected every two years, and a city council, which confirms the executive's appointment of the police commissioners and elects all other municipal officials, excepting those chosen by the people. Settled in 1882, Newport News was incorporated first in 1896. Its growth during the decade 1890-1900 was exceedingly rapid, a population in 1890 of 4449 having increased to 19,635 in 1900.

NEW PROV′IDENCE. The most important, although one of the smallest, of the Bahama Islands. It is situated between Eleuthera and Andros islands, 170 miles from the southeast coast of Florida (Map: West Indies, J 2), and has an area of 85 square miles. In physical features it resembles the other Bahamas (q.v.), but it alone has a good harbor, and on it is the town of Nassau (q.v.), the capital of the islands. The first English settlement in the Bahamas was founded on New Providence in 1629.

NEW RED SANDSTONE. A large series of reddish-colored loams, shales, and sandstones, occurring between the Carboniferous and the Middle Triassic formations, were grouped together under this name, in contradistinction to the Old Red Sandstone group, which lies below the coal measures, and has a similar mineral structure. It has been found, however, that two very distinct periods were included under this name; and the contained fossils of each group were found to be so remarkably different that the one period was referred to the Paleozoic system, under the name of Permian (q.v.), while the other was determined to belong to the Triassic system (q.v.). The name is no longer used in the United States.

NEW RIVER. A river of West Virginia. See Great Kanawha.

NEW ROCHELLE, rô-shĕl′. A city in Westchester County, N. Y., 16½ miles from the Grand Central Station, New York City; on an arm of Long Island Sound, and on the New York, New Haven and Hartford Railroad (Map: New York, G 5). It is mainly a residential suburb of New York, and has some reputation as a summer resort. There are many handsome residences, and several spacious colonial mansions dating from the Dutch and English periods. An Ursuline seminary now occupies 'Leland Castle,' which is known for its fine interior decorations. The city has a public library with over 8500 volumes. New Rochelle was settled in 1687 by Huguenots, some of whom were natives of La Rochelle. It was the home for several years of Thomas Paine, to whose memory a monument has been erected. Population, in 1890, 9057; in 1900, 14,720.

NEW ROSS. A town lying mainly in County Wexford and partly in Kilkenny, Ireland, on the Barrow River, 29 miles by rail northwest of Wexford (Map: Ireland, E 4). An iron bridge with a draw connects the suburb of Rosbercon on the Kilkenny side. Ships of 600 tons can unload at its quays at all stages of the tide. Its favorable situation is deserving of much greater industrial prosperity than the town possesses. There is, however, some trade in agricultural products, and there are salmon fisheries. Although believed to date from the sixth century, its history begins with the erection of the old monastery in the thirteenth century. Cromwell captured the town in 1649 and destroyed its walls and fortresses, of which there are fragmentary remains. Population, in 1901, 5867.

NEWRY, nū'rĭ. A seaport and market-town. partly in County Armagh, but principally in County Down, Ulster, Ireland, 63 miles north of Dublin and 38 miles south-southwest of Belfast (Map: Ireland, E 2). It is traversed by the Newry River, which is crossed by five bridges and falls into Carlingford Lough, and by a canal, by which the navigation is prolonged to Lough Neagh, a distance of 32 miles. Newry is also connected by the Newry Canal with Victoria Lock. The town is handsomely and compactly built. The quays are lined with spacious warehouses, and there are several tanyards, coach and car manufactories, iron foundries, grain, flour, and spinning mills. Extensive water-works have been constructed. Steam vessels ply to Liverpool and Glasgow from Warrenpoint, a port five miles distant on Carlingford Lough. The Newry and Greenore Railway connects the Newry and Armagh line with the deep water harbor of Greenore. The town is nearly coeval with the English invasion, having grown up around a monastery founded in 1183 and a castle subsequently erected by De Courcey. This castle was the scene of several struggles, and in most of the civil wars of Ulster Newry suffered severely. It was incorporated as a borough by James I., and sent two members to Parliament. The corporation was abolished by the Irish Municipal Reform Act and the affairs of the town are now administered by twenty-one commissioners. Population, in 1891, 12,961; in 1901, 12,587.

NEW SALLEE, sȧ-lā'. A seaport of Morocco. See RABAT.

NEW SCHOOL PRESBYTERIANS. See PRESBYTERIANISM.

NEW SIBE'RIA, or LIAKHOV, **ISLANDS.** A group of islands in the Arctic Ocean, situated north of Eastern Siberia, between latitudes 73° 9′ and 77° 30′ N., and between longitudes 136° 16′ and 159° 6′ E. (Map: Asia, P 1). The principal islands of the group are Kotelnoi, New Siberia, and Liakhov, with areas of from 1000 to 3000 square miles, the combined area of the whole group being 9500 square miles. The islands consist mainly of rocky, ice-bound cliffs, and are quite treeless and uninhabited, save for the temporary sojourn of hunters. Game, especially fur-bearing animals, is abundant. The islands are noted for the great quantities of bones of extinct animals found there, notably those of the mammoth. The group was discovered in 1770 by the Russian merchant Liakhoff, and the islands have since been visited by several other explorers.

NEW SOUTH SHETLAND ISLANDS. See SOUTH SHETLAND ISLANDS.

NEW SOUTH WALES. A State of Australia, situated in the southeastern part of the continent, and bounded on the north by Queensland, on the east by the Pacific Ocean, on the south by Victoria, and on the west by South Australia (Map: Australia, H 5). Its area, 310,367 squares miles, is more than five times that of England and Wales, much larger than that of any of the United States, and more than twice that of the State of California.

PHYSICAL FEATURES. The Great Dividing Range runs along the coast in an irregular system of broken minor ranges, whose main axis extends about 100 miles inland. It is known as the Australian Alps in the south, the Blue Mountains near the centre, and the New England Range in the north. These mountains are broken by deep ravines and cañons. The Blue Mountains are especially rugged and abrupt and long formed an impassable barrier. The highest point is Mount Kosciusko, near the southern boundary, with an altitude of 7308 feet. The mountains are flanked on the west by a broad, undulating plateau, which sinks gradually toward the Great Plains of the west, but rises again in the northwestern corner of the State to a height of 2000 feet in the Stanley and Grey Ranges. The coast is bold and rocky, and indented by a number of small inlets, among which Port Jackson, the harbor of Sydney, forms one of the finest harbors in the world. The rivers on the eastern slope of the Dividing Range are small, the largest being the Hawkesbury, with a length of 330 miles. The Murray River forms the southern boundary of the State, and its two great tributaries, the Darling and the Lachlan, course through the western plains. Several streams flow from the northwestern mountains toward the Darling, but are lost in the arid plains before they reach it. Nearly all the rivers of the plains dry up or are reduced to strings of ponds during the dry season, while in the wet season large areas of the plains are inundated.

CLIMATE. The climate is in general mild, becoming subtropical toward the north. The mean temperature on the coast is 76°, with an average maximum of 100° for January, and 55° for July. On the interior plains the range is much greater. Here the temperature may reach 130°, and there are hot dust winds. The rainfall is greatest in the southeastern extremity, where it registers 73 inches, the average on the coast being 50 inches. On the interior plains it is generally less than 20 inches, falling below 10 inches in the northwest. The uplands and the eastern portion of the great plains are covered with open forests of eucalyptus trees. Denser forests grow in the valleys of the very fertile coastal districts. The arid western plains are covered only with stunted scrub.

The flora and fauna partake of the general character of Eastern Australia. See AUSTRALIA.

GEOLOGY AND MINERALS. The mountain and plateau regions consist mainly of Paleozoic rocks, Silurian in the south, Carboniferous in the central portion, and Devonian in the north, while the northeastern and southeastern coast districts are overlaid with lower Mesozoic strata. There are considerable outcrops of granites and metamorphic rocks in the higher regions, with dikes of volcanic trap, basalt, and greenstone. The great plains are formed by horizontal strata of Cretaceous and Tertiary sandstone, sands, and gravel. Rich and extensive coal beds cover large areas in the State. Gold exists in quartz veins in the Silurian rocks, and silver, tin, copper, iron, and precious stones are also found.

MINING. Mining rivals grazing in importance, and has been gaining, while the latter has declined. The first Australian gold was mined in New South Wales, and the total value of this product mined to date exceeds that of any other mineral in the State. The annual output in recent years, however, has been exceeded in value by silver and silver-lead and by coal, although nearly half the men employed in the mining industry, or 19,350 (1899), are engaged in gold-mining. The average yield of gold between 1890 and 1900 was twice that of the preceding decade. The output in 1900 was valued at £1,194,521. The production of silver and silver-lead ore was insignificant prior to 1884, when it increased rapidly until 1891, the record for that year not having been subsequently surpassed. In 1900 the value was £2,604,117. The production of coal in 1900 was valued at £1,668,911, an amount exceeded in only one previous year. The decline in copper production from 1890 to 1895 was wholly regained in the latter part of the decade, the output in 1900 being valued at £425,301. The production of tin in 1900 was valued at £142,724—the highest figure attained since 1892. Several kinds of iron ore are mined, and a number of other minerals are obtained in small quantities.

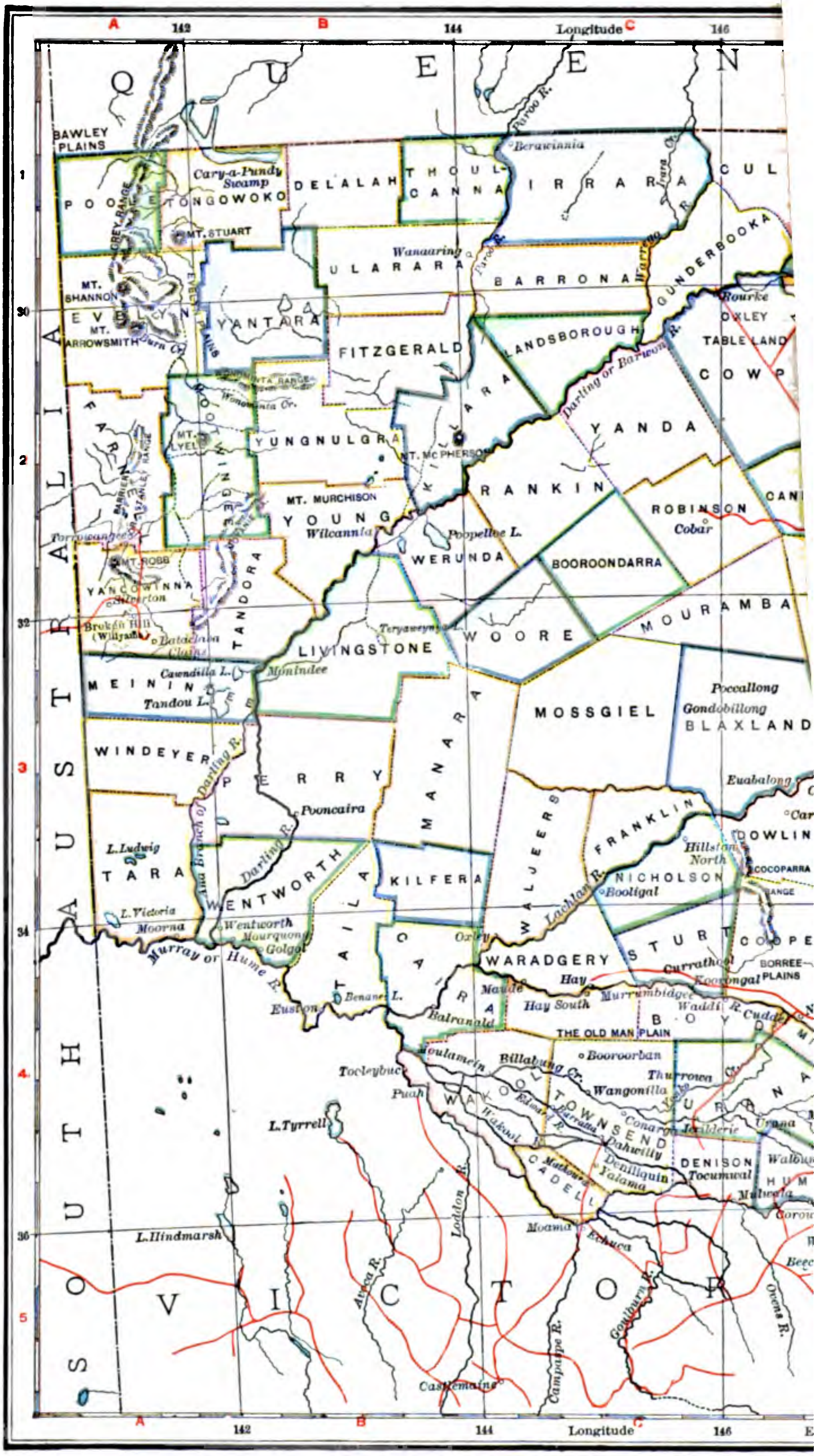
AGRICULTURE. Agriculture is increasing in importance, but is still subsidiary to stock-raising. The soil is generally of great fertility, but the scantiness and uncertainty of the rainfall prevent it from being tilled in the great regions west of the mountain ranges. The unfavorable climatic conditions are most severe on the far western plains. In the coast district, and on the tablelands and the western slope of the tablelands, a considerable area is cultivated. The climate on the coast admits of the growth of a wide range of products, both temperate and tropical, being not unlike that of California in this respect. Although the possibilities of fruit culture are great, the industry in general has not made any considerable progress. Oranges and grapes, however, receive no little attention. The remoteness from the world's markets has tended to limit the production of all agricultural products. The total area under tillage, excluding lands grassed, increased almost steadily from 629,180 acres in 1881 to 852,704 acres in 1891, and 2,446,767 acres in 1901. The principal crop and the one that represents the largest percentage of increase is wheat, to which 1,530,609 acres were devoted in the latter year. The other principal crops, with their acreages, were: hay, 66,236; corn, 206,051; oats, 29,383; sugar-cane, 22,114; and grapevines, 8441.

STOCK-RAISING. The extensive area of grassed lands and the mildness of the winters are greatly favorable to grazing, which is the most characteristic industry of the State. The greatest attention is paid to sheep, about four-sevenths of the sheep of Australia being in New South Wales. The maximum number, nearly 62,000,000, was reached in 1891. This was reduced in 1900 to about 40,000,000. The decrease was attributed to the droughts, which were very severe during this period. The insufficient water supply is a serious disadvantage to the industry. The number of cattle in 1900 was 1,983,116; horses, 481,417; and swine, 256,577. Much of the pastoral land is owned by the State and leased to the stockmen.

MANUFACTURES. Prior to the establishment of the federation of Australian States, New South Wales differed from the other Australian colonies in that it did not have a tariff for the protection of its manufactures. However, the majority of the 60,779 hands employed in these industries in 1900 were engaged in domestic manufactures which were not subject to foreign competition—the preparation of food, drink, etc. The manufactures centre largely about Sydney.

TRANSPORTATION AND COMMERCE. A railroad traverses the eastern part of the State from north to south and a branch line penetrates northwestward to the Darling River. In 1900 nearly the whole of the 2896 miles of line in operation were in the hands of the Government. The net earnings are almost equal to the annual cost of the debt incurred in the construction. The State has a large foreign trade. It is almost evenly divided between imports and exports. The value of the total trade in 1900 was £55,725,587, being in excess of that reached in any previous year. Considerably over three-fifths of the imports were for home consumption, and a like amount of the exports were of domestic origin. Wool is by far the greatest item of the State's exports. It is followed in order of importance by silver, silver-lead, and ore, coal, copper, tallow, and tin. The great bulk of the commerce is with the United Kingdom, but the trade with the United States, France, Germany, and Belgium is rapidly growing. The largest export to the United States is wool and the State's imports from the United States are mainly manufactured products. In 1900, 3406 vessels, with 3,920,801 tonnage, cleared the ports of New South Wales.

GOVERNMENT AND FINANCE. New South Wales is governed by a Governor, appointed by the Crown, a responsible Ministry, a Legislative Council appointed by the Crown for life, and a Legislative Assembly elected by the resident voters of the colony. Down to 1893 there was a property qualification by law. In that year it was abolished. The suffrage is exercised by every male subject twenty-one years of age who has lived three years in the colony and three months in his electoral district. New South Wales has six representatives in the Australian Senate and 26 in the Australian House of Representatives. In the fiscal year ending in 1900, out of a total net revenue of £9,970,677, the Government received £2,618,066 from taxation, £2,116,076 from land-sales and leases, and £4,992,521 from service—railroads, etc. The greater part of the tax receipts are from import and excise duties.



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Cary-a-Pundy Swamp
TONGOWOKO
DELALAH
THOULCANNA
IRRARA
CULGOA
Berawinnia
Irara Cr.
Paroo R.
Warrego R.
MT. STUART
GREY RANGE
MT. SHANNON
EVELYN
MT. ARROWSMITH
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EVELYN PLAINS
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ULARARA
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BARRONA
GUNDERBOOKA
Bourke
OXLEY
TABLE LAND
COWPER
FITZGERALD
LANDSBOROUGH
Darling or Barwon R.
FARNELL
Wonominta Cr.
WOOREWINGEE
MT. LYELL
YUNGNULGRA
KILLARA
MT. McPHERSON
YANDA
RANKIN
ROBINSON
Cobar
CANBELEGO
BARRIER or STANLEY RANGE
Torrowangee
MT. MURCHISON
YOUNG
Wilcannia
Poopelloe L.
WERUNDA
BOOROONDARRA
MT. ROBB
YANCOWINNA
Silverton
Broken Hill (Willyama)
Bataclava Claims
TANDORA
Teryaweynya
WOORE
MOURAMBA
LIVINGSTONE
Cawndilla L.
Menindee
MENINDEE
Tandou L.
MOSSGIEL
Poccallong
Gondobillong
BLAXLAND
WINDEYER
Darling R.
PERRY
MANARA
Euabalong
Pooncaira
Condobolin
WALJEERS
FRANKLIN
DOWLING
Hillston North
COCOPARRA RANGE
L. Ludwig
TARA
Ana Branch of Darling R.
Darling R.
WENTWORTH
KILFERA
NICHOLSON
Booligal
Lachlan R.
L. Victoria
Moorna
Wentworth
Mourquong
Gol Gol
TAILA
CAIRA
Oxley
WARADGERY
STURT
COOPER
BORREE PLAINS
Murray or Hume R.
Hay
Carrathool
Kooyongal
Euston
Benanee L.
Maude
Hay South
Murrumbidgee R.
Waddi
Cudal
Balranald
BOYD
THE OLD MAN PLAIN
MITCHELL
Moulamein
Billabung Cr.
Booroorban
Thurrowa
Wangonilla
URANA
Tooleybuc
Puah
WAKOOL
Edward R.
TOWNSEND
Conargo
Jerilderie
Urana
Yanko Cr.
Wakool R.
Murrama
Pahwilly
L. Tyrrell
Mathoura
CADELL
Deniliquin
Yalama
DENISON
Tocumwal
Walbundrie
HUME
Mulwala
Corowa
Loddon R.
Moama
Echuca
L. Hindmarsh
Avoca R.
Campaspe R.
Goulburn R.
Ovens R.
Beechworth
SOUTH AUSTRALIA
VICTORIA
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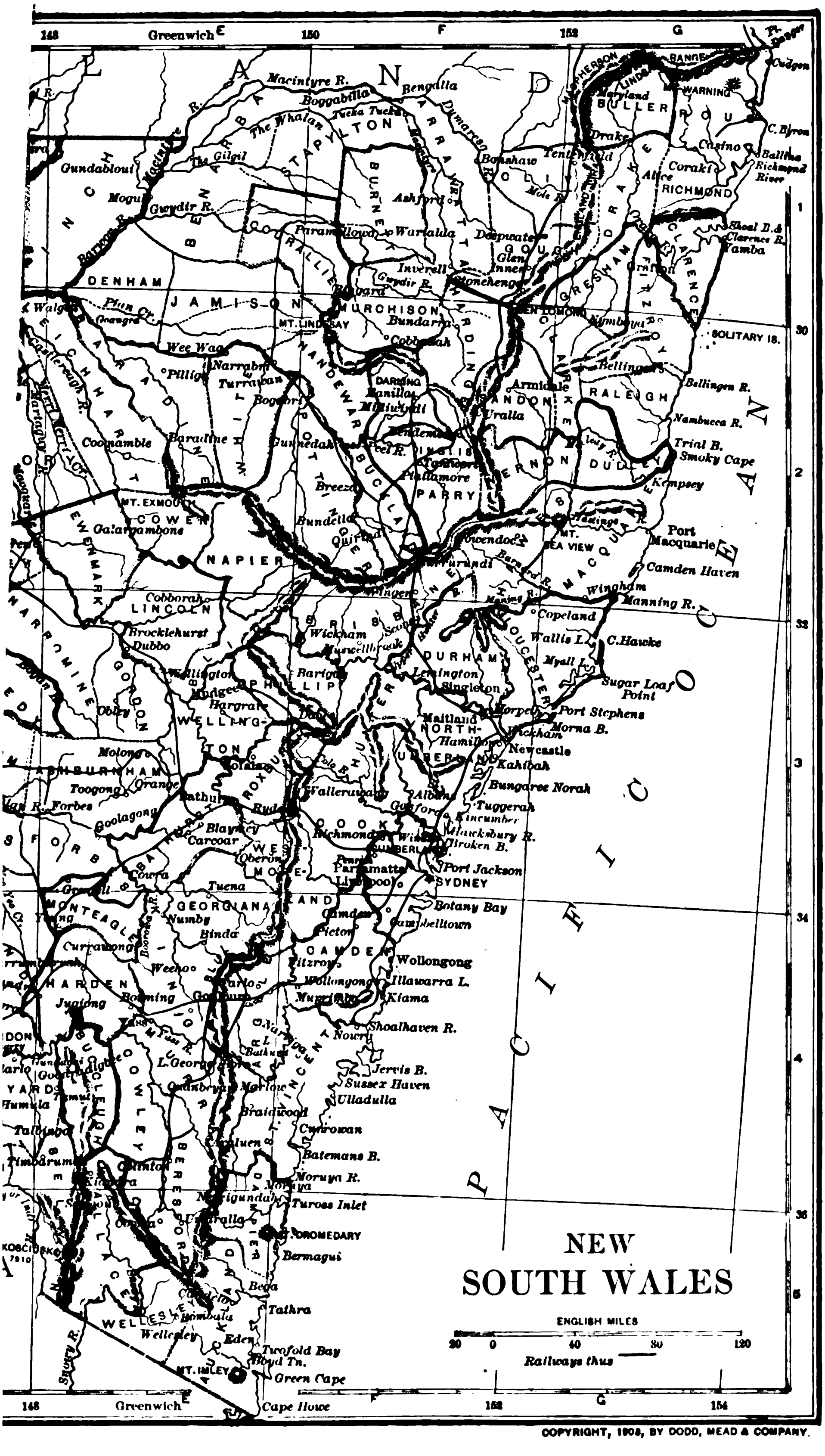

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There is an income tax. The bulk of the income is expended upon the maintenance of the public works and public service and the charges of the public debt. For a further discussion of New South Wales and its government, particularly in comparison with other Australian States, see AUSTRALIAN FEDERATION.

POPULATION. In 1901 there was a population of 1,359,133—males, 712,456; females, 646,677—or 4.38 per square mile. In 1860 the population was only 348,546, the gain since that time having been much greater than for any other Australian State. At the end of the century the State had passed Victoria, and had become the most populous Australian State. From 1881 to 1891 there were 164,205 more arrivals than departures, but the excess had fallen in the followlowing decade to only 16,167. The Chinese number 10,974, and the aborigines and half castes 7434. In 1901 Sydney, the capital, had a population of 111,801, and with suburbs, 488,968; Newcastle, 14,250; and Broken Hill, 27,518.

RELIGION. About 45 per cent. of the church population are adherents of the Church of England and about 25 per cent. Roman Catholic. The Presbyterians and the Wesleyans and other Methodists are the strongest of the smaller denominations. State aid to religion is abolished.

EDUCATION. There is a compulsory school attendance law for children between the ages of six and fourteen. Small fees are charged those able to pay. In 1900 there were 238,382 scholars enrolled in the State schools and colleges, and 60,327 in private institutions. Over half of the latter number were in Catholic schools. In 1900 the gross State expenditure for schools was £780,216, and the receipts from school fees amounted to £82,494. The State maintains a university at Sydney.

HISTORY. See AUSTRALIA and article on AUSTRALIAN FEDERATION.

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NEWSPAPER. A public print issued at periodical intervals, sold at a fixed price per copy, and for a definite period to regular readers known as subscribers, and giving three classes of information: (a) relating to events, or 'news'; (b) opinions, or 'editorials'; and (c) wares on sale, or 'advertisements.' A newspaper is distinguished on one side from the magazine or monthly by the absence in the latter of any concerted effort to present a new record of recent current events. It is separated from the pamphlet or newsletter by its periodic appearance and stated publication. Special postal privileges in the United States—a rate of one cent a pound, paid in bulk, or one-eighth that for books, one-sixteenth that for merchandise, and one-thirty-second that for letters—and in other countries press laws have led to many judicial and administrative decisions which unite in defining a periodical as earmarked by recurrent publication and a subscription list made in good faith, and the newspaper as published at least once a week. The term newspaper, while legally applied to a weekly, usually indicates a daily publication issued either early in the morning or in the afternoon. When the size of a sheet of paper and of a press bed-plate was limited by conditions of manufacture to the sweep of a man's arm in paper-making or in working a hand-press, the newspaper consisted of one large folio sheet doubled, giving four pages. When the changes in paper manufacture at the close of the eighteenth century and in the bed-plate of a press at the beginning of the nineteenth century through the application of power to printing enlarged the sheets and altered their limit, the newspaper began to be folded for the weekly to a square octavo, and enlarged for the daily to a large 'blanket' sheet. The introduction of the cylinder press after the middle of the nineteenth century and the manufacture of paper from wood-pulp of any size desired, fed to a press from a spool, changed the daily newspaper to its present form, containing a variable number of pages—from 4 pages to above 100, but usually 12 to 16 pages in English-speaking cities of over 500,000; 8 to 12 in cities of 250,000; and 4 in cities of less than 20,000; in Europe, usually from 4 to 8 in cities of 100,000; and 4 in smaller places, printed on both sides at a single impression. Newspapers, by periodic appearance, divide sharply into weekly (usually devoted to a special field, social, political, literary, the general weekly being the exception) and daily. The special daily is the exception, the world's four largest capitals and some American lesser cities having dailies devoted exclusively to the stock market or sports. American universities of over 1000 students usually support a daily. The city daily necessarily covers four fields: (a) the events of the place in which it is published; (b) events without; (c) opinion, usually given on a separate page, known as the editorial page; (d) the quotation of stock, cereal, and other exchanges, and advertisements. To these are added combined criticism and record, in special articles and correspondence on special fields, as politics, sports, theatre, letters, education, etc. Usually the earlier pages of a newspaper open with news from without and pass to local news. The markets and the larger share of the advertisements are usually on later pages. The editorial page, or expression of opinion, is generally between. When the two sides of a 4 or 8-page sheet had to be printed successively (until the invention of the web-perfecting press), this division was necessary. Still preserved from custom, an arrangement is now growing up in the United States in which important news, likely to attract buyers, gravitates to the front, and other fields to the rear pages, an arrangement long prevalent in the French boulevard press. As politics is the one subject of universal interest for men, newspapers in all countries tend to ally themselves with one of two political parties, where a bi-partisan organization for the control of an elective government exists. Where, as in European countries, parties are replaced by groups, each has its newspaper. In both cases some papers are known as independent. In all, newspapers exert a double influence. Those who read are directly affected by what is printed as with any printed utterance, but the periodic issue and the consequent array of subscribers or regular readers give newspapers in politics and in other fields a representative character, their influence depending on the fact that what is said expresses the opinion of a great multitude of readers. The skillful editor succeeds in combining leadership in new exigencies and problems with the capacity of expressing the opinion or sentiment that great masses of his readers will feel as new events call for the application of old principles.

Two empires, the Roman and the Chinese, had from an early period issues similar to the newspaper. The *Acta Diurna* (Daily Occurrences) of ancient Rome contained reports of great military achievements and of interesting events at Rome, as reports of elections, trials, games, fires, sacrifices, and miracles. They were written out by officers called *actuarii*, and deposited among other public archives. Copies were sometimes posted in public places, and sent at irregular intervals to the generals in the provinces, that the army might be informed of what was taking place in other parts of the Empire. They continued to be issued until the downfall of the Western Empire.

The Peking Gazette, *Tching-pao*, "News of the Capital," has appeared since 713 to 741 in the T'ang dynasty at the Chinese capital, and has for many centuries been issued daily. It is printed in a Government edition sent to officials, and in a popular edition with regular subscribers, reprints also appearing in the provinces, both having been furnished from an early period. It consists exclusively of Imperial rescripts, council decrees, and official news. It is undoubtedly the earliest daily in existence.

Neither of these official issues has any relation with the modern newspaper by example, still less by direct descent. The newspaper, as known today, is of composite origin. In the sixteenth century it was represented by news sheets, single folio pages sold by peddlers and criers giving news of a single occurrence. The first dated examples of these appeared in 1498, and some 800 examples are preserved which appeared before 1510.

These small news sheets appeared in Augsburg, Vienna, Ratisbon, Nuremberg, Antwerp, and many other places, generally in the form of letters. The extant numbers contain, among other matters, accounts of the discovery of America, of the conquests of the Turks, of the French and Austrian War in Italy, with such local occurrences as executions, inundations, earthquakes, burnings of witches, and child-murders, supposed to be committed by the Jews. Of equal interest are the official *Notizie Scritte*, established by the Venetian Government in 1566, containing accounts of the wars carried on by the Republic, and of other events of general interest. At first they were not printed, but might be read in various public places on payment of a small coin, called a *gazzetta*, whence the name *Gazette* (q.v.).

These represented the issue of floating rumor or a private letter by the presses of the day. As the press ceased to be a personal, and became a business venture, and regular communication was established by various posts over European countries, these broad sheets of news and opinion developed into the journal regularly issued—of which the *Frankfurter Journal*, published by Egenolph Emmel in 1615, suspended in 1902, was the first—the 'news-letter,' furnished to the correspondent by men usually in official life at the different capitals, the prototype of the later despatch and correspondent, and the pamphlet, discussing opinion, which began treating public affairs all over Europe from the standpoint of the editorial in the seventeenth century. By the opening of the eighteenth century these became united in daily journals which combined the report of the broad sheet, the correspondence of the news-letter, and the polemics of the pamphlet, adding the advertisement in 1648, and the regular market report at the close of the eighteenth century.

ENGLAND. The founder of the English press was a London printer named Nathaniel Butter (died 1664). As early as 1605 he was issuing news pamphlets; and in 1622 he began *The News of the Present Week*, which under varying titles was continued till 1639. His slips were mostly compiled from similar foreign sheets, and contained very little home news. But they bore the distinguishing mark of the newspaper: they were published regularly. During the Civil Wars there circulated a large number of sheets, with such names as *England's Memorable Accidents; The Kingdom's Intelligence; Mercurius Aulicus; Mercurius Politicus; The Scots Intelligencer; The Parliament's Scout; The Scots Dove; The Parliament Kite; The Secret Owl; Mercurius Mastix; Mercurius Democritus;* and *Mercurius Acheronticus, or News from Hell.* The arrangement of the news was poor in the extreme, and the comment most virulent. The first English newspaper which aimed at general information was the *Public Intelligencer*, established by Sir Roger L'Estrange in 1663; it was dropped soon after the appearance of the *London Gazette*, the first number of which was published at Oxford, November 7, 1665. A second paper, called the *Observer* was started by L'Estrange in 1681. In the reign of Charles II. the development of the newspaper was checked by the rigid enforcement of the licensing act of 1662. Under that régime nothing but an official organ could long survive. The repeal of the licensing act in 1695 opened a new era in English journalism. Newspapers at once sprang up in London and in other cities. Besides news-letters, flying posts, and mercuries, appeared the *Edinburgh Gazette*, a semi-weekly (1699); the *Daily Courant*, the first English daily (1702); the *Review*, established by Defoe for the discussion of political questions (1703); and the *Orange Postman*, the first penny paper (1709).

Though the licensing act was of the past, the newspaper writer was held to strict account for what he printed. During the reign of George III. prosecutions were especially common. The usual result was to give increased currency to the doctrines assailed, and to confer a fictitious importance on traders in politics, by whom many of the journals were conducted. The first attempt at Parliamentary reporting was also resented by the House of Commons as a breach of privilege, but the imprisonments of 1771 ended in the tacit concession of publicity of discussion, which has ever since prevailed. The Speaker in 1893 excluded the representative of the *London Chronicle* from the Commons gallery, and it was generally accepted as within his power. A greater obstacle encountered by the press was the stamp tax. In 1712 a duty of a halfpenny per sheet was placed on every paper of a sheet and a half. It put an end to Defoe's *Review*, Addison's *Spectator*, and 'all the little penny papers.' The tax was raised in 1757 to a penny a copy; in 1776 to a penny and a half; in 1789, to twopence; in 1794, to twopence-halfpenny; in 1797, to threepence-halfpenny; and in 1815 to fourpence. At this time the usual price per copy was sevenpence. In 1836 the tax was reduced to a penny, and in 1855 abolished altogether. And in 1861 the duty on paper was repealed. As a result, newspapers increased enormously in number, and the price per copy was reduced to the present level, from threepence to a halfpenny.

Notwithstanding these exorbitant imposts, which were at first intended to be as deadly as the old licensing act, many newspapers were established, and as their scope widened they became more and more important. The *Saint James's Post* and the *Saint James's Evening Post*, each started in 1715, were fused in the *Saint James's Chronicle* (1724), the liveliest paper of the period. The *London Daily Post and General Advertiser*, founded in 1726, changed its name in 1752 to the *Public Advertiser*, and was afterwards famous for the contributions of 'Junius.' In 1762 John Wilkes issued the first number of the *North Briton*. The *Morning Chronicle*, established in 1769, was the first newspaper to give adequate reports of Parliamentary debates; it invented the leading article; and in its columns first appeared Hazlitt's dramatic criticisms. It was soon rivaled by the *Morning Post* (1772) and the *Morning Herald* (1781). The *London Daily Universal Register*, begun in 1785, was turned into the *Times* in 1788. From the first, the *Times*, under the direction of John Walter (q.v.), devoted itself mainly to a discussion of public affairs, governmental, educational, and commercial. Its Parliamentary reports and 'leaders' soon became the best, and in course of time it was recognized as 'the leading journal of Europe.' It was the first to discard the hand-press and to substitute steam (1814). In 1846 appeared the *Daily News* with Dickens as editor; and in 1855 the *Daily Telegraph*, the first penny paper of the nineteenth century, which gained an immense audience under the régime of G. A. Sala. The *Standard*, now the chief Conservative newspaper, was started in 1827, as an evening edition of the *Morning Herald*. It made a stout fight against Catholic emancipation. Its cause lost, it lived a lingering life until revived in 1876 by its able editor, W. H. Mudford. Other popular London dailies are the *Globe* (1803); the *Echo* (1868), the first London halfpenny newspaper; the *Pall Mall Gazette* (1865), which John Morley turned from its conservative ways into a powerful Radical organ; *Saint James's Gazette* (1880); the *Evening News* (1881); the *Star* (1888); *Westminster Gazette* (1892); the *Sun* (1893); and the *Daily Mail* (1896), founded by A. C. Harmsworth, who is a striking figure in recent journalism.

The London literary and society papers have a line of connection with Addison. The numerous imitations of the *Spectator* (1711-12) were essays on manners and literature. The nineteenth century type of the weekly review was set by Leigh Hunt in the *Examiner* (1808), which combined literature and politics. Under its first editor and Albany Fonblanque (q.v.), it had a brilliant career, as an exponent of current radicalism. The *Athenæum* (1828) confines itself to literature, art, and music. Though it has had many rivals, it is to-day one of the most trustworthy reviews in the world. The *Academy* (1869) is similar in design, but runs more to literary gossip. The *Saturday Review* (1855), once the most solid, is now the 'smartest' of English weeklies. The *Spectator* (1828), under R. S. Rintoul, exerted for thirty years a mighty influence for reform. After R. H. Hutton assumed the editorship (1860), it became less radical in tone; and its sane discussions of politics and literature were among the best that journalism has ever offered. It still holds its high position. As the champion of radicalism, the *Speaker* was established in 1890 by T. Wemyss Reid. Other weekly reviews of literature, society, and politics (one or all), are the *Literary World* (1868); the *National Observer* (1887); the *Outlook* (1898); *Literature* (1897); the *Pall Mall Budget* (1868); the *Saint James's Budget* (1880); the *Weekly Sun* (1891); the *Guardian* (1846); the *Weekly Register* (1849); *Pearson's Weekly* (1890); *Vanity Fair* (1868); *Society* (1878); the *Pelican* (1887); the *Critic* (1895); *Lloyd's Newspaper* (1842); *Reynolds's Newspaper* (1850); the *Referee* (1877); the brilliant *World* (1874), founded by Edmund Yates; and *Truth* (1877), edited by Henry Labouchere. Exceedingly popular are several light journals approaching the magazine, such as *Tit-Bits* (1881) and *Answers* (1888). At the head of illustrated weeklies stand the *Illustrated London News* (1842); the *Graphic* (1869); the *Lady's Pictorial* (1880); the *Gentlewoman* (1890); and *Black and White* (1891). There are also reviews for distinct trades, professions, and pastimes; the *Illustrated Sporting and Dramatic News* (1874); the *Cycle* (1893); the *Musician* (1897); the *Economist* (1841); the *Statist* (1878), for the markets of finance; *Engineering* (1866); and so on through many phases of contemporary life. Among comic journals *Punch* (q.v.) is still supreme.

The press of London, taken collectively, has passed through three broadly marked stages. It began on a mere transcript of the city's rumor, gossip, and abuse. Repressed by the licensing act for a generation, it took two forms on its repeal, 1695, one literary, of which Addison's *Spectator* was the highest type, and the other bitterly polemic (L'Estrange and Defoe). In these journals, which appeared in quick succession for a century, the personality of the editor was decisive. With the Napoleonic wars English journalism entered on a third stage, led and molded by John Walter, the founder of the London *Times*, in which the personality of the editor became only one factor, though still of importance, in a compact organ of public opinion and vehicle of public news, whose articles were anonymous and whose editor was by a transparent fiction unknown. The weight and influence of journals in this period turned on the success with which editorials expressed the opinions of the ruling forces of the nation, of a party, a class, or an interest, and the accuracy and impartiality with which its news columns recorded facts. While this type was most completely developed in the *Times*, it was apparent in all English periodicals, daily, weekly, and monthly, from the Napoleonic wars until the defeat of Gladstone's Irish Home Rule Bill recast party relations and based the Conservative-Imperialist majority on a mass vote. With this period, now nearly twenty years distant, English dailies began developing circulation independent of influence, signed articles and the personal journalist became conspicuous, and the publisher with an avowed commercial aim had an increasing control and influence. The earlier newspaper, like the *Times*, waned in weight, and the type of the new is not yet developed.

The earliest provincial English newspaper was the *Worcester Postman* (1690), which, under the name *Berrow's Worcester Journal*, still circulates freely through the West Midlands. Five years later was founded the *Mercury*, now called the *Lincoln, Rutland, and Stamford Mercury.* In 1706 appeared the *Norwich Postman* at a penny, with the announcement that a halfpenny would not be refused. It was followed by the *Norwich Mercury* (1714), which still exists. Among other early successes were the *Nottingham Courant* (1710), which with changed name continued till 1886, when it was incorporated with the illustrated *Weekly Express;* the *Newcastle Courant* (1710), with a present large circulation in the north; the still prosperous *Hereford Journal* (1713); the *Leeds Mercury* (1718), one of the best of provincial papers; the *Salisbury and Winchester Journal* (1729), now an influential paper; and the *Birmingham Gazette* (1741), to-day one of the leading Midland dailies. These examples, without the catalogue of numerous failures, show how the newspaper spread through England early in the seventeenth century. They were, however, small sheets, and continued to be such till about 1860. Still other well-known English papers are the *Leeds-Yorkshire Post* (1754), with a daily since 1866 and an evening issue since 1890; the *Newcastle Chronicle* (1764), now issuing two daily editions; the *Liverpool Courier* (1808), two daily issues and a weekly; the *Leicester Daily Post* (1872); the *Sheffield Weekly Telegraph*, with a circulation of 215,000; and the *Manchester Guardian* (1821), which has a reputation far beyond England for its independence and able comment. Wales depends largely upon the newspapers of the border counties. She has, however, several English journals of her own; as the *North Wales Chronicle* (Bangor, 1807); the *South Wales Daily* (Cardiff, 1872), in the Liberal interest; and the *Western Mail* (1869), in the Conservative interest. A few newspapers are printed in the Welsh language. Among them are *Y Genedl Gymreig* (The Welsh Nation) and *Baner ac Amserau Cymru* (Banner and Times of Wales).

Scotland very naturally had a hand in the numerous sheets employed to circulate information during the civil wars. The first to be printed in Scotland was the *Mercurius Politicus* (Leith, 1653; Edinburgh, 1654-60). Under the title *Mercurius Publicus*, it continued till 1663. The *Mercurius Caledonius* (Edinburgh, 1660) failed after ten issues. The establishment of the newspaper in Scotland was due to James Watson, who was both editor and printer. He started the *Edinburgh Gazette* (1700); the *Edinburgh Courant* (1705), a tri-weekly, which suspended after fifty-five numbers; and the *Scots Courant* (1706), continued till 1718. In 1718 appeared the *Edinburgh Evening Courant*, and two years later the *Caledonian Mercury*, which continued for nearly a century and a half. The *Scotsman* (Edinburgh, 1817), a daily since 1855, the most substantial journal in Scotland, is also most favorably known in the United States. Among the numerous other good Scotch journals are the *Glasgow Herald* (1782), an independent daily with a weekly issue; the *Glasgow Weekly Mail* (1862); the *Dundee Advertiser* (1801), daily; the *Dundee Weekly News* (1855), having a circulation above 250,000; the *Aberdeen Journal* (1748), daily and weekly; and the *North British Daily Mail* (Glasgow, 1847).

Ireland. During the civil wars there were printed in London several sheets containing news from Ireland, as *Warrented Tidings from Ireland* (1641) and *Mercurius Hibernicus* (1644). The first real Irish newspaper was the *Dublin News-Letter* (1685). Fifteen years later came the first Dublin daily, *Pue's Occurrences*, which was continued for a half century. In 1728 appeared another daily, *Falkener's Journal. Esdaile's News-Letter* (1744), changed to *Saunders's News-Letter* (1754), a Dublin tri-weekly and then a daily, lasted till 1879. The official *Dublin Gazette* (1710?) still continues. The oldest provincial Irish newspapers still existing are the daily *Belfast News Letter* (1737), the semi-weekly *Waterford Chronicle* (1766), and the *Limerick Chronicle* (1766). Among the most flourishing Dublin newspapers are the famous *Freeman's Journal* (1763); the *Weekly Nation* (1847); the *Evening Telegraph* (1877); and *Sport* (1881). The *Belfast Northern Whig* (1824), with a large circulation in Ulster, is also well known outside of Ireland.

The British Colonies. In British North America the chief places from which newspapers (daily and weekly) are diffused are Toronto, Montreal, Ottawa, Quebec, and Halifax. Among the earliest journals were the *Halifax Gazette* (1751), which lasted hardly twenty years, and the *Montreal Gazette* (1765), now a daily and weekly. Toronto, though later in the field, takes the lead to-day with its five dailies and many weeklies, among which are the *Globe* (morning, evening, and weekly), the *Daily Mail*, and *Evening News*. Quebec and Ottawa support several dailies and weeklies in French.

India. The deportation clause in the early libel act, censorship, and a rigid license act restricted journalism in India, and a press law still leaves all newspapers published in the vernacular subject to administrative suppression. Anglo-Indian journalism began with the *Indian World*, Calcutta, edited by William Duane in 1794, deported by the East India Company. He was afterwards editor of the *Aurora*, Philadelphia, Pa. About thirty years later J. S. Buckingham was deported for a like reason. In 1800 nine newspapers were started and soon suspended. Early in the nineteenth century the English papers were the *Englishman*, started in 1821 as *John Bull in the East*, *Hurakarn*, Calcutta *Star*, and *Friend of India*. Much of Rudyard Kipling's early work appeared in the Lahore *Civil and Military Gazette*. In Calcutta nine dailies are published in English and seven in the vernacular. The *Indian Daily Mirror* (1863) is the first daily in English edited by natives. The *Hindu* of

Madras is the oldest daily in that city. In all, five dailies in English are conducted by natives. There are in the Empire about 140 English and about 300 native newspapers. The largest circulation of the latter is 25,000, and most circulate a few hundreds. The vernacular press is for the most part bitterly opposed to the Government, and is generally edited by Bengalis.

AUSTRALASIA AND SOUTH AFRICA. Journalism in Australia began with the Sydney *Gazette* and New South Wales *Advertiser* (1803-04), of which but one complete file is in existence at the Sydney Government House. The history of journalism in Australia is scattered with failures from 1810 to 1860. But to-day the dailies and weeklies of large circulation are numerous. Though the press has been established in the small towns, the great journalistic centres are Melbourne and Sydney; and next to them, Adelaide and Brisbane. We may cite for Melbourne, the *Argus*, the *Age*, and the numerous journals devoted to building, mining, stock-raising, and shipping; for New South Wales, the Sydney *Morning Herald*, the *Australian Star*, and the *Daily Telegraph;* for South Australia, the *Register;* for Queensland, the *Brisbane Courier*. The Australian papers are remarkable for the large number of pages in an issue, larger in proportion to population and circulation than in any other country, particularly in the case of weeklies.

New Zealand's first paper was the New Zealand *Herald* (1841), now consolidated with the Auckland *News*. It was published for a year, revived (1863) by W. C. Wilson, and merged in its present ownership (1864). It is one of two dailies in Auckland. The *Times*, Wellington, is a typical and leading daily. A Maori paper, *Te Pakio Matirki*, is published by a former chief, Tawhiao. The newspaper has followed the colonist to Cape Colony, Natal, and to other British possessions in Africa, and throughout the world. Cape Colony has several weeklies and three dailies, of which may be mentioned the *Cape Argus* and the *Cape Times*, both daily and weekly.

FRANCE. The now flourishing *Gazette de France* (daily) is the oldest of all French newspapers. As the *Gazette* it was established at Paris in 1631 under the patronage of Richelieu by Théophraste Renaudot (1584-1653). It first appeared weekly with a monthly supplement, and afterwards as a semi-weekly. Being thus a continuous record (except for a slight suspension) of foreign and domestic events for toward three centuries, it possesses very great historical value. In its arrangement of foreign news first and home news last, it also set an example which has generally prevailed in French journalism. Before the close of the seventeenth century it began to give space to commerce, theatrical announcements, and advertisements. The *Gazette Burlesque* (1650-65), the first journal of the kind, aimed to be the *chronique scandaleuse* of Paris. The two types thus established were continued in the *Mercure Galant* (1672), which, under different names, commonly the *Mercure de France*, was continued, with short interruptions, down to 1853. The rather insipid *Journal de Paris* (1777-1819) is said to have been the first Parisian daily. During the Revolution journals sprang up rapidly as organs of the various parties, but they soon expired. Two, however, have lived till the present time: the *Journal des Débats* (1789) and the *Moniteur Universel* (1789), the official organ under the first Napoleon. The *Constitutionnel*, in which Sainte-Beuve began the *Causeries du lundi*, dates from 1815. In 1836 were established two cheaper papers, the *Presse* and the *Siècle*, now popular dailies. The *Figaro*, the modern *journal de scandale*, established in 1854, became a daily in 1866. It has had considerable influence on the lighter newspaper in England and elsewhere. The *Charivari* (1832), a *journal satirique*, has likewise been imitated in many countries. The *Patrie*, political, commercial, and literary, was a daily from the first (1841). Of all Parisian newspapers, perhaps the *Temps* (a daily, 1861) has the most solid reputation abroad. The Parisian political press is further represented by the *Soir* (1870), the *Matin* (1884), and many others. The *Petit Journal* (1863), the first French paper selling at five centimes (half the usual price), at once gained a circulation of 100,000. After arrangements were made whereby it could be furnished throughout France at the same price, its daily issue rapidly increased till it reached a million. French newspapers contain less news than the English or the American. Space is thus found for the *feuilleton*, a literary essay, sketch, or short story, an indispensable feature of the French journal. Paris is famous for her weeklies devoted to art, fashion, literature, and the professions. Outside of Paris, the larger towns support several dailies.

BELGIUM. Antwerp has already been mentioned as one of the places from which were issued the news-letters of the sixteenth century. They were succeeded by the *Nieuwe Tijdinghen* of Antwerp (1605?), on which were founded the *Posttijdingen* (1637-44) and the *Gazette van Antwerpen* (down to 1827). To the period 1640-50 belong the *Nieuwe Tijdinghen* of Bruges, the *Brusselsche Gazette*, and *Le Courier Véritable des Pays-Bas* (Brussels), which, as the official *Gazette de Bruxelles* and the *Gazette des Pays-Bas*, continued till 1791. At that time the most outspoken political journal was the *Annales Politiques* of Linguet (often suppressed). The Belgian press, held in firm restraint during the Spanish, Austrian, and French rule, became practically free on the independence of Belgium (1830). Antwerp with its seven dailies has been far outstripped by Brussels, which has now about twenty dailies. The chief are the *Indépendance Belge*, the *Etoile Belge*, and the *Journal de Bruxelles*. At Antwerp and at Ghent dailies are published in Flemish.

HOLLAND. The papers of Holland were long noted for the accuracy of their commercial news. Since 1830 they have given more attention to politics. At present the principal Dutch dailies are the *Allgemeene Handelsblad* and *Nieuws van den Dag*, both of Amsterdam; the *Amsterdamsche Courant;* the *Journal de la Haye;* the *Haagsche Courant;* and the *Staats Courant*—published at The Hague. Other places of active journalism are Haarlem and Rotterdam. Weeklies, several of which are illustrated, are also common.

SWITZERLAND. The Swiss papers are devoted mostly to local interests. They are, however, well managed, especially the dailies at Geneva, Berne, and Lausanne. For tourists there is published at Geneva the *Swiss and Nice Times*, in both French and English.

GERMANY. The news sheets of the sixteenth century led to the newspapers that began to appear just after 1600. Frankfort-on-Main was among the first with the *Frankfurter Journal* (1615) and the *Frankfurter Oberpostamtszeitung* (1616), which, as the *Frankfurter Postzeitung*, lived till 1866. Periodical papers were soon established in other towns, as Strassburg, Nuremberg, Hildesheim, Augsburg, Munich, Hamburg, and Leipzig (1660). The *Hamburgischer Correspondent* (1714), still existing, is famed as being the first to have a regular foreign correspondent, a French refugee living in England (1725-35). The *Allgemeine Zeitung*, started at Augsburg in 1798 and published since 1883 at Munich, from the first a weighty political organ, now ranks among the foremost papers of Germany. The press in Germany was long under severe restrictions. The press laws of Germany are in theory liberal. In practice, however, by a rigid application of the law in regard to lèse-majesté, the courts have come to construe almost any criticism of current administration as an insult to the constituted authorities. Even a comment on the frequency of railroad accidents has been visited with court proceedings, and the editor of *Kladderadatsch* was imprisoned for two months for a cartoon which represented a group of great soldiers of the past reading the Emperor's speech to his guard, declaring that it was necessary to be a good Christian in order to be a good soldier. Berlin has over twenty-five dailies, among which are the *Vossische Zeitung;* the *Norddeutsche Allgemeine Zeitung;* the *Neue Preussische Zeitung; National-Zeitung;* the *Tägliche Rundschau; Germania;* and the *Volkszeitung.* The *Cologne Gazette* is noted for its foreign news. From all the great cities of Germany issue many weeklies, some of which are illustrated. The leading comic periodicals are *Fliegende Blätter* and *Jugend*, Munich, and *Kladderadatsch*, Berlin.

AUSTRIA-HUNGARY took an active part in the early history of journalism and has kept abreast with modern methods. Of the Vienna dailies, numbering about fifteen, the most important are the *Neue Freie Presse; Neues Wiener Tageblatt; Wiener Allgemeine Zeitung; Deutsche Zeitung;* the semi-official *Fremdenblatt;* and the official *Wiener Zeitung*, with its semi-official evening edition, *Wiener Abendpost.* Budapest has twenty-seven dailies, of which *Pesti Napló* (Pest Daily), *Egyetértés* (Union), and *Pesti Hirlap* (Pest Gazette) are the most prominent in Hungarian, and the *Pester Lloyd* and *Neuer Pester Journal* in German. Among the provincial papers the foremost in German are the *Bohemia*, in Prague; the *Grazer Tagespost*, the *Triester Zeitung;* in Czech, the *Národni Listy* (National News), in Prague; in Polish, the *Czas* (Times), in Cracow; and in Italian, the *Indipendente*, in Triest. As in France, considerable space is given by the press of Germany and Austria to literary reviews and short stories.

SCANDINAVIA. The earliest Swedish paper seems to have been the *Ordinarie Post-Tidende* of Stockholm (1643-80). A little later came the *Svensk Mercurius* (1675-83) and the *Relationes Curiosæ* in Latin (1682-1701). In the eighteenth century were established two French papers: the *Gazette Française* (1742) and the *Mercure de Suède* (1772). The first political paper of importance in Sweden was the *Argus*, founded by Johannsen (1820). Ten years later were established the *Fäderneslandet*, the organ of the Royalists, and the *Aftonbladet*, the organ of the Reformers, now the leading dailies of Stockholm. The first Norwegian newspapers were the *Christiania Intelligentssedler* (1763) and the *Adressecontors Efterretninger* (Bergen, 1765). Christiania now has five and Bergen three dailies. In both Norway and Sweden semi-weeklies and tri-weeklies are common. The press of Denmark dates from the *Danske Mercurius* (1666). Down to 1830 the papers of Denmark were made up mostly of extracts from foreign journals; and those outside of Copenhagen are still very poor. Copenhagen now has thirteen dailies, morning and evening, of which the oldest is the *Berlingske Tidende* (1749). The *Aftenposten* enjoys the largest circulation. At Reikjavik in Iceland are published two small journals.

ITALY. As has already been mentioned, Italy with her ancient *Acta Diurna*, and the Venetian gazettes of the sixteenth century, was the original home of the newspaper. The succeeding sheets fell into disfavor with the popes and were denounced in a bull issued by Gregory XIII. The *Diario di Roma* (1716) was the leading Italian newspaper for more than a century. Next followed the existing *Gazzetta di Napoli.* Up to 1848 the newspapers of Italy, subject to strict censorship, were small and politically insignificant. Press laws then became liberal, and as a result newspapers sprang up rapidly. Among the ten Roman dailies may be cited the *Opinione* (established at Turin in 1847 and afterwards removed to Rome); *Diritto; Riforma; Fanfulla;* and the *Voce della Verità* (in the interest of the Pope). Florence issues the *Corriere Italiano* and two other dailies; Genoa, the *Caffaro* and the *Corriere Mercantile;* Milan, six dailies, among them the influential *Perseveranza;* Turin, five; Venice, four; and Naples, six. There are also several illustrated and humorous weeklies.

THE SPANISH PENINSULA. Though there were earlier sheets published at irregular intervals, the first Spanish newspaper seems to date only from the eighteenth century. Even for some time after 1800 Madrid had only its *Diario.* Indeed, the press in Spain had a hard career till the Revolution of 1854. Dailies in all the chief cities are now numerous. Madrid has about twenty, among which are the *Imparcial* and the *Correspondencia de España.* Among the Madrid illustrated weeklies are the *Correspondencia Ilustrada* and the *Illustración Española y Americana.* From the American standpoint, the news in Spanish papers is meagre. This is also true of the numerous dailies of Lisbon.

RUSSIA. The earliest newspapers of Russia were issued under the direction of Peter the Great, first at Moscow and then at Saint Petersburg, to report the progress of the war with Sweden. The first gazette, the *Vedomosti*, appeared in Moscow in 1702. The issue of 1703, preserved in the Imperial Library at Saint Petersburg, was reprinted in 1855. Political journalism, however, has never been permitted in Russia except in defense of the Government policy. The flourishing period of the press has been at the time of national crises, as the French invasion of 1812, the Polish insurrection of 1830, and the Crimean War. The official organ is the *Journal de Saint Pétersbourg.* The *Novoe Vremya* (New Times), the *Novosti* (a news and stock gazette), and the *Severnaya* (Northern Bee) circulate widely from Saint Petersburg. The oldest Moscow daily is the *Moskvskia Vedomosti* (Moscow News), dating from 1766. Russian papers, necessarily occupying themselves mainly with scientific and literary subjects, make much of the *feuilleton*. The weekly *Niva* (Harvestfield) issues two large monthly supplements.

TURKEY. The newspaper was introduced into Turkey by the French, the first being started in Pera in 1795 by Verninhac, French Ambassador. The *Djeridei Havadis*, established in 1843 by Alfred Churchill, an Englishman born in Turkey, is now the leading daily of Constantinople. Beirut is the centre of the Arab press of the Empire. There exist dailies in the capital, also in English, French, Italian, Armenian, and Greek. Owing to the repressive policy of the Government, the editorial is impossible. The contents of a Turkish paper include home and foreign news, a Court gazette, official appointments, advertisements, and a *feuilleton*. Religious weeklies, as the *Avedafer* in Armenian, have played an important part in mission enterprise.

GREECE. During the War of Liberation, many papers appeared in Athens, but they disappeared in 1833 on the introduction of caution money, by King Otho. Then followed the period of the official organ. Now the Athenian press is represented by several journals in Greek, French, Italian, and English; the daily *Akropolis*, *Ephemeris*, and *Nea Ephemeris;* and the weekly *Journal d'Athènes*, and the *Messager d'Athènes*.

CHINA. The *Peking Gazette* has already been described. It contains a court calendar, Imperial decrees, and memorials from officers of the State. The European journal has been brought to China by the English and the French. Shanghai and Hong Kong have several dailies in English and Chinese. The native press of China is the product of the past twenty-five years. The earliest was the *Cheng-pao* of Shanghai, begun by an Englishman, Major, aided by Chinese literati, circulation, 1895, 12,000; the *Hou-pao* (1883); the *Che-pao* at Tien-tsin; and *Kouang-pao* at Canton. These have been succeeded by a vernacular press all over the Empire, which has a considerable influence. The *Shih Wu-pao* of Shanghai is one of several sheets started by a viceroy, in this case Chang Chih-tung, to counteract the vernacular press in private hands, and in August, 1898, the subject of an Imperial rescript.

JAPAN. Japanese journalism owes its initiative impulse and traditions to Fukazawa, who founded and for many years edited the *Sizi Shimpo*, the leading daily paper in the Empire, published at Tokio. Himself one of the ablest editors of the century, as prolific as Girardin, as full of moral earnestness as Greeley, and as able in directing public policy as Delane, his paper in the early stages of the Miji educated Japan. The first periodical, *Manhio*, appeared in 1863. The first daily, *Mainichi Shimbon*, was established in 1871 at Tokio. Among other Japanese papers worthy of mention are: *Nichi Nichi Shimbon* (1872), Count Ito's organ, *Hochi Shimbon*, *Jisi Shimpo*, *Nippon*, *Kohumin Shimbon*, *Kohumin*, and *Noromo*. The *Miro Miro* is a comic paper. In 1883 Japan had 113 newspapers and periodicals, of which one had 1900 circulation; in 1888, 550, and in 1900, 827, of which Tokio had 201, Osaka 56, and Kioto 51. The dailies number 150, of which 17 in 1888 had a combined circulation of 130,200.

THE UNITED STATES. The newspaper has an importance in the United States attained nowhere else. A broad area under a common language with a homogeneous population, universal education, easy means of communication, the cheapest mail facilities known, newspaper tolls cheaper in proportion to average distance, though higher for short distances than elsewhere, and a constant interest in political and social affairs, complete freedom from censorship or restriction, except that provided by the libel laws, have given 5 per cent. of the population of the world 40 per cent. of its newspapers. Less accurate than the English newspaper, less well written than the French, less well equipped than the German, the American newspaper occupies a mean position between all three in the extent of its news service, in the freedom of its literary vehicle, and in its habit of treating all subjects from the point of the educator rather than the investigator. Journalism in the United States has shared the conditions due to material circumstances which affect all periodicals. They have already been described for England, where, a dense population occupying a limited area, questions of transportation play a limited part. The journalism of the Revolution, when for newspaper purposes no common communication existed between colonial centres, was limited in influence and circulation to the place and region in which each paper was published, and even the New York *Journal*, in which the Federalist appeared, had small influence outside of New York City. When the postal service was fully organized after the Revolution, but remained subject to special carriage until the organization of an adequate stage service along the Atlantic Coast in the third and fourth decades of the nineteenth century, the rates upon newspapers were so high that their circulation was the luxury of a few, and the small group of newspapers edited at the chief centres by men of a commanding personality, known to the public class of the period, had a most important influence, akin to that of the English journal of the same time, from the general knowledge among men of public affairs of the personality of their editors, and their ability to affect the dominant class of their place and region. The organization of a stage service, in particular between New York and Philadelphia, just prior to the development of railroads, and a reduction in newspaper mail rates gave a wide circulation to weeklies and began the political influence of such newspapers, usually the weekly edition of a daily, which lasted from 1840 to 1875. During this period, as with the New York *Tribune*, the real influence and weight of its editor rested, not upon its daily edition, which in this case was always out-topped in New York City in circulation by two or more papers, but upon its weekly, which circulated throughout all the North. Political and religious weeklies during this period were the most profitable of newspaper properties, and the most potent of political, religious, and social factors. Ten years after the close of the Civil War competition began in the telegraph service, both by cable and by land; tolls dropped, newspaper postage was reduced to a nominal figure, the price of paper per pound began to decrease, train service was improved, the early delivery of the morning paper became possible, owing to presses capable of printing a large edition rapidly before breakfast within a radius of 200 miles, and during the last quarter of the nineteenth century the daily became dominant. It had for more than half a century held an unchallenged field in all cities of over 100,000 population. The changes just recited extended the newspaper radius of all cities of half a million or over, and dailies which had been important at a remove of 100 or 200 miles over a great centre, in towns from 50,000 to 100,000, while they suffered no loss in their value as local means of communication and business properties, lost their weight in the daily newspaper field as organs of political and social importance, now that circulation which had been measured by the 10,000 down to 1885 was measured by the 100,000. From 1840, when the power press, the railroad, and the telegraph made the modern daily newspaper possible, down to 1875, a circulation of 50,000 in New York City was remarkable, and nearly all newspapers were well satisfied with half of this. From 1875 to 1885 these figures doubled. From 1885 to 1900, with a few exceptions, a newspaper could not be considered in any city of over half a million as of importance unless its daily circulation turned 100,000, and in cities still larger 150,000 to twice these figures was not unknown. The effect of this enormous growth was to change radically both the condition and character of newspapers seeking a large circulation. Where a regulation subscription had been the general source of support, news-stand and street sales became responsible for the great bulk of the edition. Newspapers began sharply to differentiate between the newspaper in each city which sought a large but unstable circulation and the newspaper which aimed at a smaller but secure and more select group of readers. Where one newspaper to the home had been the rule, it became more and more common for the house and office to take from two to five. During the last decade of the nineteenth century, in the struggle for circulation and a general competition, the usual price of the daily newspaper in a large city, which was 4 and 5 cents down to 1880, and from 2 to 3 cents down to 1890, dropped to 1 cent for most of the newspapers having a large circulation, for all in Philadelphia, for all but three English morning newspapers in New York in the general field, while in Boston and Chicago 2 and 3 cents was still maintained. At the same time, a corresponding fall took place in the rate charged for the small 'want' advertisement, and for the special advertising of business firms, a larger and larger share of which was monopolized by 'department stores.'

Boston was first in the field with *Publick Occurrences* (1690), a small quarto sheet, having one page blank. For containing "reflexions of a very high nature," it was suppressed by the Governor of Massachusetts. Next came the Boston *News-Letter* (1704), first conducted by John Campbell, the postmaster. In 1719 it met a bitter rival in the Boston *Gazette;* but with its name changed to the *Massachusetts Gazette and Boston News-Letter*, it grew to be the chief organ of British rule in America down to the evacuation of Boston. In 1721 James Franklin began the *New England Courant*. It suspended in 1727; and two years later Benjamin Franklin, who had been apprenticed to his brother James, established at Philadelphia the *Pennsylvania Gazette*, which he conducted as a weekly till 1765. The *Pennsylvania Gazette* was then merged in the *North American*. Numerous ventures at Boston led to the *Boston Evening Post* (1735), which was ably conducted as an independent journal down to 1775, when it expired. The new *Boston Gazette* (1755) became the voice of the people against England. To it John Adams contributed the *Letters of Novanglus*. The *Massachusetts Spy* (1770) was another brilliant paper on the Revolutionary side. On the day of the battle of Lexington, it was removed to Worcester, where, after one short suspension, it has continued till the present under the name of the *Worcester Spy*. In other colonies the newspaper had already appeared or was appearing. In 1725 the colonies had two newspapers, one in Boston and one in Philadelphia. At the outbreak of the Revolution the number had increased to 34. The years immediately following saw, amid many failures and successes, the establishment of two dailies: the *Advertiser* of Philadelphia (1784) and the *Advertiser* of New York (1785).

For America, as for the rest of the world, the period of immense expansion in journalism began about 1830, on the establishment of the great New York dailies. The *Daily Sun* (1833), the first penny paper in the United States, was among the pioneers. Reorganized by Charles A. Dana in 1868, it gained wide repute for concise news items and brilliant editorials. The *Herald* (1835), founded by James Gordon Bennett, has long been noted for its exclusive foreign news, often obtained at lavish expense. The *Tribune* (1841), for thirty years under the management of Horace Greeley, was distinguished for its vigorous editorials. It still remains one of the cleanest and most reliable among newspapers. The *Times*, founded in 1851 by Henry James Raymond, has always aimed at sane and conservative comment on contemporary questions. Among other New York dailies of high standing are the *Evening Post* (1801), an independent paper somewhat on the English type, and containing solid and trustworthy book reviews; the *Commercial Advertiser* (evening), which is most favorably known for its financial and literary comment; the *Mail and Express* (evening); and the *Press*, founded in the interests of the Republican Party. The latest phases of modern journalism are represented by the *World* and the *Journal* or *American*. Excellent dailies are also published in German, French, and Italian. New York has found indispensable a few dailies and numerous weeklies devoted to finance and each important branch of trade. Such are: the *Financial News* (daily); the *Journal of Commerce* (daily); *Bradstreet's;* the *Iron Age*, etc. Each department of knowledge and each profession also has its weekly. Of the many illustrated journals *Harper's Weekly* is the oldest. Among others are *Collier's Weekly* and *Frank Leslie's Illustrated Paper*. In 1875 the *Graphic* was the only illustrated daily. Now a daily without illustration is rare. American humor finds expression in *Puck*, *Judge*, and *Life;* criticism in the *Nation*, in many other weeklies, and in the Saturday or Sunday editions of the dailies. The *Times* publishes a Saturday supplement composed wholly of book reviews and literary comment. Among religious journals, which often include literary criticism, are the *Observer* (Presbyterian); the

Churchman (Episcopal); the *Christian Advocate* (Methodist); the *Examiner* (Baptist); the *Independent* and the *Outlook* (liberal); the *Catholic Review;* the *Catholic American;* and many Hebrew weeklies. Sport, art, science, the drama, fashion and society—each has its own periodicals. *Public Opinion* presents a résumé of current thought. New York still leads the American press. But what has been said of her journals is largely true of Boston, Philadelphia, Baltimore, Cincinnati, Chicago, Saint Louis, and San Francisco. And from certain other cities, sometimes small, are issued newspapers which have gained a national reputation. Such are the *Springfield Republican*, the *Detroit Free Press*, the *Louisville Courier-Journal,* and the *New Orleans Picayune.* The last years of the nineteenth century witnessed the rise of the Sunday issue of the great dailies. These immense Sunday magazines, sometimes running above a hundred pages, with colored illustrations, are now published in all the larger cities.

THE MAKING OF THE NEWSPAPER. For a conception of the wonderful progress of the press, one must leave mere annals and enter the workshop. The newspaper such as Defoe edited was nothing more than a brief chronicle of news gathered haphazard, concluding with the advertisement of a quack doctor. Next came the reporter. The special correspondent here and there appeared in the seventeenth century, but he did not gain his place till the Crimean War, and in the United States not till the Civil War. Now every great daily has its hundred correspondents scattered about the globe. This has been rendered practicable by the cable. For saving expense, news agencies have been formed in Europe and America. Reuter's (1858) was the first for England. The Associated Press of the United States dates from 1849. Though these serve for the smaller papers, they are to the larger papers only hints to be followed up by their own agents. The telegraph, indispensable for gathering news, has been reënforced by the telephone, which is now finding its way into every village. These new sources for obtaining news have revolutionized the office. The editor who personally superintended the issue of his paper is of the past. There can never be another Greeley or Dana. The editor-in-chief of certain papers finds no time even to write a leader. The work of making the paper must be divided and subdivided. A 'city editor' directs the reporters in gathering news. A 'news editor' keeps in touch with outside correspondents through the telegraph and the telephone. What pours in from the press associations and a paper's own avenues must be thoroughly sifted by 'copy editors,' who now throw out far more than they put in. For important news articles there are usually special writers. 'Exchange editors' read other periodicals with scissors in hand, clipping what they think will interest the public. Comment on the news of the day is in the hands of a trained corps of editorial writers. All these and other departments receive their general instructions from the editor-in-chief, whose place has shifted from the old editorial desk to the telephone. There are, moreover, editors for finance, commerce, and sport, and critics for music, the theatre, and literature. Many papers also now employ a woman, with a corps of assistants, to gather the news especially interesting to women. Finally, there is the 'night editor,' who makes up the paper, arranging all the articles and the headlines. The Sunday issue is under the direction of a special editor, who has his own staff of correspondents. For providing the Sunday newspapers with stories by popular novelists, syndicates were formed just after 1890. The syndicate purchases the manuscript from the author and sells the right of simultaneous publication to one newspaper in each of the great cities, thus making a handsome profit. The proceeds from the transaction have tempted Stevenson, Kipling, and many other well-known novelists. Much miscellaneous manuscript now passes through syndicates. The counting room of the newspaper we can enter only to remark that an expert is required to look after the advertisements. The income from advertisements, once insignificant, is now so great that even the wealthiest daily could not long survive a serious quarrel with its patrons.

Great as all these developments are, the marvelous changes await one who enters the mechanical department. Down to 1814 all papers were printed on hand-presses. Then the cylinder press of Koening, run by steam and printing about a thousand copies an hour, was introduced by the London *Times.* In the hands of Sir Rowland Hill, Richard M. Hoe, and other later inventors, the so-called 'web-perfecting press' has reached a stage in its development where it will print, fold, paste, and count more than 100,000 copies of eight-page papers an hour. The most recent presses will also print a sheet in six distinct colors. These improvements have been accompanied by quicker means of stereotyping. Plates may be made and clamped on the press within twelve minutes. In the last decade of the nineteenth century hand typesetting gave way to the linotype machine, which, besides reducing the expense of composition by one-half in New York and by one-third in certain other cities, brought the interval between the reception of the latest news and its publication down to less than half an hour. Between 1875 and 1900 paper suitable for print decreased in cost from 12 to 2 cents a pound. New processes in photography have also made easy the rapid reproduction of pictures. The interval between a snapshot and the printed picture is less than two hours. Electricity is displacing steam. The automobile has been pressed into service for getting newspapers on the street; and for wider circulation special trains are employed.

No observer can fail to notice that under the new régime, where the editor-in-chief counts for less, the press of the United States is becoming less personal and more and more independent. True, nearly all American papers are the voice of some party, but they are not its slaves. Certainly public questions are now discussed with a sanity and calmness rare in earlier years.

STATISTICS. According to estimates at the close of the year 1900, the total number of newspapers published in the world was about 50,000 (an increase of 10,000 during the previous ten years), distributed as follows: United States and Canada, 21,789; Germany, 7000; Great Britain, 9000; France, 4300; Japan, 2000; Italy, 1500; Austria-Hungary, 1200; Asia, exclusive of Japan, 1000; Spain, 850; Russia, 800; Australia, 800; Greece, 600; Switzerland, 450; Holland, 300; Belgium, 300; all others, 1000. Of the 21,789 estimated for the United States and Canada, only 924 were published in Canada. According to frequency of issue, they ran thus: weekly, 15,375; monthly, 2939; daily, 2279; semi-monthly, 296; semi-weekly, 470; quarterly, 180; bi-weekly, 76; bi-monthly, 68; tri-weekly, 52. The number for each State and Territory in the United States was as follows: Alabama, 231; Alaska, 9; Arizona, 54; Arkansas, 257; California, 698; Colorado, 326; Connecticut, 190; Delaware, 42; District of Columbia, 82; Florida, 159; Georgia, 362; Hawaii, 26; Idaho, 70; Illinois, 1706; Indian Territory, 84; Indiana, 859; Iowa, 1073; Kansas, 703; Kentucky, 314; Louisiana, 192; Maine, 154; Maryland, 211; Massachusetts, 618; Michigan, 790; Minnesota, 653; Mississippi, 222; Missouri, 1033; Montana, 92; Nebraska, 617; Nevada, 30; New Hampshire, 105; New Jersey, 384; New Mexico, 52; New York, 2032; North Carolina, 255; North Dakota, 155; Ohio, 1217; Oklahoma, 125; Oregon, 192; Pennsylvania, 1403; Porto Rico, 7; Rhode Island, 59; South Carolina, 128; South Dakota, 267; Tennessee, 289; Texas, 794; Utah, 77; Vermont, 75; Virginia, 240; Washington, 221; West Virginia, 189; Wisconsin, 642; Wyoming, 41.

The fullest analysis ever made of the commercial side of newspapers for any one country appeared in the United States Census Report for 1900. It varies considerably from the figures compiled by advertising agencies in the number of periodicals, because the latter contain numerous transitory publications of small consequence. The growth of the periodical press in the United States during the last half-century is best shown by the following table:

	All classes			Daily	
	Number	Total circulation per issue	Aggregate number of copies issued during the year	Number	Total circulation per issue
1900	18,226	114,299,334	8,168,148,749	2,226	15,102,156
1890	14,901	69,138,934	4,681,113,530	1,610	8,387,188
1880	11,314	31,779,686	2,067,848,209	971	3,566,395
1870	5,871	20,842,475	1,508,548,250	574	2,601,547
1860	4,051	13,663,409	927,951,548	387	1,478,435
1850	2,526	5,142,177	426,409,978	254	758,454

Complete figures exist in regard to the business of publication only during the past twenty years. These are summarized as follows:

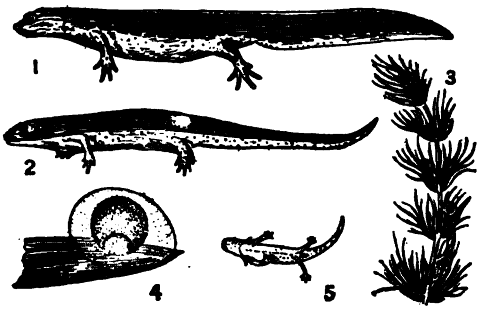
YEAR	Number of publications			Aggregate circulation per issue	Aggregate number of copies issued during the census year
	Total	Reporting	Not Reporting		
1900	21,272	18,226	3,046	114,299,334	8,168,148,749
1890	17,616	14,901	2,715	69,138,934	4,681,113,530
1880	11,314	11,314	....	31,779,686	2,067,848,209

YEAR	Wage-earners		Pounds of paper used	Value of newspaper products		
	Average number	Total wages		Total	Advertising	Subscriptions and sales
1900	94,604	$50,333,051	1,233,142,248	$175.789,610	$95,861,127	$79,928,483
1890	75,437	40.074.937	552,876,161	143,586,448	71,243.361	72,343,087
1880	71,615	28,559,336	189,145,048	89,009,074	39,136,306	49,872,768

Bibliography. The works on the newspaper are all considerably out of date. For a general view of the history of the press down to its recent marvelous development, the best single book is Hudson's *Journalism in the United States from 1690 to 1872* (New York, 1873). Hudson gives much information in regard to foreign journalism. *The American Weekly Mercury* for 1719-21, the first American newspaper in the middle colonies, was reprinted by the Colonial Society of Pennsylvania in 1898. For England, consult Grant, *The Newspaper Press* (London, 1871-72); Pebody, *English Journalism* (ib., 1882), a brief account; Jackson, *The Pictorial Press* (ib., 1885); Andrews, *History of British Journalism* (ib., 1859); Fox Bourne, *English Newspapers* (ib., 1887); and the catalogue of the British Museum. Full statistics are given for each year in *Sell's Dictionary of the World's Press* (London). Ayers and Rowell's *Newspaper Directories* give statistics for the United States and Canada. United States Census Reports are most trustworthy. For the Continent, see Hatin, *Histoire politique et littéraire de la presse en France* (8 vols., Paris, 1859-61); and *Les Gazettes de Hollande et la presse clandestine aux XVIIème et XVIIIème siècles* (Paris, 1865); Warzée, *Essai historique et critique des journaux belges* (Ghent, 1845); Larousse, *Grand Dictionnaire Universel* (15 vols., 1866-76; supplements 1878-90), which describes under separate heads the most important journals; Salomon, *Geschichte des deutschen Zeitungswesens*, vol. i. (Leipzig, 1900); and the German encyclopædias, especially Brockhaus's *Konversations-Lexikon* (Leipzig). See also Journalism, College; Periodical; and Printing.

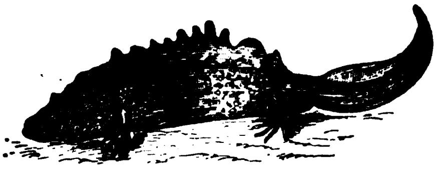
NEW SWEDEN. The early name of the region between New York and Virginia.

NEWT (ME. *newte*, *ewte*, *efte*, by faulty liaison or sandhi for *an ewte;* a similar instance in English is *nickname*, and reverse changes are *adder*, *apron*, *auger*, *orange*, *umpire*). A small salamander of the genus Triton in Europe and Asia, and Diemyctylus in North America. The most familiar American newt is the red-spotted one (*Diemyctylus viridescens*). When full grown it is about four inches long, and is greenish-brown above, with a line of vermilion dots on the sides; below, it is orange dotted with black. It inhabits ditches and quiet waters, where it feeds voraciously on all sorts of small aquatic animals. With the beginning of warm weather the females begin to deposit their eggs, which may be laid singly during five or six weeks, and are attached to the leaves of submerged plants. The young hatch in a fortnight or so, and remain in the water, wearing a dull green coat, until the end of the season, when, having completed their first metamorphosis, their gills disappear, the throat and lungs become adapted to breathing air, and they leave the water. Their color now changes to a rich uniform vermilion with fiery button-like spots along the sides. They are then only two or three inches long, and hide under leaves and within rotten logs, feeding upon small worms and the like, but coming out frequently, especially in the night and wet weather. These little creatures are among the prettiest objects in the American woods. This sojourn on land lasts until the autumn of the third or spring of the fourth season, by which time they have nearly attained to full size, and have reached sexual maturity. They then gradually change in color back to the original green, and return to the water, where their lungs cease to act, pharyngeal respiration is reëstablished, and they proceed to breed. This species is locally numerous all over the Eastern United States. A much larger species (*Diemyctylus torosus*) occurs in the Western States. It is dark brown in color, yellowish beneath, and the tail is provided with fins. It feeds mainly on earthworms.



AMERICAN GREEN NEWT.

1. Adult male of *Diemyctylus viridescens* in the green aquatic dress. 2. Young newt in the vermilion, terrestrial stage. 3. Eggs, attached to a water-weed. 4. An egg, enlarged. 5. Larva, with external gills.



EUROPEAN CRESTED NEWT.
Male in breeding dress.

Of the Old World species, the most widely distributed is the crested newt (*Triton cristatus*), which is olive-brown with white blotches on the sides, and the males of which, during the breeding season, have serrated crests along the backs. Another well-known species is the marbled newt (*Triton marmoratus*), with which the crested newt hybridizes. All newts prefer a cool and moist situation, and hibernate usually in the ground. Some species remain all their lives in the water, while others pass most of their lives on land. They cast their skins from time to time, more frequently when young, and the cast skin is eaten. The breeding habits of all resemble those of our American species. Consult: Gadow, *Amphibia and Reptiles* (London, 1901); Gage, "Life History of the Vermilion-Spotted Newt," in *The American Naturalist* (Philadelphia, 1891); Sherwood, *Salamanders Found in the Vicinity of New York City* (New York, 1895); Jordan, "Habits and Development of Newts," in *Journal of Morphology*, vol. viii. (Boston, 1893).

NEW TESTAMENT. See BIBLE.

NEW TESTAMENT CHRONOLOGY. The science which deals with the dates and order of events in the life of Christ and the Apostolic Age.

1. THE CHRONOLOGY OF THE LIFE OF CHRIST. The main data are to be found in the Gospels and checked by comparison with the contemporary events of secular history.

(1) *The Date of the Nativity.*—From Matthew we learn that the birth of Jesus took place "in the days of Herod the King" (ii. 1). The visit of the wise men, the flight of the Holy Family into Egypt, and the massacre of the children under two years of age all preceded Herod's death (ii. 3-18). Thus Herod's death gives us a date later than which the birth of Jesus cannot be placed. According to data in Josephus, it is beyond all doubt that Herod died not long before the Passover of B.C. 4. The star of the wise men may have been the conjunction of Jupiter and Saturn, which occurred in B.C. 7. The Nativity was, however, after the first appearance of the star. Since several events took place between the Nativity and Herod's death, the evidence in Matthew is conclusive only for a date between B.C. 7 and B.C. 4. In Luke ii. 1 the data are more definite. "In those days there went forth a decree from Cæsar Augustus that the [Roman] world should be enrolled. This was the first enrollment made when Quirinius was Governor of Syria." The meaning seems to be that this enrollment was the first one of the kind in those regions, and that it was taken while Quirinius was Governor. This definite statement has been the subject of much discussion. The main points in dispute are: whether Augustus ordered an enrollment in Palestine before the famous one of A.D. 6 (which was, curiously enough, while Quirinius was Governor of Syria), and, if so, whether Quirinius was the Roman official intrusted with its execution. As to the first question, documents recently discovered in Egypt supplement our former imperfect knowledge of Augustus's various censuses, so that we are now reasonably sure that about B.C. 9-8 a census was ordered to be taken in Palestine as a part of the second general census of the Empire, in which Palestine was now, for the first time, included. From B.C. 23, for a number of years, a census was taken every fourteen years. It is likely that the census ordered for the year B.C. 9-8 did not actually take place in Palestine, owing to its peculiar circumstances, until B.C. 7. As to the second question, there is a possibility

that Luke has made a mistake in naming Quirinius instead of Saturninus as the Governor of Syria at the time. Thus both Luke and Matthew agree to the effect that the Nativity took place about B.C. 7 or A.U.C. 747. It would seem that further aid might be derived from Luke iii. 1-3 and 23, which verses apparently state that Jesus was thirty years of age in the fifteenth year of Tiberius Cæsar. But this is not the case. We are uncertain (1) from what date Luke reckoned the reign of Tiberius; (2) how much latitude is to be allowed to the expression "about thirty years;" and (3) how close the connection is between v. 23 and vv. 1-3. For these reasons we must be content with the result stated above, and date the Nativity about B.C. 7.

There are no data for determining the month and day of the birth of Jesus. Ancient tradition wavered between two dates, January 6th and December 25th, each of which seems to have been the result of calculation, not based on trustworthy tradition.

(2) *The Date of Jesus' Baptism.*—From Luke we learn that John the Baptist took up his work in the fifteenth year of Tiberius. Such, at least, seems to be the meaning of Luke iii. 1-3, "Now in the fifteenth year of the reign of Tiberius Cæsar . . . the word of God came unto John . . . in the wilderness." If Luke reckoned the reign of Tiberius from the death of Augustus, the year August A.D. 28-August A.D. 29 would be the year intended. If he counted from A.D. 12, when Tiberius was associated with Augustus, as the first year, then A.D. 26-27 would be the year indicated. Accordingly, the baptism of Jesus was either in A.D. 27 or in A.D. 29. In the Gospel of John we have a datum which enables us to decide between these two dates. In John ii. 20, at the time of Jesus' first public appearance in Jerusalem, which was not long after the beginning of His public ministry, there is the statement that the Temple had been, at the time, forty-six years in the process of construction. Since the reconstruction of the Temple was begun by Herod in B.C. 20-19, the baptism of Jesus could not have been later than A.D. 27. Early in the year A.D. 27 seems, then, the most probable date for this event.

(3) *The Duration of the Ministry.*—The first three Gospels give us only the vaguest hints as to the length of the Lord's public ministry. They begin their narrative of His public life with His work in Galilee after the imprisonment of John the Baptist. But Mark i. 14 ("Now after that John was delivered up, Jesus came into Galilee") seems to imply that some time elapsed between the Temptation and John's imprisonment. This gap is partially filled by the Gospel of John, which also gives a well-ordered arrangement of the events of the ministry narrated by it. Its data are as follows:

ii. 13 sqq., Jesus in Jerusalem at a Passover, after His baptism and a brief sojourn in Galilee.

iii. 23 sqq., a brief sojourn, length not stated, in Judea, before John was imprisoned.

iv. 1-35, Jesus retires into Galilee. On the way, in Samaria, He says to His disciples, "Do ye not say that there are yet four months and the harvest comes?"

v. 1, Jesus goes up to Jerusalem to attend a feast (unnamed).

vi. 1-4, Jesus is again in Galilee at the time of a Passover.

vii. 2 sqq., Jesus goes to Jerusalem to a Feast of Tabernacles. After this there is no mention of a return to Galilee.

x. 22, Jesus is in Jerusalem at the Feast of Dedication; thence He retires beyond Jordan. While here He is called to Bethany by the death of Lazarus. He then goes to Ephraim in Judea.

xii. 1, six days before the (last) Passover Jesus arrives at Bethany.

Two of these data are somewhat uncertain. The reference in iv. 35 to the "four months, and then cometh the harvest," may indicate the actual season of the year when the words were spoken. In that case Jesus must have passed through Samaria in December or January after His first Passover (John ii. 13 sqq.). If the first Passover was that of A.D. 27, the events narrated in chap. iv. took place in December, A.D. 27, or in January, A.D. 28. But it is possible that the statement in iv. 35 may have been a mere proverbial expression used by Jesus to point a lesson. In that case it has no chronological significance, and the journey through Samaria may have taken place in May, A.D. 27. The unnamed feast of v. 1 ("After these things there was a feast of the Jews, and Jesus went up to Jerusalem") introduces the greatest element of uncertainty. The main question is whether it was a Passover. If it was, then John's Gospel gives us four Passovers in Jesus' public ministry. There are two weighty reasons against taking the reference in this sense. First, John's *usus loquendi* would lead us to expect him to have expressly stated that it was a Passover, if such had been the case. Second, a Passover is expressly indicated in the next chapter (John vi. 1-4). If v. 1 refers to a Passover, we have not only a whole year passed over in complete silence by John, but we also have two whole years and more of active public ministry to place before the Passover of John vi. Since the narrative of John at this place meets that of the other Gospels (Mark vi. 30 and parallels), this does not seem very probable. For such reasons it seems better to take John v. 1 as referring to some minor feast between the two Passovers of ii. 13 sqq. and vi. 1-4. The evidence of the Gospel of John, then, is to the effect that there were three Passovers in the public ministry of Our Lord, those of the years A.D. 27, 28, and 29.

(4) *The Date of the Crucifixion.*—All the Gospels agree that the day of the week was Friday. It is a question whether this Friday was the Passover day or the day after the Passover. Since the Passover always came on the fourteenth day of the Jewish [lunar] month Nisan, the question is, Was Jesus crucified on the 14th or on the 15th of Nisan? On this point the evidence of the Gospels appears contradictory. The Synoptic Gospels positively state that Jesus ate his last supper with His disciples on the Passover evening, i.e. on the 14th of Nisan, and that He was crucified on the next or 15th day. But the Gospel of John in several passages, xiii. 1-2, xviii. 28, xix. 13 and 31, appears to place the Crucifixion on the Passover day. Of the references noted, xviii. 28, "they themselves [the Jews] entered not into

the prætorium, that they might not be defiled, but might eat the Passover," and xix. 14, "Now it was the Preparation (παρασκευή) of the Passover," are the most important. It is to be noted, however, that the Gospel of John uses the term τὸ πάσχα, the Passover, in an inclusive sense to indicate the whole Passover season, just as the Synoptic Gospels use the term τὰ ἄζυμα, the [Feast of] Unleavened Bread, in the same broad sense. It is also to be noted that in xix. 31 and 42 the word παρασκευή, literally 'preparation day,' is used in its common significance of Friday. It is therefore possible that in verse 14 we should interpret so as to read "it was the Friday of the Passover season." So understood, there is no conflict between John and the Synoptists. If there is actual disagreement, the evidence may be represented as follows:

NISAN	13	14	15	16	17
Jewish customs fixed according to days of Nisan		Passover meal at evening	Holy Rest Day. First day of the Feast of Unleavened Bread	Wave Sheaf	
Synoptic Gospels, as to—					
(1) Days of the week	Wednesday	Thursday	Friday—i.e. the παρασκευή	Saturday	Sunday
(2) Events		Passover meal, Lord's Supper	Crucifixion		Resurrection
Gospel of John, as to—					
(1) Days of the week	Thursday	Friday—the παρασκευή	Saturday — i.e. Sabbath, a 'great Sabbath'; xix. 31	Sunday	
(2) Events	Lord's Supper (not identical with Passover)	Crucifixion		Resurrection	

If the year of the Crucifixion was A.D. 29, the Passover was either in April (17th or 18th) or March (18th). The latter is the more probable date.

We therefore arrive at the following results:

B.C.	9-7.	The annunciations concerning the births of the Baptist and Jesus.
	7.	Birth of Jesus.
A.D.	26.	John the Baptist opens his ministry.
	27.	(26) Jesus is baptized by John.
	27.	(Early in the year) Jesus begins His ministry.
	27.	The first Passover, in Jerusalem (John ii. 13 sqq.).
	27-29.	Passover to Passover, two years of public activity, a year and some months being spent in Galilee.
	29.	March 18, Friday, the Crucifixion. On Sunday, March 20th, the Resurrection, and 40 days later the Ascension.

These results differ from those most commonly accepted, mainly in that they make the ministry cover but two years and a little over instead of three years or more. The main specific difference is in regard to the feast of John v. 1, which is usually taken as a Passover. The most commonly accepted year for the Crucifixion is A.D. 30 instead of A.D. 29, as given above.

II. CHRONOLOGY OF THE APOSTOLIC AGE. The Apostolic Age began immediately after the Lord's Ascension. Its close may be considered as marked by the passing away of the Apostles and their companions. Our main authority for this period is the Book of Acts. Incidentally, the Epistles furnish some valuable hints. In Acts we are presented with a sketch of the progress of Christianity, (1) in the city of Jerusalem, chaps. i.-vii.; (2) among the Jewish population of Palestine and Syria, with the transition to work among the Gentiles, chaps. viii.-xii.; and (3) among the Gentiles through the missionary labors of Paul, chaps. xiii.-xxviii. Since the data in reference to Paul's career are more numerous and exact than those connected with the earlier events, we shall make the chronology of Paul's labors the basis of our investigations. We have to consider the evidence furnished by the following data:

(1) *Acts ix. 23 sqq.* Paul's escape from the Jews at Damascus 'many days' after his conversion. In II. Cor. xi. 32 Paul refers to this event, noting that it took place while Aretas was ethnarch of Damascus. In Gal. i. 18 Paul says that he did not leave Damascus for Jerusalem until three years after his conversion. In all probability Aretas was not ethnarch of Damascus until after the death of Tiberius, March 16, A.D. 37. It is certain that he did not hold this position in A.D. 34. Therefore Paul's conversion was not before A.D. 31, probably not before A.D. 34.

(2) *Acts xi. 27-30 and xii. 25.* Agabus, a prophet, predicted a famine. In consequence, the Christians of Antioch sent aid to Jerusalem by Barnabas and Paul, active workers in the Antioch church. This visit was probably not long before the famine was at its height. Notices in Josephus (*Ant.*, xx. 2, 3 and 5, 2) show that there was such a famine about A.D. 47. The prophecy may well have been uttered two or three years earlier, and the visit may be placed in A.D. 46-47.

(3) *Acts xiii. 7.* Sergius Paulus is mentioned as proconsul of Cyprus. The name of this official has been discovered on an inscription of Cyprus, but his date has not been determined. All that is certain is that he was not proconsul of the island in the years A.D. 51 and 52.

(4) *Acts xviii. 2 and 12.* Paul, soon after his arrival in Corinth on his second missionary journey, meets Aquila and Priscilla, Jews lately banished from Rome in consequence of a decree of the Emperor Claudius. Paul stays in Corinth upward of two years, during which time Gallio was proconsul of Achaia. We have here two data: Claudius's decree and Gallio's proconsulship. The edict of expulsion is mentioned by Suetonius and probably referred to by Tacitus and Dio Cassius, but in such a way that its date cannot be exactly fixed. Orosius (fifth century, A.D.) places it in A.D. 49. As to Gallio,

all that can be said is that he was probably not appointed to the office before the recall of his famous brother Seneca from banishment (A.D. 49). Thus A.D. 49-50 may be accepted provisionally as the most satisfactory date for these facts.

(5) *Acts xx. 6-7.* Paul, on his way to Jerusalem, returning from his third missionary journey, kept the Feast of Unleavened Bread at Philippi, Macedonia. Leaving Philippi, in five days he reached Troas. Here he stayed seven days, leaving on Monday. Reckoning back, it becomes probable, but not certain, that the Passover of that year was on Thursday. In that case, the year was probably either A.D. 56 or 57, the probability being in favor of 56.

(6) *Acts xxiv. 27.* After Paul had been detained as a prisoner for two years, Felix, the Roman Governor of Palestine, was succeeded by Festus. Felix was appointed in A.D. 52 by Claudius, having already been in charge of Samaria for some time. In Acts xxiv. 10, two years before Felix's removal, Paul addresses him as having been for 'many years' judge of the nation. The Apostle may have included in the 'many years' the time that Felix spent in Samaria, and the statement should not be pressed as necessitating as many as five or six years after A.D. 52 as the time when they were uttered. Josephus says that Felix, when recalled, had to answer serious charges before Nero, and would have been condemned, had not his wealthy brother Pallas interceded for him. Though Pallas was dismissed from office soon after Nero's accession (A.D. 54), he was for some years a wealthy and influential man. Eusebius's Chronicle places the appointment of Festus in the year September 56-September 57. The accuracy of this statement is not beyond doubt. Paul's words in Acts xxiv. 10, as well as the general representation of Felix's administration in Josephus, seem to require a date not earlier than A.D. 58 for the recall of Felix and the appointment of Festus. This date will harmonize with the conclusion reached under No. 5 above.

(7) *The Death of Paul.* All that can be said here is that the most ancient tradition of the Church represents that Paul closed his career by suffering martyrdom at Rome under Nero. As to the date, it is most probable that this took place in the cruel persecution by which Nero sought to divert from himself the suspicion of having burned Rome, i.e. in A.D. 64 or 65.

(8) *The Period Covered by Acts i.-xii.* (in reference to the doings of the Jewish-Christian Church of Palestine). The only fixed date we have is the death of Herod Agrippa I. (Acts xii. 19 sqq.) in A.D. 44. From this we see that the period covered by these chapters is about fifteen years, since the Crucifixion took place A.D. 29. Within the period we have the probable date, A.D. 34, as that for the conversion of Paul. On the basis of the results thus reached we may construct the following table:

A.D. 29. Pentecost, first preaching by the Apostles. Acts ii.

29-34 (35). Christianity organized and becomes prominent in Jerusalem. Acts ii.-vi.

34 (35). Stephen martyred. Persecution extends Christianity outside Jerusalem. Paul converted at Damascus. Acts vii.-ix.

34-37 (35-38). Paul in Arabia. His return to Damascus and escape thence. He visits Jerusalem and goes thence to Tarsus. Gal. i. 17-21; II. Cor. xi. 32; Acts ix. 30.

34 (35)-44. Rapid extension of Christianity through Palestine, Phœnicia, and Syria, as far as Antioch. Acts ix.-xi.

38-40?. Paul and Barnabas in Antioch.

44. Execution of James, the brother of John. Peter escapes from Herod Agrippa I., who soon after dies at Cæsarea. Acts xii.

46 ?. Paul and Barnabas carry a contribution to Jerusalem. Acts xi. 27-30.

47 (Spring)-48 (Fall). First missionary journey of Paul. Acts xiii.-xiv.

49 (Pentecost ?). The Apostolic Council in Jerusalem. Acts xv. (cf. Gal. ii. 1-10).

49. Barnabas and Mark go to Cyprus. Acts xv. 35-39.

49. (Fall)-52 (Summer). The Second Missionary Journey. Acts xv. 49-xviii. 22. I. and II. Thessalonians written from Corinth in 50 and 51.

52 (Early Fall)-56 (Spring). Third Missionary Journey. Acts xviii. 23-xxi. 17. I. Corinthians written from Ephesus, 53-54. II. Corinthians written from Macedonia late in spring of 55. Galatians written from somewhere on the journey to Corinth, in summer or fall of 55. Romans written from Corinth in 56.

56-58. Paul held in Palestine, most of the time in Cæsarea. Acts xxiii. 1.

58 (Fall)-59 (Spring). Paul's voyage to Rome.

59-61. Two years' imprisonment in Rome. Epistles to Philippians, Colossians, Philemon, and Ephesians.

61-64. Missionary journey to Spain. Revisits the East. I. Timothy and Titus written.

64. Again imprisoned in Rome. II. Timothy written.

64 (65). Executed by order of Nero. According to tradition, Peter also was martyred at Rome about the same time.

70. The capture of Jerusalem by the Romans under Titus. The Palestinian Christians scattered.

65(?)-90(?). The Apostle John in Asia Minor (Ephesus).

The table given above differs from the most commonly received chronology (Wieseler's), mainly in that it dates the chief events of Paul's life about two years earlier. Ramsay's dates are, in the main, about one year later than those given above, Harnack's two years earlier.

BIBLIOGRAPHY. Of the large body of literature bearing on New Testament Chronology, particular mention may be made of the following: Ideler, *Handbuch der mathematischen und technischen Chronologie* (Berlin, 1825); Wieseler, *Chronologische Synopse der vier Evangelien* (Hamburg, 1843; Eng. trans., 2d ed., London, 1878); id., *Chronologie des apostolischen Zeitalters* (Göttingen, 1848); id., *Beiträge zur richtigen Würdigung der Evangelien* (Gotha, 1869); Lewin, *Fasti Sacri* (London. 1865); Schürer, *Geschichte des jüdischen Volkes im*

Zeitalter Jesu Christi (Leipzig, 1886-90; Eng. trans., New York, 1891); Harnack, *Chronologie der altchristlichen Litteratur* (Leipzig, 1897); Ramsay, *Saint Paul the Traveler and the Roman Citizen* (New York, 1896); id., *Was Christ Born in Bethlehem?* (London, 1898).

NEW THEOLOGY, The, or New Divinity. A term often applied in the last quarter of the last century to a movement represented by Andover Theological Seminary, and embodied in a small volume by its professors, called *Progressive Orthodoxy*, published in 1886. It became clear finally that the movement was larger and deeper than this, and the term is now generally applied to those forms of theological effort which attempt to incorporate fully in theology the approved results of modern thinking, especially such as are derived from the general theory of evolution. The new theology cannot be said to be a consistent system of thought, nor uniform among its various advocates and promotors. There are left and right wings. But with various differences of emphasis and of the completeness with which the separate results of the new methods are adopted, the new theology may be said to agree in the following points: the acceptance of evolution as the method of divine providence in the spiritual sphere as well as in the material; the employment of the methods of the higher criticism in the discussion of the origin and authority of both Testaments; the rejection of verbal inspiration and the substitution for it of greater, or sometimes exclusive, emphasis upon revelation (see Inspiration); a subjective view of the atonement; increased emphasis upon ethics in distinction from dogmatics, and upon sociological study and work; restatement of positions in eschatology, with a strong tendency to universalism. The tendency of the school is to minimize the supernatural (miraculous), and in the left wing to exclude it. Every important denomination of Christians has some share in this movement.

NEWTON, nū′ton. A city and the county-seat of Jasper County, Ill., 50 miles southwest of Terre Haute, Ind.; on the Embarras River, and on the Indiana and Illinois Southern and the Peoria, Decatur and Evansville railroads (Map: Illinois, D 5). The surrounding region is well adapted to farming and fruit-growing, and there are also coal deposits. The city manufactures flour, woolen goods, lumber products, brick, and tile. Population, in 1890, 1428; in 1900, 1630.

NEWTON. A city and the county-seat of Jasper County, Iowa, 36 miles east by north of Des Moines; on the Iowa Central and the Chicago, Rock Island and Pacific railroads (Map: Iowa, D 3). It is the seat of Newton Normal College, and has a Carnegie library ($10,000), and a fine post-office building. The city is surrounded by a district engaged in farming and stock-raising, and manufactures agricultural machines, foundry and machine-shop products, brick and tile, flour, etc. The water-works are owned by the municipality. Population, in 1890, 2564; in 1900, 3682.

NEWTON. A city and the county-seat of Harvey County, Kan., 201 miles southwest of Kansas City; on the Missouri Pacific and the Atchison, Topeka and Santa Fe railroads (Map: Kansas, E 3). It has a public library with over 5000 volumes, and Bethel College (Mennonite). The city is a division point on the Santa Fe Railroad, and, as the centre of a fine farming and stock-raising section, has considerable trade. There are some manufactures, principally flour and grain drills. Newton was settled and incorporated about 1871. It is governed by a mayor, elected biennially, and a council. The water-works are owned and operated by the municipality. Population, in 1890, 5605; in 1900, 6208.

NEWTON. A city in Middlesex County, Mass., adjoining Boston; on the Charles River and on the Boston and Albany Railroad (Map: Massachusetts, E 3). Within the municipal limits are 15 villages, the city occupying an area of about 18 square miles. Newton has a site of great beauty, several hills contributing to its picturesqueness, and it is one of Boston's handsome suburbs. There are 160 acres of city parks, besides the Metropolitan Park reservation (118 acres), and the Metropolitan parkways, which extend along the Charles River. The city maintains a public library (61,400 volumes), and is the seat of the Newton Theological Institution (Baptist), opened in 1825, the Lasell Seminary for women, opened in 1851, and the Allen School for boys, opened in 1853. Among the more prominent buildings are the First Baptist Church and Eliot Church, and the high school and several grammar schools. The Eliot Memorial in honor of the 'Apostle to the Indians' stands near the site of Waban's Wigwam, where John Eliot began on October 28, 1646, to preach to the Indians, in the town called 'Nonantum.' A large cemetery is in the heart of the city. Though Newton is primarily a residential city, it is engaged to a considerable extent in manufacturing. Its industrial establishments include machine shops, fire-alarm supply works, silk mills, worsted mills, rubber works, manufactories of paper boxes, curtains, railway signals, cordage, shoes, etc. The manufacturing interests are promoted by the water power of Charles River. Under a charter, last revised in 1899 and 1902, the government is vested in a mayor, hereafter to be elected for two years, and a board of aldermen, in which each ward is represented by three members—one alderman elected annually by the ward, and two aldermen-at-large elected from the ward on a general ticket, one being chosen each year to serve two years. Some of the administrative officials are elected by the board of aldermen, and some are subject to confirmation by that body upon nomination of the mayor. The school committee is chosen by popular vote for terms of three years. Newton spends annually in maintenance and operation more than $1,000,000, the principal items being: for interest on debt, $265,000; for sinking funds, $119,500; for schools, $200,000; for drains, parks, sewers, and streets, $170,000; for the police department, $70,000; for municipal lighting, $53,500; for the fire department and wires, $58,000; for the charity department, $25,000; for the health department, $21,000. Newton is one of the wealthiest cities per capita in the United States; the assessed valuation of property, real and personal, in 1902 was about $62,000,000, and the net debt January 1, 1903, $4,331,283.94. The water-works are owned and operated by the municipality. Population, in 1890, 24,379; in

1900, 33,587. Settled in 1631 and originally a part of Cambridge (Newtowne), Newton was incorporated as a separate town in 1688, being called New Cambridge until 1692. It was chartered as a city in 1873. Consult Smith, *History of Newton, Massachusetts* (Boston, 1880).

NEWTON. A town and the county-seat of Sussex County, N. J., 60 miles west by north of New York City; on the Delaware, Lackawanna and Western Railroad (Map: New Jersey, C 1). It is known as a summer resort; has the Newton Collegiate Institute and the Dennis Library (subscription), with over 8000 volumes. The surrounding country is largely agricultural, though there is considerable mineral wealth, and the city manufactures shoes, silks, paper boxes, and roofing slate. The water-works are owned by the municipality. Population, in 1890, 3003; in 1900, 4376.

NEWTON, Alfred (1829—). An English ornithologist and zoölogist. He was born at Geneva, Switzerland, of British parents, and graduated at Magdalene College, Cambridge, in 1853. As a traveling fellow of the college he visited Lapland, Iceland, the West Indies, North America, Spitzbergen, and other countries between the years 1854-64, and by bringing the subject to the notice of the British Association he was instrumental in getting passed the acts of Parliament for the protection of birds. He was made vice-president of the Royal and the Zoölogical Societies, president of the Cambridge Philosophical Society, and received gold medals from the Linnean and the Royal Society. His publications include: *The Zoölogy of Ancient Europe* (1862); *Zoölogy* (1874; 2d ed. 1894); *The Birds of Greenland* (1875); and *A Dictionary of Birds* (1893-96). He edited *The Ibis* for five years (1865-70), and contributed the article on Ornithology to the ninth edition of the *Encyclopædia Britannica.*

NEWTON, Charles Thomas (1816-94). An English archæologist. He was educated at Christ Church, Oxford. In 1840 he became assistant keeper of the department of antiquities in the British Museum, and in 1852 obtained the appointment of vice-consul at Mytilene, whence he was transferred in 1853 to Rhodes. His position was avowedly in the interest of the British Museum, and his time largely devoted to archæological travels and excavation. In 1856 he began his great work at Budrun, the ancient Halicarnassus, where he discovered the site of the famous Mausoleum, and recovered many remains of the ancient sculptures. He next worked at Branchidæ and Cnidus, securing valuable results. He was rewarded by an appointment to the consulship at Rome in 1860, and in 1861 was made keeper of Greek and Roman antiquities in the British Museum, a position which he held until failing health led to his resignation in 1885. From 1880 to 1888 he was Yates professor of classical archæology at the University College, London. In 1861 he married Ann Mary, daughter of the artist Joseph Severn, and herself an artist of high reputation. She died in 1869. Newton's great service lay in widening the narrow circle of classical studies in England, by drawing attention to the importance of art and archæology in any estimate of Greek life. For the museum his long term proved of great importance, as he was able to secure large grants and acquire five valuable collections of antiquities. He received the honorary degree of D.C.L. from Oxford in 1875, LL.D. from Cambridge, and Ph.D. from Strassburg in 1879. He published many short papers and discussions, some of which were collected in his *Essays on Art and Archæology* (London, 1880), including the best popular account of Greek inscriptions. Other important works were: *History of Discoveries at Halicarnassus, Cnidus, and Branchidæ* (London, 1862-63) and *Travels and Discoveries in the Levant* (ib., 1865).

NEWTON, Gilbert Stuart (1794-1835). An English portrait and genre painter. He was born at Halifax, Nova Scotia, September 20, 1794, the son of Edward Newton, British collector of customs. Newton's parents had quitted Boston after the evacuation by British troops in 1776, but his mother returned to that city upon the death of his father in 1803. He studied painting with his uncle, Gilbert Stuart. In 1817 he traveled in Italy, and studied at Florence, later visiting Paris, where he was influenced by Watteau. He entered the schools of the Royal Academy, and in 1832 was made Academician. Among his chief works are: "The Deserted" (1821), Metropolitan Museum, New York; "The Lovers' Quarrel" (1826); "The Dull Lecture" (1825), Lenox Library, New York; "Don Quixote in His Study" (1828); "The Lute-Player," New York Historical Society; "Yorick and the Grisette" (1830) and "The Widow, or the Dutch Girl" (1829), National Gallery, London; "Portia and Bassanio" (1831), South Kensington Museum; and his last picture, "Abelard," exhibited at the Royal Academy in 1833. Among his portraits are those of Thomas Moore, Sir Walter Scott, and Washington Irving. Newton's pictures, although deficient in drawing, are good in coloring, refined and individual in conception. Suffering from mental derangement, in 1833 he was removed to an asylum at Chelsea, where he died of consumption, August 5, 1835.

NEWTON, Hubert Anson (1830-96). An American astronomer and mathematician, best known for his researches on meteors. He was born at Sherburne, N. Y., and graduated at Yale in 1850. In 1855 he was appointed professor of mathematics at Yale. His chief labor, the study of the laws of meteoroids and of comets and their interrelation, began with the attempt to contribute to the theory advanced by Professor Olmsted of Yale in 1833, that meteors were a part of a mass of bodies moving round the sun in a fixed orbit. Newton calculated five possible orbits and showed the mode of deciding between them, by a computation of the secular motion of the node. He supervised the work of the Connecticut Academy of Arts and Sciences in 1861 in regard to the August and November meteors; prepared a map of the heavens for its use; and identified comets with meteors and shooting stars. This led to his valuable statistical study of comets. On these subjects he became a world-wide authority, winning from the National Academy of Sciences the Smith gold medal for his researches on meteors. Many of these were published in the *Memoirs of the National Academy,* the *Journal of Science,* and the *American Journal of Science.*

NEWTON, Sir Isaac (1642-1727). A famous English mathematician and natural philosopher,

SIR ISAAC NEWTON

FROM AN ENGRAVING BY ROBERT C. BELL, AFTER A PAINTING BY SIR GODFREY KNELLER

born at Woolsthorpe, in Lincolnshire. Newton received his early education at the grammar school of Grantham, in the neighborhood of his home, at Woolsthorpe. On June 5, 1661, he left home for Cambridge, where he was admitted as subsizar at Trinity College. On July 8th following he matriculated as sizar of the same college. He immediately applied himself to mathematical studies, and within a very few years not only made himself master of most of the works of value then existing, but had also begun to make some progress in original methods for extending the science. In the years 1665 and 1666 he made many important mathematical inventions and discoveries, including that of the binomial theorem, the method of tangents of Gregory and Clusius, the direct method of fluxions (integral calculus), and the action of gravity on the moon. According to a legend, which, however, is seriously considered by certain authorities, in the year 1665 the fall of an apple, as Newton sat in his garden at Woolsthorpe, suggested the most magnificent of his subsequent discoveries—the law of universal gravitation (q.v.). On his first attempt, however, to apply the law, to explain the lunar and planetary motions, he employed an estimate then in use of the radius of the earth, which based on the value of a degree of latitude then prevalent, was so erroneous as to produce a discrepancy between the value of the real force of gravity and that required by theory to explain the motions, and indicated only an approximate verification of his theory. He accordingly abandoned for a number of years the hypothesis for other studies, which consisted chiefly of investigations of the nature of light and the construction of telescopes (q.v.). In 1666 he had acquired a prism, and in 1668 completed his first reflecting telescope, with which he observed Jupiter's satellites. In a variety of ingenious and interesting experiments where a spectrum was produced by sunlight refracted through a prism in a darkened room, he was led to the conclusion that rays of light which differ in color differ also in refrangibility. This discovery enabled him to explain an imperfection of the telescope, which had not till then been accounted for. The indistinctness of the image formed by the object-glass was not necessarily due to any imperfection of its form, but to the fact of the different colored rays of light being brought to a focus at different distances. He concluded rightly that it was impossible for an object-glass consisting of a single lens to produce a distinct image. He went further, and too hastily concluding, from a single experiment, that the dispersive power of different substances was proportional to their refractive power, he pronounced it impossible to produce a perfect image by a combination of lenses. This conclusion—since proved erroneous by the invention of the achromatic telescope by Chester More Hall, about 1729, and afterwards, independently, by Dolland (q.v.) in 1751—turned Newton's attention to the construction of reflecting telescopes; and the form devised by him is the one which, at later periods, proved so useful in astronomical researches.

It was on January 11, 1672, that Newton was elected a member of the Royal Society, having become known to that body from his reflecting telescopes, and a month later his famous paper on a "New Theory About Light and Color" was read before that body, in which he states that "Light consists of rays differently refrangible" and that "Colors are not qualifications of light derived from refractions or natural bodies, as is generally believed, but original and connate properties which in divers rays are divers." He also said that "White light is ever compounded and to its composition are requisite all the aforesaid primary colors mixed in proper proportion." In 1675 Newton communicated to the Royal Society a paper on light and color, which contained an explanation of the production of colors by thin plates or films, and in which were given the results of the first measurements of the colored rings now known as Newton's rings (q.v.). Newton formulated the emission theory of light from hypotheses previously advanced by Descartes, and a complete exposition of that theory was the result. All of Newton's investigations in light and color were collected into a work with the title of *Optics*, published in 1704. The development of the theory was accomplished by rigid dynamical reasoning, and the explanations of reflection, refraction, diffraction, and the colors of thin plates were made on the basis that light consisted of luminous corpuscles sent out from the light-giving body. This theory, while it did not survive the work of Young and Fresnel, nevertheless had more points in common with the undulatory theory than is generally supposed (*Optics*, book ii., part iii., prop. XII.). At what period Newton resumed his calculations about gravitation, employing the more correct measure of the earth obtained by Picard in 1670, does not clearly appear; but it was in the year 1684 that it became known to Halley that he was in possession of the whole theory and its demonstration. It was on the urgent solicitation of Halley that he was induced to commit to a systematic treatise these principles and their demonstrations. The principal results of his discoveries were set down in a treatise called *De Motu Corporum*, and were afterwards more completely unfolded in the great work entitled *Philosophiæ Naturalis Principia Mathematica*, which was finally published about midsummer, 1687.

Shortly before the *Principia* was given to the public, Newton, who since 1669 had occupied the Lucasian chair at Cambridge, was called to take an active part in defending the rights of the university against the illegal encroachments of James II. The conspicuous part which he had taken on that occasion procured him a seat in the Convention Parliament, in which he sat from January, 1689, to its dissolution in 1690. In 1696 he was appointed warden of the mint, and in 1699 was promoted to the office of master of the mint, an office which he held till the end of his life. He again took a seat in Parliament in the year 1701, as the representative of his university. Thus engaged in the public service, he had little time left for mere scientific studies—pursuits which he always held of secondary importance to the public duties in which he was engaged. In the interval of public duty, however, Newton showed that he still retained the scientific power by which his great discoveries had been made. He was president of the Royal Society from 1703 till his death, a period of twenty-four years, being each year reëlected. In this position, and enjoying the confidence of Prince George of Denmark, he did much toward the advancement of science; and one of his most important works during this time was the superintendence of the publication of Flamsteed's *Greenwich Observations*—a task, however, not accomplished without much controversy and some bitterness between himself and that astronomer. The controversy between Newton and Leibnitz, as to priority of discovery of the differential calculus, or the method of fluxions, was raised rather through the partisanship of jealous friends than through the anxiety of the philosophers themselves, who were, however, induced to enter into and carry on the dispute with some degree of bitterness and mutual recrimination. The details of these controversies, with all other information of the life of this philosopher, will be found admirably collected in the biography by Brewster, who wrote, not only with an intimate acquaintance with Newton's works, but in possession of all the materials collected in the hands of his family. Newton died on March 20, 1727, and his remains received a resting-place in Westminster Abbey, where a monument was erected to his memory in 1731. A magnificent full-length statue of the philosopher, executed by Roubilliac, was erected in 1755 in the antechapel of Trinity College, Cambridge. This work was assisted by a cast of the face taken after death, which is preserved in the University Library at Cambridge. In 1699 Newton was elected a foreign associate of the Academy of Sciences, and in 1705 he received the honor of knighthood from Queen Anne. Among the best editions of Newton's principal works are the quarto edition of the *Optics* (London, 1704), and the quarto edition of the *Principia*, published at Cambridge, England, in 1713. Consult: Brewster, *Memoirs of the Life, Writings, and Discoveries of Sir Isaac Newton* (London, 1855-60); Pemberton, *View of Sir Isaac Newton's Philosophy* (ib., 1728); Ball, *History of Mathematics* (ib., 1893); id., *Essay on Newton's Principia* (ib., 1893); and Glazebrook, in the *Dictionary of National Biography*, xl. (New York, 1894).

NEWTON, John (1622-78). An English mathematician and astronomer, born at Oundle, Northamptonshire. He studied at Oxford and remained loyal to the King under Cromwell. Newton was something of an educational reformer, urged intelligent instruction in mathematics, and wrote text-books on arithmetic, geometry, astronomy, logic, and rhetoric. But his most important labors were for the facilitation of the decimal system and of logarithms. His *Institutio Mathematica*, with its logarithmic tables and descriptions of applications to astronomy, dialing, and navigation (1654), is one of the earliest books of its kind in English.

NEWTON, John (1725-1807). A Church of England divine. He was born in London, July 24, 1725, son of a sea-captain. After a little time at a boarding-school in Essex, he went to sea with his father at the age of eleven. During the next six years he made other voyages with his father and adopted infidel opinions. He became midshipman on a man-of-war, but deserted, was caught, flogged, and degraded. In 1745 he set sail for India as a common sailor, and was landed penniless on the African coast near Sierra Leone. In 1747 an English captain, arriving at Sierra Leone with a request from his father to look out for him, rescued him from a most degraded condition, and took him home. On the voyage during a storm he became converted, and thenceforth was a changed man. Soon afterwards he was appointed commander of an African slaver, and for four years continued in the slave trade, the cruelties of which afterwards he labored earnestly to expose. In 1754 a sudden attack of sickness led him to abandon a seafaring life, and from 1775 to 1760 he was tide-surveyor at Liverpool. At this time he studied Greek and Hebrew, and the best theological works in Latin, French, and English. In 1764 he was ordained and appointed curate of the parish of Olney, Buckinghamshire, where he remained sixteen years. He entered heartily into the religious work and views of Wesley and Whitefield. At Olney he published in 1764 *An Authentic Narrative of Some Remarkable and Interesting Particulars in the Life of the Rev. John Newton*. Here, too, he formed an intimate friendship with Cowper, and in connection with him produced the *Olney Hymns* (1779). Most of them were written by himself for the use of his congregation. In 1780 he became rector of the united parishes of Saint Mary Woolnoth and Saint Mary Woolchurch, Lombard Street, London, where he remained till his death, in London, December 21, 1807. His works, besides those already mentioned, were a *Review of Ecclesiastical History* (1770); *Omicron's Letters* (1774); *Cardiphonia, or the Utterances of the Heart* (1781); *Messiah: Fifty Discourses on the Scriptural Passages of the Oratorio of Handel* (1786); and numerous sermons, discourses, tracts, and letters. His collected works were edited with memoir by Cecil (London, 1808). Consult, also, the memoir by Bickersteth (ib., 1843).

NEWTON, John (1823-95). An American military and civil engineer and soldier. He was born in Virginia and was educated at West Point, receiving a commission in the Corps of Engineers on his graduation in 1842. After serving as assistant professor of engineering at the United States Military Academy for three years, he was occupied with the construction of fortifications and river and harbor improvement on the Atlantic coast. During the Civil War, after receiving the rank of brigadier-general of volunteers, he was summoned to assist in constructing the defenses of Washington. He took part in the battles of Gaines's Mill, Glendale, South Mountain, and Antietam, and in command of a division he was present at Fredericksburg, at Salem, and at Gettysburg. In the invasion of Georgia he led a division of the Army of the Cumberland through all the engagements preceding the capture of Atlanta, and March 13, 1865, he was made brevet major in the United States Army. After the war he was occupied in strengthening the defenses of New York Harbor, in removing the obstacles to navigation at Hell Gate (q.v.) and other portions of the East River, in harbor improvements at Lake Champlain, and New York Harbor. June 30, 1879, he attained the rank of colonel in the corps of engineers; in 1884 was made brigadier-general and chief of engineers; retired in 1886. He was commissioner of public works, New York City, 1887-88, a position which he resigned to become president of the Panama Railroad Company in 1888.

NEWTON, Richard Heber (1840—). A clergyman of the Protestant Episcopal Church.

He was born in Philadelphia. He studied at the University of Pennsylvania and Philadelphia Divinity School, and was ordained in 1862. From 1869 to 1902 he was rector of All Souls' Church in New York City, and in the latter year accepted the position of chaplain at Leland Stanford, Jr., University at Palo Alto, Cal. He belongs to the 'broad church' party and has won distinction for his advocacy of liberal ideas. He has published: *Studies of Jesus* (1881); *Right and Wrong Uses of the Bible* (1883); *The Book of the Beginnings* (1884); *Philistinism* (1885); *Social Studies* (1887); *Church and Creed* (1891); *Christian Science* (1898).

NEWTON-AB′BOT. A market-town in Devonshire, England, on the Teign estuary at the mouth of the Lemon, 15 miles south of Exeter (Map: England, C 6). It has railway works, a shipping trade, and considerable commerce in agricultural produce and cattle. Its principal industry is the manufacture of ornamental pottery from china clay and potter's clay, found in the neighborhood. Lignite and tin ore are mined. It has some interesting old buildings, a town hall, and municipal markets. In the vicinity are important remains of a Roman encampment. Charles I. lodged at Newton-Abbot during his western campaign, and here William III. was first proclaimed King in 1688. Population, in 1891, 11,000; in 1901, 12,500.

NEWTON-IN-MAKERFIELD, măk′ẽr-fēld, or Newton-le-Willows. A manufacturing town in Lancashire, England, 15 miles west of Manchester (Map: England, D 3). The chief industries are paper-making, printing, sugar refining, railway wagon manufacturing, and coal-mining. It has a town hall, mechanics' institute, and grammar school. There is a beautiful lake in the town called Newton Mere, which is covered, during the summer months, with the pleasure-boats of the residents. Horse-races are held here in June, and horse and cattle fairs in May and August annually. The barony belonged to Edward the Confessor. Population, in 1891, 12,861; in 1901, 16,699.

NEWTON'S RINGS. The colored rings seen when a thin film of air or other substance intervenes between the surfaces of two plates of glass. This phenomenon is named from its discoverer, Sir Isaac Newton, who in his work on *Optics* describes how he took a plano-convex lens designed for a fourteen-foot telescope and placed it with its plane side downward on top of a double convex lens constructed for a telescope of about fifty feet in length. On slowly pressing the upper lens against the lower, a number of concentric rings having the point of contact of the lenses as their centre appeared, increasing in size as the pressure was increased. This arrangement of a lens and plane surface is often employed in performing the experiment, and the thickness of the film and the wave lengths of the different kinds of lights can be ascertained. The effect is due to the interference (q.v.) of the waves of light reflected from the upper and lower surfaces of the thin film of air, which from nothing at the point of contact gradually increases in thickness with the distance from the centre. If light of one color, or, speaking more scientifically, of a single wave length, is used, the rings will be alternately bright and dark, the bright waves being produced by the combination of the various waves caused by interference and overlapping. Therefore the colors of Newton's rings are not pure spectral colors, though they are extremely brilliant and varied. In the centre, where the glass surfaces are in contact, there is a dark spot, and as the air film begins to have an appreciable thickness the rings are formed. They were divided by Newton into a series of orders, seven in number, though usually not more than four or five are seen. The colors of the first order, from the central black circle outward, are gray, whitish, straw color, orange, brick-red, and dark purple, the last color corresponding to a thickness of the film of .000011 of an inch or .00028 of a millimeter. In the second order we have the purest colors, which run through a succession of violet, blue, peacock, yellow, orange, red, and violet, the thickness of the air film in the last instance amounting to .000022 of an inch or .00055 of a millimeter; in the third and fourth orders we also have a succession of colors; in the fifth we have pale green, pale rose, and rose; in the sixth, pale peacock, and pale rose and rose; and in the seventh, pale green and rose. When the thickness of the film reaches .001 millimeter the color appears as pale green, and is included in the fourth order, but from this point the colors begin to fade and disappear. By means of these rings we are enabled to measure the distance between two transparent surfaces which are in seeming contact. In case the light passes through the plates instead of being reflected, the colors are reversed, and we have the rings formed with the complementary colors. See Light, sections *Interference* and *Diffraction*. Consult: Thompson, *Light Visible and Invisible;* Preston, *Theory of Light* (New York, 1894).

NEWTON THEOLOGICAL INSTITUTION. A divinity school at Newton Centre, Mass., founded in 1825, under the supervision of the Baptist churches of New England, but open to members of any Christian denomination. It has a three years' course leading to the degree of bachelor of divinity. In 1902 there were 8 instructors and 61 students. The buildings, eight in number, are valued with the grounds at $400,000. The institution has a library of 24,000 volumes, an endowment of $800,000, and property estimated at $1,300,000.

NEW′TOWN. Formerly a town in Queens County, N. Y., since 1898 included in the Borough of Queens, New York City (q.v.) (Map: New York City, G 6). Newtown was founded by New Englanders in 1652, and was known as Middleburgh until 1664, when it came under the jurisdiction of Connecticut, and was renamed Hastings. It received its present name and became part of New York in 1665. During the Revolution it was occupied for some time by British troops. Consult J. Riker, Jr., *The Annals of Newtown* (New York, 1852).

NEWTOWNARDS, nū′ton-ärdz′. A town in county Down, Ireland, 13 miles by rail from Belfast, on Lough Strangford (Map: Ireland, F 2). It has many interesting ruins, notably those of the Old Parish Church. For a hundred years the manufacture of linen goods has been the most important industry. Newtownards was chartered as a borough by James I. Population, in 1901, 9110.

NEW ULM. A city and the county-seat of Brown County, Minn., 26 miles west by north of Mankato; on the Minnesota River, and on the Chicago and Northwestern and the Minneapolis and Saint Louis railroads (Map: Minnesota, D 6). It has a handsome court house, Saint Alexander Hospital, a public library and high school and Turnverein libraries, Saint Michael's Academy, and Dr. Martin Luther College (Lutheran). New Ulm is the centre of a rich agricultural and stock-raising section, and carries on considerable trade. Its industrial establishments comprise grain elevators and flour mills, breweries, cigar factories, brick plants, machine shops, cooperage shops, and manufactories of pipe organs, woolens, pottery, and creamery products. Under a revised charter of 1891, the government is vested in a mayor, elected biennially, and a council. There are municipal water-works and electric-light plants. Settled in 1854, New Ulm was incorporated in 1876. It was in 1862 the scene of an Indian massacre. A memorial has been erected to the citizen soldiers killed by the Indians, and on Hermann Heights is a fine monument in honor of Hermann (Arminius). Population, in 1890, 3741; in 1900, 5403.

NEW WAY TO PAY OLD DEBTS, A. A play by Massinger, printed in 1632. It was written probably in 1625. Fletcher has been credited with a share in it, but his part, if any, was slight. It was the most popular of Massinger's plays, and was acted until recent times.

NEW WESTMINSTER. The former capital and one of the chief cities of the Province of British Columbia, Canada, on Fraser River, in the midst of the gold region, 15 miles above the mouth of the river, 75 miles northeast of Victoria (Map: British Columbia, E 5). The river at this point is about a mile wide and contains several inhabited islands. The terminus of the Great Northern Railway via Blaine is on the opposite bank. The city is the centre of considerable tracts of arable land, is delightfully located, has a fine climate, and a heavy rainfall. Its leading industry is salmon fishing, several establishments exporting the fish in cans and barrels. Other kinds of fish are caught for this trade. Fish oil is manufactured. New Westminster has also a large traffic in lumber and furs, a woolen mill, foundries, iron works, machine and carriage factories, etc. Anthracite and bituminous coal are exported. There are, in the city, Methodist and Roman Catholic colleges, the provincial asylum for the insane, the Dominion penitentiary, and public library; and New Westminster has municipal water-works, electric lights, an electric street railroad, and public parks. Population, in 1891, 6678; in 1901, 6499.

NEW YEAR'S DAY. The first day of the year. The custom of celebrating by some religious observance, generally accompanied by festive rejoicing, the first day of the year, appears to have prevailed among most of the ancient nations. The Jews, the Egyptians, the Chinese, the Romans, and the Mohammedans, although differing as to the time from which they reckoned the commencement of the year, all regarded it as a day of special interest. In Rome the year anciently began in March; and when Numa, according to the ancient legend, made the year begin on January 1st, that day was held sacred to *Janus Bifrons*, who was thus supposed to turn at once back upon the old year and forward into the new. On the establishment of Christianity, the usage of a solemn inauguration of the new year was retained; but considerable variety prevailed, both as to the time and as to the manner of its celebration. Christmas Day, the Annunciation (March 25th), Easter Day, and March 1st have all, at different times or places, shared with January 1st the honor of opening the new year; nor was it till late in the sixteenth century that January 1st was in most countries accepted as the first day of the new year. The early fathers—Chrysostom, Ambrose, Augustine, Peter Chrysologus, and others—in reprobation of the immoral and superstitious observances of the pagan festival, prohibited in Christian use all festive celebration; and, on the contrary, directed that the Christian year should be opened with a day of prayer, fasting, and humiliation. The mandate, however, was but partially observed.

The social observances of the first day of the new year appear to have been in substance the same in all ages. From the earliest recorded celebration we find notice of feasting and the interchange of presents. Tradition referred the origin of New Year's gifts among the Romans to Tatius, King of the Sabines (B.C. 747). Branches cut from the wood consecrated to Strenia, the goddess of strength, were received by him on the first day of the new year as presents of good omen. He sanctioned the custom and called the gifts *strenæ* (cf. French *jour d'étrennes*). In later times in Rome similar practices attended the worship of Salus. Simple *strenæ*, consisting of branches of bay and of palm, sweetmeats made of honey, figs, or dates as a good omen that the year might bring only joy and happiness (Ovid, *Fasti*, i., 185-190), finally gave way to gifts of more elaborate character. The custom of presenting gifts to the Emperor became so general that the people went *en masse* to carry him presents and to wish him a happy new year. The writers of the Empire describe other observances—exchanging visits, masquerading, and feasting—which characterized the day. The festival held by the Druids at the opening of the year resembles the worship of Salus by the Romans. The priests cut the sacred plant and distributed the sprays. In many countries the night before New Year's, 'Saint Sylvester's Eve,' was celebrated with great festivity, which was prolonged till after twelve o'clock, when the new year was ushered in with congratulations, visits, and mutual wishes for a happy new year. This is an ancient Scottish custom, which also prevails in many parts of Germany, where the form of wish—"Prosst- (for the Lat. *prosit*) Neu-jahr"—"May the new year be happy"—attests the antiquity of the custom. In many places the practice of tolling bells at midnight, and thus 'ringing in the new year,' is still observed. Many religious communions are wont to celebrate it with a special service or watch night. In the Roman Catholic Church the *Te Deum* is often sung at the close of the old year in thanksgiving for the blessings granted during its course, and New Year's Day is a holy day of obligation, because on it falls the Feast of the Circumcision.

NEW YORK (popularly called the 'Empire State'). A North Atlantic State of the United

States. It lies between latitudes 40° 30′ and 45° 1′ north, longitudes 71° 51′ and 79° 46′ west, and is bounded on the northwest by Lake Ontario and the Saint Lawrence River, which separate it from the Canadian Province of Ontario; on the north by the Province of Quebec; and on the east by the States of Vermont, Massachusetts, and Connecticut, a part of the Vermont boundary being formed by Lake Champlain. On the south the Atlantic Ocean and its arms, Long Island Sound, New York Bay, and Staten Island Sound, surround Long Island and Staten Island, which belong to the State, while the mainland portion is bounded by a part of these waters and by the States of New Jersey and Pennsylvania. On the west the boundary is completed by the latter State, together with Lake Erie and the Niagara River. New York has roughly the shape of a triangle, with the base on the Great Lakes and the apex extending down to the ocean. Its extreme length from north to south is 312 miles, and from east to west 326 miles. It ranks twenty-sixth in size among the States, its area being 49,170 square miles, of which 47,620 square miles are land surface.

TOPOGRAPHY. The topographical features of New York are varied and complex, but a certain number of more or less well-marked physical divisions may be recognized. The great Appalachian belt first comes out upon the coast in this State. The Piedmont plain, which has such a distinctive development farther south, is here scarcely represented; and the coastal plain is represented only by Long Island, which is low and sandy, with an average elevation of about 70 feet and a maximum of 380 feet. The first division of the mainland, covering the southeastern corner of the State, consists of the Highlands, an extension of the Highlands of New Jersey. It is a rugged region rising in some of its peaks to a height of about 1500 feet, and is pierced by the Hudson in a magnificent gorge. It falls into gentle undulations toward Long Island Sound and New York Bay. Northwest and north of the Highlands follows an extension of the Kittatinny Valley of New Jersey. This is low compared with the neighboring elevations, but east of the Hudson the land rises into the Taconic Range, 2800 feet high, which runs along the eastern boundary into Massachusetts and Vermont, where its extension forms the Green Mountains. West of this Taconic region rises the extension of the Pennsylvanian part of the Appalachian system in the form of a vast plateau covering more than one-third of the State, and reaching from the Hudson to within two or three miles of Lake Erie. It is deeply eroded by river valleys lying in places over 1000 feet below the higher portions. Its eastern part rises in many peaks over 3000 feet in the wild and much dissected mountain region known as the Catskills, whose highest peak, Slide Mountain, has an altitude of 4205 feet. South of the Catskills are the Shawangunk Mountains. The average elevation of the western part of the great plateau is about 1200 feet, with some points reaching 2000 feet. Throughout its length on the north, east, and southeast, it is bounded by a limestone escarpment in some places very high and abrupt, and known in the east as the Helderberg Mountain. North of this escarpment is a low-lying region, forming in the west the lake shore plain and in the east the Mohawk Valley. The latter is bounded on the north by an irregular and hilly country, which merges imperceptibly into the last great topographical region, the Adirondacks. The Adirondacks with their outlying hills cover the entire northern part of the State. Their central portion is heavily forested, and is a famous summer resort. Several of their peaks are over 4000 feet high, and Mount Marcy, the highest point in the State, has an altitude of 5344 feet.

HYDROGRAPHY. The rivers of the State flow in all directions, and supply five main systems—the Saint Lawrence, Hudson, Mississippi, Susquehanna, and Delaware. The Saint Lawrence drainage basin is the largest in the State, but includes mostly small streams flowing into Lakes Erie and Ontario, the Saint Lawrence River, and Lake Champlain. The largest of these streams are the Genesee, the Oswego, and the Black rivers, all emptying into Lake Ontario. The second drainage basin is that of the Hudson—the only large river flowing entirely within the State. It explains in large part the commercial supremacy of New York, since through its western branch-valley of the Mohawk, through which it has been practicable to construct a canal, it opens a continuous waterway into the heart of the Continent. Even before the Erie Canal was constructed the Hudson and Mohawk valleys constituted an important trade route between the Atlantic and the Great Lakes. The Delaware and Susquehanna rivers both rise in this State, draining its south-central portion. The latter is a large river before it crosses the boundary, but is not navigable. The Mississippi system is represented only by the Allegheny River in the extreme western part of the State. Many of the rivers flow through picturesque gorges, and are broken by falls and rapids, the most noted of which, besides Niagara, are those of the Genesee at Rochester.

New York is dotted with numerous lakes celebrated for beauty. Some of them are of considerable size, and nearly all are of elongated type, formed by the damming of river valleys by glacial materials. This type appears most conspicuously in the group known as the Finger Lakes in the western part of the State. They lie nearly parallel in a north and south direction. The largest are Lakes Seneca and Cayuga, each nearly 40 miles long and from 2 to 3 miles wide. Lake Chautauqua in the extreme west and the picturesque Lake George in the extreme east are of similar formation, as is also Oneida Lake in the central portion, though the last has a width of over 5 miles, with a length of 20 miles. The Adirondack region abounds in mountain lakes of romantic beauty.

CLIMATE. The climate of the State is of the continental rather than the insular type, though the extreme coastal regions of Long Island are somewhat tempered by the ocean. The range of temperature is nowhere as great as in the States of the Northwestern plains. The average maximum is about 100° and the minimum zero, or a few degrees below, but these figures vary much with the topography, the winters in the Adirondacks being very cold. The mean temperature for January is 30° on the coast, 26° in the northwest, and 15° in the Adirondacks. The corresponding figures for July are 72°, 70°, and 64°. The rainfall is abundant throughout the State. In the Adirondacks it is nearly 60 inches, and at New York City, 42 inches. In the rest of the State it ranges between 35 and 45 inches, being least in the northwest.

GEOLOGY. There are two areas of Archæan rocks, which probably represent the portions of the State that rose above the pre-Cambrian ocean. These are the Adirondack region of the north and the Highlands of the extreme south. Both consist of very ancient crystalline and metamorphic rocks, granites, gneisses, etc., with intruded basic rocks forming the central or Mount Marcy group of the Adirondacks. The northern Archæan area is flanked on the north by outcrops of Potsdam sandstone of the Cambrian Age, and again on all sides by a narrow band of Trenton limestone, while a tongue of Lower Cambrian extends from the southern end of Lake Champlain toward the Hudson Valley. In the early Silurian Age a great upheaval connected the Adirondacks with the Highlands and raised above sea-level the regions bordering these on the west. That portion now appears as Lower Silurian slates and limestones, running in a great curve from Lake Ontario toward Lake George, and thence south and southwestward into the Kittatinny Valley of New Jersey. On this formation the Upper Silurian rests unconformably and crops out along the southern shore of Lake Ontario. The rest of the State, including the entire southwestern and south-central portion as far east as the Hudson Valley, remained submerged until the close of the Devonian Age, when, in the early Carboniferous Age, it was raised by the great Appalachian upheaval. This portion is now covered by rocks of the Devonian system, forming the great western plateau, which is terminated by the abrupt escarpment formed by the Helderberg limestone. The eastern portion of the plateau is more folded and upturned than the western, and is capped by harder sandstone, whence it remains at a higher level as the Catskill Mountains. The Upper Devonian may have been overlain by a light Carboniferous stratum; but if so, the latter has been entirely worn away, and the State contains no rocks later than the Upper Devonian, with the exception of a small area of Triassic and Cretaceous strata in the southeastern part. Glacial action has been very effective in shaping the present topography of New York, by the formation of lakes, the changing of river courses, the scooping out of some valleys and filling in of others, and the deposition of moraine materials, these materials covering the older rock-formations in an irregular sheet from a few inches to several hundred feet in thickness, and constituting the principal soil of the State.

MINERAL RESOURCES. The coal measures, which are so extensively developed south of the boundary, are not represented in this State. There are valuable clay deposits in the lowlands around the lakes and river valleys, formed by the deposits from the larger lakes which covered those regions in Pleistocene times. The granites of the Archæan regions, the limestones of the Trenton and Niagara formations in the northwest, and the Potsdam and Catskill sandstones, especially those layers of the Hamilton group known as the Hudson River bluestone, form valuable sources of building stone. The principal metallic ore is iron, which occurs in extensive beds of magnetite and hermatite in the crystalline rocks of the Adirondacks. Interbedded with the shales of the Upper Silurian strata south of Lake Ontario are extensive deposits of rock salt from 15 to 150 feet thick, while other minerals are found in smaller quantities in various parts of the State.

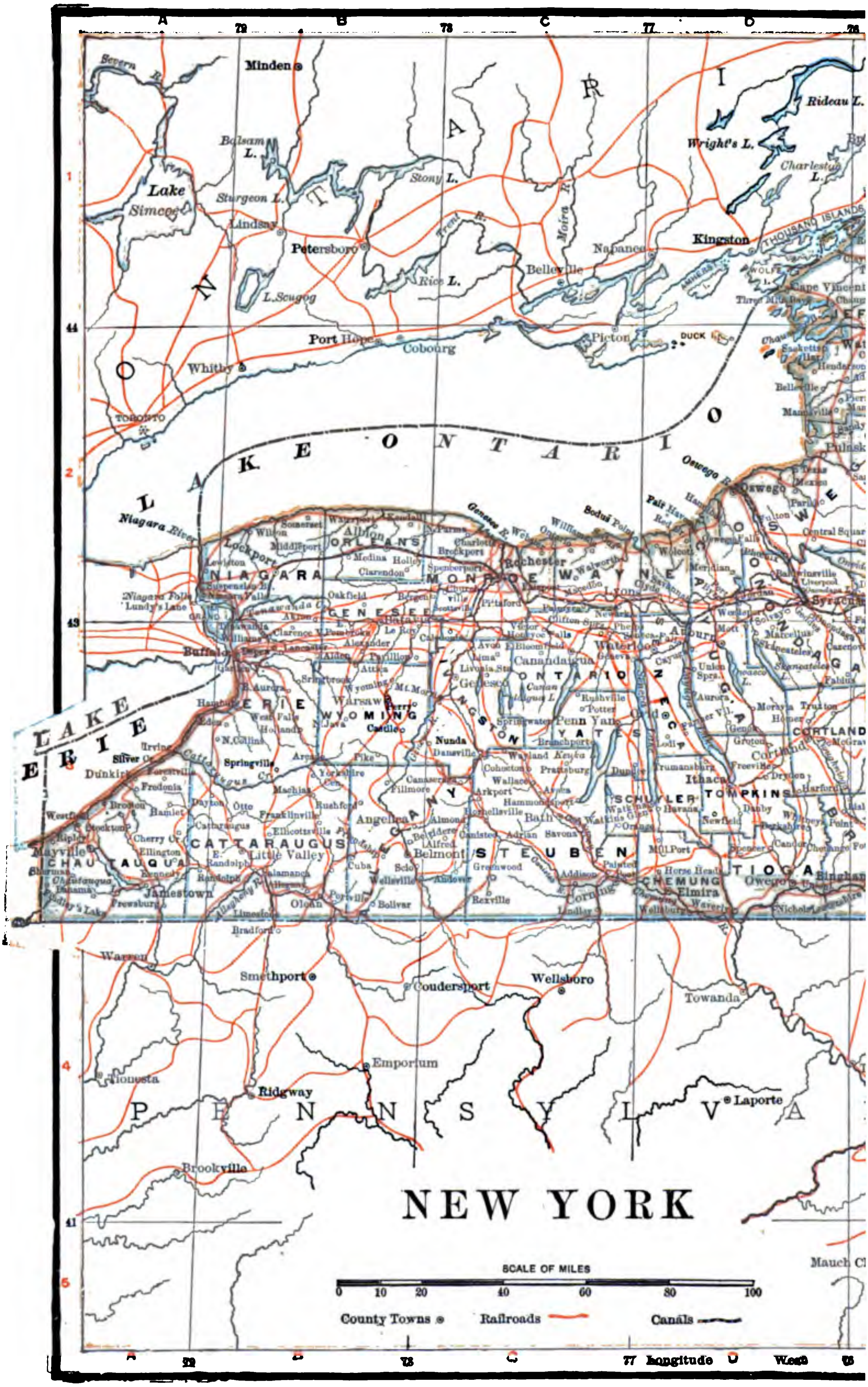
MINING. New York has no coal mines, and is in this respect in marked contrast with the sister Commonwealth of Pennsylvania. The State ranks high in the stone-quarrying industry. All the more important varieties of stone, as well as industrial clays, are worked. The output of limestone in 1900 was valued at $1,730,162, the largest for any year in the decade 1890-1900. The sandstone for the same year (nearly two-thirds being bluestone) was valued at $1,467,496—also the largest value attained from 1890 to 1900. The annual production of granite and of marble each ranges in value from about $200,000 to $500,000. Slate is of less importance. New York produces over half of the total output of rock cement for the country, the value for 1900 being $2,045,451. Portland cement is also made. The value of the clay products for 1900 was $8,073,769—a little less than in 1890—of which over one-sixth represented pottery, and the remainder brick and tile. New York is the largest salt-producing State, the value of the product being over one-third that for the entire country. Prior to 1893 New York was exceeded by Michigan in the salt output, but it has regularly held first rank since that year. Since 1898 the annual value has been more than $2,000,000. The yield of the different kinds of iron ore in 1900 was: red hematite, 44,467 long tons; brown hematite, 44,891; magnetite, 345,714; and carbonate, 6413 long tons, the value of the entire product being $1,103,817. Petroleum and natural gas are obtained in the western part of the State. The value of the natural gas yield was greatest in 1890—$552,000. The highest subsequent figure was that for 1900—$363,367. Only one State, Wisconsin, exceeds New York in the value of its mineral waters, the total receipts being $929,038, from 44 springs reporting in 1900.

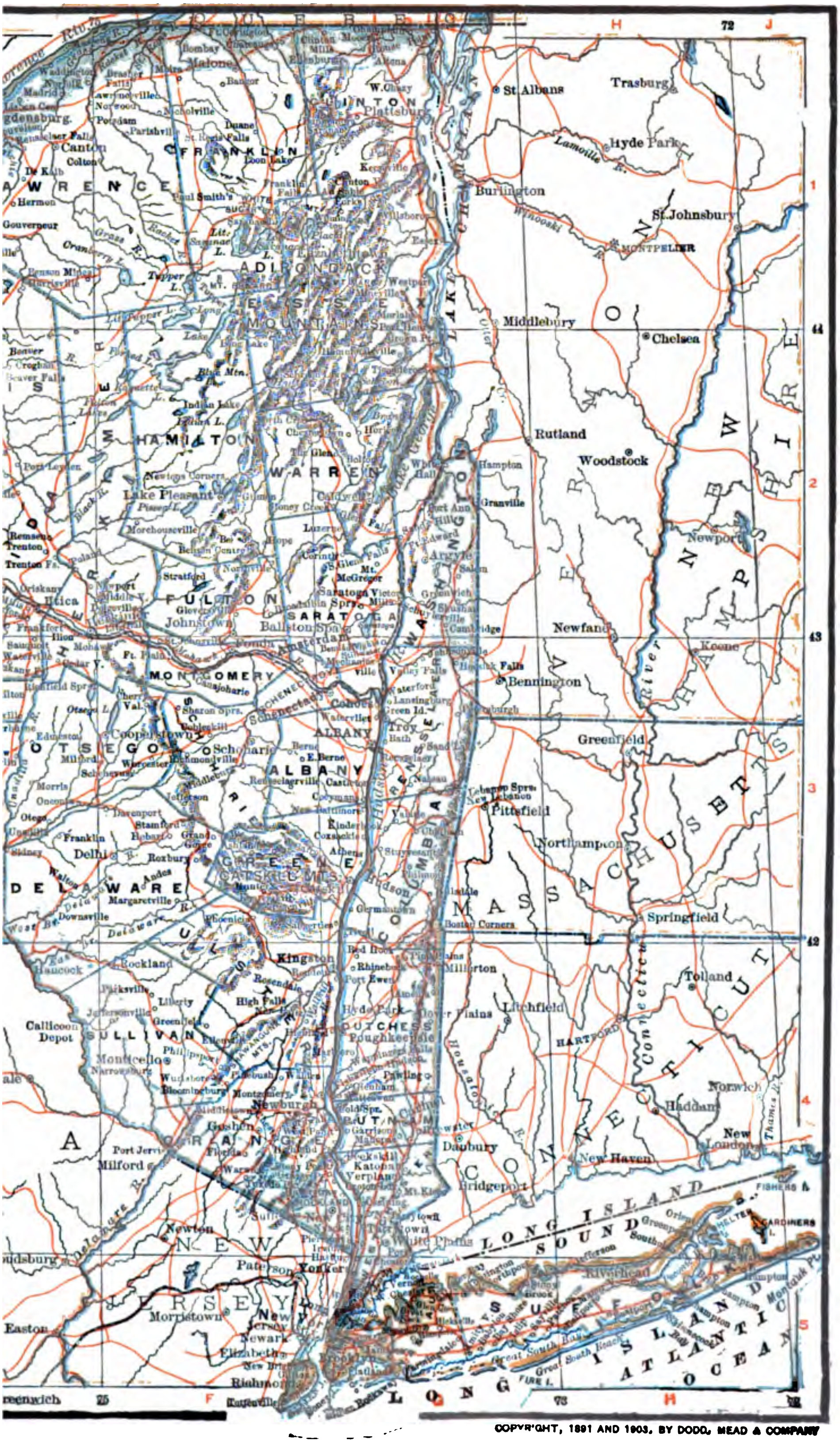
FISHERIES. The fishery industries, like those of most of the Middle Atlantic coast States, have greatly declined in value of late. Its vessel fisheries, however, show an increase. In 1898 there were 9185 persons engaged in the industries, as against 12,246 in 1891. The value of the catch for the same year was $3,545,189, showing a decline of nearly 30 per cent. since 1891, although the amount of the catch increased during the same period. Suffolk County, on Long Island, is the foremost county in the State in fisheries. The oyster represents more than one-half of the total value. Next come menhaden, bluefish, and clams. In the counties bordering on the Hudson the fisheries are of minor importance. The chief species here are shad and alewives. The lake fisheries of New York are also of some importance. The menhaden industry has been considerably consolidated in late years. Its product in 1898 was $405,488. The value of the canned fish amounted in 1900 to $197,869. See the bibliography under the article FISHERIES.

AGRICULTURE. For a long time New York was the first State in agricultural importance, and as late as 1890 was surpassed by Illinois alone in the value of farm products. In 1900, although these products had increased 51 per cent. in the decade ending with that year, the amount was

AREA AND POPULATION OF NEW YORK BY COUNTIES.

County.	Map Index.	County Seat.	Area in square miles.	Population.	
				1890.	1900.
Albany,	F 3	Albany.	528	164,555	165,571
Allegany	B 3	Belmont.	1,018	43,240	41,501
Broome	E 3	Binghamton	696	62,973	69,149
Cattaraugus	B 3	Little Valley	1,330	60,866	65,643
Cayuga	D 2	Auburn	722	65,302	66,234
Chautauqua	A 3	Mayville	1,062	75,202	88,314
Chemung	D 3	Elmira	394	48,265	54,063
Chenango	E 3	Norwich	847	37,776	36,568
Clinton	G 4	Plattsburg	1,041	46,437	47,430
Columbia	G 3	Hudson	647	46,172	43,211
Cortland	D 3	Cortland	486	28,657	27,576
Delaware	E 3	Delhi.	1,531	45,496	46,413
Dutchess	G 4	Poughkeepsie	800	77,879	81,670
Erie	B 3	Buffalo	1,040	822,981	433,686
Essex	F 1	Elizabethtown	1,834	33,052	30,707
Franklin	F 1	Malone.	1,717	38,110	42,853
Fulton	F 2	Johnstown	486	37,650	42,842
Genesee	B 2	Batavia	484	33,265	34,561
Greene	F 3	Catskill	644	31,598	31,478
Hamilton	F 2	Lake Pleasant	1,747	4,762	4,947
Herkimer	E 2	Herkimer	1,426	45,608	51,049
Jefferson	E 1	Watertown.	1,252	68,806	76,748
Kings	F 5	Brooklyn	77	838,547	1,166,582
Lewis	E 2	Lowville	1,265	29,806	27,427
Livingston	C 3	Geneseo	635	37,801	37,059
Madison	E 3	Morrisville	649	42,892	40,545
Monroe	C 2	Rochester	643	189,586	217,854
Montgomery	F 3	Fonda	399	45,699	47,488
Nassau	G 5	Mineola	252	......	55,448
New York	F 5	New York	63	1,515,301	2,050,600
Niagara	B 2	Lockport.	522	62,491	74,961
Oneida	E 2	Utica	1,180	122,922	132,800
Onondaga	D 2	Syracuse	794	146,247	168,735
Ontario	C 3	Canandaigua	652	48,453	49,605
Orange	F 4	Goshen	849	97,859	103,859
Orleans	B 2	Albion	396	30,803	30,164
Oswego	D 2	Oswego	974	71,883	70,881
Otsego	E 3	Cooperstown	978	50,861	48,939
Putnam	G 4	Carmel	239	14,849	13,787
Queens	G 5	Jamaica	120	128,059	152,999
Rensselaer	G 3	Troy	664	124,511	121,697
Richmond	F 5	Richmond	57	51,693	67,021
Rockland	F 5	New City	180	35,162	38,298
St. Lawrence	F 1	Canton.	2,810	85,048	89,083
Saratoga	F 2	Ballston Spa.	830	57,663	61,089
Schenectady	F 3	Schenectady	210	29,797	46,852
Schoharie	F 3	Schoharie	648	29,164	26,854
Schuyler	C 3	Watkins	339	16,711	15,811
Seneca	D 3	Ovid & Waterloo	328	28,227	28,114
Steuben	C 3	Bath	1,401	81,473	82,822
Suffolk	G 5	Riverhead.	918	62,491	77,582
Sullivan	F 4	Monticello	967	31,031	32,306
Tioga	D 3	Owego	518	29,935	27,951
Tompkins	D 3	Ithaca	477	32,923	33,830
Ulster	F 4	Kingston	1,128	87,062	88,422
Warren	F 2	Caldwell	895	27,866	29,943
Washington	G 2	Argyle	797	45,690	45,624
Wayne	C 3	Lyons	624	49,729	48,660
Westchester	G 4	White Plains	450	146,772	183,375
Wyoming	B 3	Warsaw	603	31,193	30,413
Yates	C 3	Penn Yan	348	21,001	20,318

NEW YORK
SCALE OF MILES
0 10 20 40 60 80 100
County Towns
Railroads
Canals
Longitude West
A B C D
79 78 77
1 2 3 4 5
44 43 42 41
ONTARIO
LAKE ONTARIO
LAKE ERIE
PENNSYLVANIA
Lake Simcoe
Minden
Balsam L.
Sturgeon L.
Stony L.
Lindsay
Petersboro
Rice L.
L. Scugog
Trent R.
Moira R.
Belleville
Napanee
Kingston
Rideau L.
Wright's L.
Charleston L.
THOUSAND ISLANDS
WOLFE I.
AMHERST I.
Cape Vincent
Three Mile Bay
Port Hope
Cobourg
Whitby
TORONTO
Picton
DUCK
Sackett's Har.
Henderson
Belleville
Mannsville
Pulaski
Oswego
Oswego R.
Mexico
Parish
Fulton
Central Square
Baldwinsville
Liverpool
Syracuse
Niagara River
Niagara Falls
Lundy's Lane
Lewiston
Suspension Br.
Wilson
Somerset
Lockport
Middleport
Albion
Medina
Holley
Kendall
Parma
Charlotte
Brockport
Rochester
Genesee R.
Williamson
Ontario
Sodus Point
Fair Haven
Wolcott
Oswego Falls
Clyde
Lyons
Newark
Palmyra
Macedon
Walworth
Fairport
Pittsford
Clarendon
Oakfield
Bergen
Churchville
Scottsville
Batavia
Le Roy
Tonawanda
Akron
Alexander
Attica
Williamsville
Buffalo
Depew
Lancaster
Alden
Darien
Pavilion
Avon
Lima
Geneseo
Livonia Sta.
Victor
Honeoye Falls
E. Bloomfield
Canandaigua
Clifton Springs
Phelps
Geneva
Waterloo
Seneca Falls
Auburn
Cayuga
Union Springs
Aurora
Moravia
Skaneateles
Marcellus
Cazenovia
Fabius
Truxton
Homer
Cortland
McGraw
Groton
Dryden
Freeville
Ithaca
Trumansburg
Lodi
Penn Yan
Rushville
Potter
Branchport
Keuka
Wayland
Cohocton
Wallace
Prattsburg
Avoca
Arkport
Hornellsville
Bath
Hammondsport
Savona
Watkins
Watkins Glen
Havana
Dundee
Orange
Newfield
Danby
Spencer
Candor
Owego
Horse Heads
Elmira
Waverly
Wellsburg
Corning
Addison
Painted Post
Lindley
Mill Port
Canisteo
Adrian
Greenwood
Rexville
Andover
Alfred
Belmont
Almond
Wellsville
Scio
Cuba
Bolivar
Portville
Olean
Salamanca
Little Valley
Ellicottville
Franklinville
Rushford
Angelica
Fillmore
Canaseraga
Nunda
Dansville
Mt. Morris
Castile
Perry
Warsaw
Wyoming
Java
Arcade
Yorkshire
Pike
Machias
Springville
Holland
East Aurora
West Falls
Hamburg
Eden
N. Collins
Irving
Silver Creek
Dunkirk
Forestville
Fredonia
Brocton
Westfield
Ripley
Mayville
Sherman
Panama
Chautauqua
Ellington
Cherry Creek
Stockton
Hamlet
Dayton
Otto
Cattaraugus
Randolph
Kennedy
Frewsburg
Jamestown
Chautauqua L.
Cattaraugus Cr.
Limestone
Bradford
Warren
Smethport
Coudersport
Wellsboro
Towanda
Emporium
Tionesta
Ridgway
Laporte
Brookville
Mauch Ch
Binghamton
Nichols
NIAGARA
ORLEANS
MONROE
WAYNE
GENESEE
ERIE
WYOMING
LIVINGSTON
ONTARIO
YATES
SENECA
CAYUGA
ONONDAGA
OSWEGO
CORTLAND
TOMPKINS
SCHUYLER
STEUBEN
CHEMUNG
TIOGA
ALLEGANY
CATTARAUGUS
CHAUTAUQUA



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exceeded in three Western States. Each decade since 1870 has witnessed a decrease in the value of farm land and farm improvements, a fact generally explained by the rise of Western competition. The area of improved land reached its maximum in New York in 1880, and declined in each of the subsequent decades. In 1900 74.3 per cent. of the land area of the State was included in farms, and of this amount 68.9 per cent. was improved. The average size of farms decreased from 112.1 acres in 1850 to 99.9 acres in 1900. Tenant farming is growing in favor, and embraced in 1900 23.9 per cent. of all farms. Over one-half of the total crop acreage is devoted to hay and forage, and exceeds the corresponding area in any other State. The importance of the dairy industry gives a special value to hay. While the total product is sometimes exceeded in other States, it generally stands first as to total value. Oats is the most important cereal and is a favorite crop in the Saint Lawrence Valley. Wheat and corn are of about equal prominence. Both regained from 1890 to 1900 a part of the very large loss of area which characterized them in the preceding decade. Only one other State rivals New York in the production of rye and buckwheat.

After hay, the potato is the most valuable farm product. The State is unapproached in the area devoted to this vegetable, and in the value of its production. New York also takes first rank in garden farming. Long Island is almost wholly devoted to this industry, for which it has the special advantage of being near to the New York market. In the production of beans the State holds second rank. In the western counties north of the watershed and in Ulster County are large fruit orchards, the apple trees constituting 70 per cent. of the total number of fruit trees in the State. Grapes are grown abundantly in the southern part of the Hudson Valley and in the lake region. Tobacco is raised in the Chemung Valley and northeastward to the eastern end of Lake Erie. Hops are a prominent crop in some of the central counties, but recently there has been a significant decrease, owing to Western competition. A large income is annually obtained from the products of floriculture. Fertilizers are very commonly used throughout the State, an average of $20 per farm being expended for them. The following table of acreages explains itself:

CROP	1900	1890
Hay	5,154,965	5,243,010
Oats	1,329,753	1,417,371
Corn	658,654	493,320
Wheat	557,736	462,561
Buckwheat	289,862	280,029
Rye	177,416	236,674
Barley	111,658	349,311
Potatoes	395,640	357,464
Beans	129,298	....

Stock-Raising. Stock-raising is characterized by the great prominence of dairy cows. The number of cows has increased steadily, and the dairy industry has likewise grown. In 1900 the value of dairy products constituted 30.5 per cent. of the gross farm income. The receipts from the sales of milk in that year were $36,248,833, and from sales of butter, $9,868,446. From 1890 to 1900 there was a decided increase in the number of cattle and a marked decrease in the number of sheep. Poultry products are a very prominent item. The following table of the holdings of stock is self-explanatory:

	1900	1890
Dairy cows	1,501,608	1,440,230
Other cattle	1,094,781	691,162
Horses	628,438	664,430
Mules and asses	3,651	4,636
Sheep	984,516	1,528,976
Swine	676,639	843,342

Forests and Forest Products. Forests of white pine, spruce, and hemlock originally covered the Adirondacks, and, mingled with hard woods, were common throughout other parts of the State. New York has long played a prominent part in the lumber industry of the country, and in 1850 ranked first among the States in the value of timber products. As a result the merchantable timber has been generally removed except in the Adirondacks, and most of the pine has been cleared from that region. The State possesses here 1,163,414 acres. In 1900 there were in New York 705,914 acres in private reserves, and 1,356,816 acres were owned by individuals or companies for other purposes. Hemlock and spruce are cut in the largest quantities. From the table below it will be seen that while the value of the lumber and timber products, as also the planing mill products, etc., decreased somewhat during the decade, the value of paper and wood pulp increased 88.2 per cent. This gave the State first rank in this industry.

Manufactures. The leading position of New York as a manufacturing State dates from about 1825, when the Erie Canal was finished. The largest absolute gain in the industry was made from 1880 to 1890. The percentage of the population engaged in the industry as wage-earners increased from 6.4 in 1850 to 11.7 in 1900. There was, however, a decrease in the last decade of that period. The total value of manufactures for the year 1900 was $2,175,726,900. This figure was one-seventh greater than that for Pennsylvania—the only other State which approaches New York in this respect. The figure was in fact nearly one-sixth of that for the United States. This position is held by the State despite the comparative lack of iron manufacturing and textile industries. It is due to the great number of factories and shops producing the more highly finished products. The State is not without valuable resources of field, forest, and mine, and counts also among its advantages the sources of an abundant water-power, including the Niagara Falls. But its advanced position is the outgrowth rather of its superior situation with respect to both home and foreign markets. The construction of the Erie Canal westward through the Mohawk Valley—the only natural break in the Appalachian Mountain range—established early communication between the Hudson River and the Great Lakes, and brought to New York much of the commerce of the West. The water routes determined the location of nearly all the large towns, which in turn largely determined the location of railway routes. At the southern extremity of this system of water transportation was New York Harbor, with its superior natural facilities for shipping. New York City thus became the metropolis of the country, and extensive manufacturing industries sprang up in and about it. About three-fifths

INDUSTRIES	Year	Number of establishments	Average number wage-earners	Value of products, including custom work and repairing	Rank among the States
Total for selected industries for State	1900	24,417	502,839	$1,380,975,268	
	1890	21,309	445,867	1,082,595,478	
Increase, 1890 to 1900	......	3,108	56,972	$298,379,790	
Per cent. of increase	......	14.6	12.8	27.6	
Per cent. of total of all industries in State	1900	31.0	59.2	63.5	
	1890	32.4	59.3	63.3	
Clothing—total	1900	4,204	90,017	$233,370,447	
	1890	3,466	78,874	141,968,351	
Clothing, men's, factory product	1900	2,531	41,300	126,478,067	First
	1890	2,661	54,110	96,880,957	
Clothing, women's, factory product	1900	1,673	48,717	106,892,390	First
	1890	805	24,764	45,087,394	
Furnishing goods, men's	1900	270	21,610	31,000,834	First
	1890	215	11,671	14,379,970	
Millinery and lace goods	1900	393	11,274	21,037,782	First
	1890	165	6,038	10,803,361	
Musical instruments—total	1900	193	7,244	15,509,839	First
	1890	211	7,142	15,718,919	
Textiles—total	1900	537	64,901	94,263,047	
	1890	627	61,097	86,642,771	
Carpets and rugs, other than rag	1900	12	8,603	15,029,218	Second
	1890	15	8,879	14,606,116	
Cotton goods (including cotton small wares)	1900	52	9,259	10,788,003	Tenth
	1890	42	8,316	9,777,295	
Hosiery and knit goods	1900	242	26,470	35,886,048	First
	1890	201	19,828	24,776,582	
Silk and silk goods	1900	92	7,861	12,706,246	Fourth
	1890	185	12,719	19,417,796	
Woolen goods	1900	65	4,033	6,715,005	
	1890	91	2,838	5,188,020	
Worsted goods	1900	7	3,726	5,968,259	
	1890	13	3,870	5,763,102	
Fur goods	1900	560	4,454	15,828,996	First
	1890	281	4,342	12,434,272	
Shirts	1900	324	13,565	22,782,302	First
	1890	377	17,948	17,483,958	
Gloves and mittens	1900	244	9,889	10,835,898	First
	1890	212	6,208	7,369,730	
Boots and shoes, factory product	1900	223	15,796	25,585,631	Second
	1890	257	15,361	23,661,204	
Leather—tanned, curried, and finished	1900	147	6,530	23,205,991	Third
	1890	210	6,200	23,348,078	
Iron and steel	1900	30	5,418	13,858,553	Seventh
	1890	44	6,848	15,849,537	
Foundry and machine-shop products	1900	1,352	50,173	96,636,517	Second
	1890	1,081	39,133	72,084,500	
Ironwork, architectural and ornamental	1900	203	4,942	12,745,249	First
	1890	155	4,018	8,386,281	
Electrical apparatus and supplies	1900	134	10,370	22,695,024	First
	1890	66	3,890	8,189,180	
Jewelry	1900	250	3,022	10,244,624	Third
	1890	195	1,994	7,385,139	
Sugar and molasses, refining	1900	14	3,275	90,680,478	First
	1890	14	610	17,157,694	
Coffee and spice, roasting and grinding	1900	87	1,541	22,470,856	First
	1890	70	1,260	31,013,213	
Confectionery	1900	858	7,230	18,842,148	First
	1890	657	5,920	12,920,812	
Patent medicines and compounds	1900	392	2,885	17,075,937	First
	1890	227	1,467	8,032,938	
Tobacco—chewing, smoking, and snuff	1900	42	1,020	4,632,101	
	1890	30	1,531	4,431,373	
Tobacco—cigars and cigarettes	1900	3,055	26,051	49,028,479	First
	1890	2,858	28,738	47,422,603	
Liquors—total	1900	279	7,730	58,282,253	
	1890	249	7,084	54,009,249	
Flouring and grist-mill products	1900	1,513	2,489	42,796,340	Second
	1890	1,235	3,389	52,550,744	
Slaughtering	1900	110	3,099	57,431,293	
	1890	181	3,744	76,642,151	
Soap and candles	1900	91	2,020	12,833,645	First
	1890	101	1,711	9,036,982	
Cheese, butter, and condensed milk, factory product	1900	1,908	2,439	26,557,888	First
	1890	1,308	2,461	14,385,966	
Chemical products—total	1900	279	8,854	40,663,363	First
	1890	288	8,720	41,338,134	
Printing and publishing	1900	2,640	32,948	95,232,051	First
	1890	2,230	27,587	68,929,001	
Lithographing and engraving	1900	111	6,335	11,062,856	First
	1890	94	4,094	8,333,764	
Lumber and timber products	1900	1,765	6,850	15,766,977	Twelfth
	1890	1,734	12,981	17,160,547	
Lumber, planing mill products, including sash, doors, and blinds	1900	509	11,515	29,756,257	First
	1890	540	14,179	33,765,173	
Agricultural implements	1900	87	5,551	10,537,254	Third
	1890	116	5,620	11,680,842	
Carriages and wagons	1900	893	6,981	13,068,385	Second
	1890	1,098	9,776	16,803,241	

INDUSTRIES	Year	Number of establishments	Average number wage-earners	Value of products, including custom work and repairing	Rank among the States
Cars and general shop construction and repairs by steam railroad companies	1900	82	13,062	$16,194,850	Third
	1890	46	8,585	9,046,025	
Furniture, factory product	1900	354	14,481	23,643,245	First
	1890	415	13,211	23,539,011	
Gas, illuminating and heating	1900	101	5,381	20,917,726	First
	1890	94	3,970	18,716,683	
Petroleum, refining	1900	4	2,629	27,184,524	Third
	1890	9	3,096	25,786,841	
Paper and wood pulp	1900	179	9,268	26,715,628	First
	1890	153	5,339	14,192,240	

of the total State output is accredited to New York City, but this output includes many industries of only local concern, such as the manufacture of gas and of bread and other food preparations, carpentering, plumbing, tinsmithing, and masonry work. In the different branches of the clothing and garment industry, New York City and other towns of the State produce more than a third of the output of the United States. The production of men's and women's factory-made clothing is largely confined to the metropolis. The work is generally performed in small workshops or tenement rooms. This system grows out of the necessity for specialization owing to the large number of patterns used, and is favored by the abundance of cheap labor available where there are such large numbers of foreigners unable to secure more profitable employment. This branch of industry is of comparatively recent development. Troy shares with New York in the extensive production of men's furnishing goods—shirts, neckwear, etc. Millinery and lace goods and silk and silk goods are New York City products, the last having suffered a large decline from 1890 to 1900 owing to the removal of establishments, in quest of cheaper rents and certain other advantages, to points outside the State. Yonkers is the centre of a large knitting industry, and Cohoes and Utica are noted for their carpet and rug manufactures. The manufacture of fur goods in New York City, and of boots and shoes at different points, is extensive. Tanning and the manufacture of leather are also very important.

While the iron and steel industry is of comparatively small and decreasing importance, the foundry and machine-shop industry is rapidly developing, and in 1900 gave the State second rank. The printing press and steam engine are the best known of these products. The industry is well represented at most of the large centres. New York is unrivaled in the manufacture of electrical apparatus and musical instruments. Especially prominent are the manufactures of refined sugar and molasses, roasted and ground coffee and spice, confectionery, patent medicine, tobacco, and liquors—most of which are produced almost wholly in New York City. Flour and grist-milling, slaughtering and meat-packing, and the factory production of cheese, butter, and condensed milk, are more generally distributed over the State. In the first-named industry the State ranks second. On the opening of the Erie Canal, Rochester, being favored with water power from the falls of the Genesee River, became the leading 'flour city' of the United States, and New York held first place until the comparatively recent development of the industry at Minneapolis. Between 1890 and 1900 both the flouring and slaughtering industries declined. The factory production of cheese, butter, and condensed milk, on the contrary, increased during that period nearly 85 per cent., and the State continues to hold first rank in this line. The manufacture of chemicals, including paints and varnishes, has attained large proportions in New York City. The printing industry of New York is more than twice that of any other State, and the metropolis is the centre of the periodical press as well as of book publishing. New York has long ranked as one of the foremost States in the brewing industry. The preceding table is a summary for the leading industries.

Commerce and Transportation. In maritime commerce New York far outranks any other State in the Union. In the fiscal year ending June 30, 1901, 64 per cent. of the imports and 35.60 per cent. of the exports of the entire nation passed through the port of New York. Its traffic to and from other United States coast points is between two and three times the volume of its foreign trade. In addition it has a vast trade along the Hudson. Buffalo is the chief lake port of the State, and has an immense commerce with the West. With this commerce may be included that of Tonawanda. Oswego is the principal port on Lake Ontario. Other important shipping points are: Charlotte, Sodus Point, Fair Haven, and Cape Vincent on Lake Ontario, Ogdensburg on the Saint Lawrence River, Rouses Point, Plattsburg, and Whitehall on Lake Champlain, and Newburgh and Rondout on the Hudson River. The total traffic for the entire State can best be noted in connection with the means of inland transportation.

New York was the first State to enter actively on the work of canal construction. In addition to the Erie Canal, opened in 1825, the State has constructed the Champlain Canal, the Oswego Canal, and several other branch canals, and enlarged the Erie Canal to four times its original dimensions. The total expenditure on canal construction has been nearly $100,000,000. In recent years, owing to railroad competition and the neglect of the State to improve the canals, the traffic on them has declined, most of the branch canals have been abandoned, and only on the Erie and Champlain routes is there any considerable tonnage. Proposed plans for the enlargement of the Erie Canal constitute a most important question for the State.

The first railroad in the State was the Mohawk and Hudson, opened in 1831 from Albany to Schenectady, a distance of seventeen miles. By 1842 there were lines extending from Albany to Buffalo. Within another decade the Erie road across the southern part of the State and the Hudson River road from New York to Albany had been completed. Since then roads have been built over every section of the State, and the different lines have been united into great systems. There were, in 1900, 8095 miles of road and over 12,000 miles of track in the State. The total traffic in 1899 was 150,000,000 passengers, moved 3,500,000,000 passenger miles, and 170,000,000 tons of freight, moved 24,000,000,000 ton-miles—being one-fourth of the passenger traffic and one-fifth of the freight traffic of the entire country. The principal railroad systems crossing the State are the New York Central and Hudson River, the Erie, the Lackawanna, the New York, Chicago and Saint Louis (with the West Shore), the New York, Ontario and Western, and the Lehigh Valley. Other important systems enter at the east and west. There is a State board of railroad commissioners, having general supervision of railroads and their operation with reference to public safety and convenience. The board is empowered to investigate and report violations of the law.

Banks. The paramount position of New York City in the American financial world places New York State in the lead among the States in the number and resources of its financial institutions. The first bank of the State was the Bank of North America, incorporated in 1782. In 1791 the second bank was chartered under the name of the Bank of New York. In 1804 an act was passed prohibiting banking and the issuing of currency in the State except under a special charter from the Legislature. Due to the high profits, banking charters were eagerly sought and became political favors. At the time of the declaration of war with Great Britain in 1812 there were twenty banks in the State, and twenty-four more were chartered between 1812 and 1829. As the bank charters were for a limited number of years, and most of them were to expire in 1831, the banks in 1828 made a combined effort for a general renewal of their charters. But a strong opposition developed to this plan. The careless distribution of charters to political friends had produced bad results, and the New York currency was becoming less secure. A reform of the banking system was therefore undertaken in 1829, and the plan of securing bank circulation by the formation of a safety fund was successfully carried through. The law required all banks with new or renewed charters to contribute one-half of one per cent. of their capital annually to a common safety fund, out of which losses from bank failures were to be covered. A board of three bank commissioners was created by the same bill, and quarterly examinations and annual reports provided for. In 1832 fifty-two banks were members of the safety fund, and twelve did not belong to it.

The financial crisis of 1837 was heavily felt in New York, where the banks suspended specie payments, and bills of many concerns passed at a discount. The chartered banks became the object of popular dissatisfaction, which expressed itself in a demand for a free banking system. As a result of this agitation a free banking law was passed in 1838, which, in order to secure the bank currency, compelled the investment of the bank capital in New York State bonds or equally good securities and their deposit with the State. This was the plan afterwards adopted by the Federal Government in the national banking system. For some time both systems of banking worked side by side, notwithstanding a great deal of friction. For twelve years (1829-41) this safety fund was not drawn upon, as no chartered bank failed during that time. But the failure of six banks in 1841 so exhausted the fund that a law was passed in 1842 limiting the guarantee to circulation only, and not to all the liabilities of the failing banks. As the charters of the chartered safety fund banks expired, most of them reorganized under the free banking law. This was amended in 1840 by limiting the deposits to New York State bonds, as many of the other securities deposited had proved worthless. In the many bank failures during the crisis of 1841, this system of deposits proved its value, preventing serious losses on circulation.

In the severe financial crisis of 1857 this system was again put to a severe test, but notwithstanding a general suspension of specie payment for some time, the banks remained firm. At the time of the introduction of the national banking system the New York banking was not only the greatest, but also the most secure in the country. The new system was therefore not welcomed, and specially heavy taxes were imposed on the national banks. These taxes were, however, declared unconstitutional by the Federal courts. The State banks were forced to obtain national charters, and from 309 in 1863 the number of State banks was reduced to 45 in 1868. After that their number increased but slowly until 1880 (70), when a steady increase began. Since 1894 capital has preferred the new form of organization known as trust companies, which, while doing a general banking business, are yet different enough to have a more favorable system of taxation. Savings banks have existed in the State since 1819, and their number grew rapidly, especially after the Civil War, increasing from 71 in 1863 to 150 in 1873. Though since then their number has gradually diminished, the amount of deposits has increased immensely. See article on **Bank, Banking.**

The condition of the banks in New York State in 1902 is shown as follows:

	National banks	State banks	Private banks	Trust companies	Savings banks
Number	352	193	14	70	127
Capital	$126,058,000	$25,515,000	$223,000	$53,225,000	$.............
Surplus	80,643,000	17,326,000	73,000	70,887,000	115,540,000
Cash, etc.	199,777,000	75,396,000	191,000	10,481,000	9,339,000
Deposits	785,921,000	253,412,000	2,611,000	881,001,000	1,051,689,000
Loans	772,391,000	218,836,000	1,798,000	701,284,000	464,997,000

The system of clearing houses originated in New York City. The total exchanges for the first year (1854) were more than five and a half billions, and in 1900 more than sixty billion dollars. Consolidation has latterly become a prominent feature of the banking business of New York, about thirty small banks having been bought out.

by larger institutions, and in many instances becoming local branches of the same. The largest financial transactions all over the country mostly emanate from New York, and, besides, New York City remains the main channel for all financial transactions between the Old and New Worlds. The New York clearing house is therefore the clearing house for the whole nation. The New York money market regulates the country's money markets, and is beginning to assert a dominant influence upon the European world. Many foreign loans have been floated in New York during the last few years, and many foreign securities listed on the New York exchange. The greatest industrial and railroad consolidations between 1890 and 1900, though chartered in New Jersey and Delaware, and uniting property located in various parts of the Union, are nevertheless all creatures of 'Wall Street'—as the New York financial world has come to be known.

FINANCE. At the close of the Revolutionary War the State, by the sale of public lands, formed a general fund, the revenues of which were to defray the expenses of government, and for some time this was actually accomplished. Another fund was established for school purposes. In 1814 the State even paid out of this fund the direct tax levied by the National Government. A State tax became necessary after that, but was discontinued in 1826. In 1817 the State entered upon the system of public improvements, mainly canal construction, and a public debt of more than $7,000,000 was created for that purpose. At the same time a sinking fund was organized, and the tolls of the canals, as well as the salt duties, were assigned to it so as to prevent financial difficulties. After the construction of the main Erie Canal, other lateral canals were undertaken, which increased the public debt. In 1827 the State entered upon a new policy of lending its credit to private companies for public improvements, and $5,228,700 was loaned to ten companies, chiefly railroads. Some of them failed, the most important one being the Erie Railroad (in 1842). Their indebtedness ($3,665,000) became a burden upon the State fund. The total debt then amounted to more than $20,000,000, and the State was threatened with insolvency. A new course was therefore adopted in 1842. All expenditures upon public works were stopped, outstanding debts funded, and a tax imposed to meet the expenses of government and the payment of interest. The new Constitution of 1846 provided for a special canal sinking fund and a general sinking fund, and prohibited the creation of a new indebtedness except for war purposes, and even then only after popular sanction by a referendum. This last provision has been preserved in the present Constitution. Under these strict regulations the bounty State debt of $30,000,000 was created in 1865 to meet the expenses of the Civil War, and at that time the State debt reached its maximum of $53,000,000. After that the debt was rapidly reduced by means of the sinking fund. In 1870 it was only $32,400,000; in 1880, $8,988,000. The year 1893 saw the total extinction of the debt.

But a public debt was again created toward the year 1900 for purposes of canal improvement. After 1842 the main source of the State income was a direct tax upon all assessable property. Between 1890 and 1900 other sources, such as licenses, fees from foreign corporations, etc., became more important, and at the end of the nineteenth century several energetic efforts were made to separate the sources of State and local taxation. New taxes were laid upon banks, trust companies, public franchises of corporations. Further efforts in the same direction were made in 1902. On January 1, 1903, the debt of the State amounted to $10,000,000. The aggregate receipts of the ten funds for which separate accounts are kept were $27,049,558, or, subtracting transfers from one fund to the other, $24,042,462. The main sources of income were a State tax for general and for school purposes, 29 per cent.; inheritance tax, 14 per cent.; excise tax, 17½ per cent.; and corporation tax, 25½ per cent. The expenditures were $26,609,055, or, excluding transfers, $23,601,959, leaving a surplus of $440,503. Balance in treasury (1903), $6,992,599.

GOVERNMENT AND ADMINISTRATION. The last revision of the Constitution took place in 1894, and on being approved by the vote of the people of the State went into force on January 1, 1895. It provides for a census in 1905 and every tenth year thereafter. It permits of amendments if passed in two consecutive Legislatures by a majority of each House, and adopted by a vote of the people. It provides for the submission to the people of the question of a constitutional convention every twenty years, or oftener if ordered by the Legislature. A voter in New York must have been a citizen of the United States ninety days, a resident of the State one year, of the county four months, and of the town or precinct thirty days. The registration of voters is required, but such registration cannot be required for town and village elections except by express provision of law. The holding of party primaries in the cities is regulated by statute. The Legislature consists of a Senate of 50 members, chosen for two years, and an Assembly of 150 members, chosen annually. Of the latter, sixty are elected in New York City. The Assembly districts are single-member districts. Each county, except Fulton and Herkimer, has at least one representative. The more populous counties are formed into Assembly districts, but county lines are not crossed. The members of either House receive a salary of $1500 and mileage. The capital of the State is Albany.

EXECUTIVE. The Governor is elected for two years. He has the right to veto legislative measures, including items in appropriation bills, but his veto may be over-ridden by two-thirds of the members of each branch of the Legislature. He has the power to pardon; he may remove certain State and local officers; and with the consent of the Senate he makes appointments to a number of positions. With the Governor there are elected for the same term a Lieutenant-Governor (who is president of the Senate), a Secretary of State, a Comptroller, a Treasurer, an Attorney-General, and a State Engineer and Surveyor. The most important appointive officers are the superintendent of public works (who has charge of the State canals), and in addition the superintendents of banking, of insurance, and of State prisons; also a commissioner of labor statistics, a factory inspector, an excise commissioner, and a commissioner of agriculture. There are boards or commissions, also appointed, for charities, health, lunacy, railroads, tax equalization, quarantine, forestry, etc.

JUDICIAL. The highest court in the State is the Court of Appeals, composed of a Chief Justice and six associate justices, elected singly for terms of fourteen years. The Supreme Court is composed of seventy-six judges, each elected for fourteen years. They act in eight judicial districts. There are also county courts, surrogates' courts, and city courts.

LOCAL GOVERNMENT. The Legislature provides for the organization of cities and incorporated villages, and restricts their power of taxation assessment, borrowing money, contracting debts, etc., "so as to prevent abuses. . . ." It divides all cities into three classes, according to size, and provides that all special legislation shall be submitted for the approval of the cities concerned, although they may be passed later over the city's veto. In the counties, the board of supervisors, elected by towns and wards of cities, have control of public buildings and the care of the poor, and they audit the accounts of county officers. The cities are governed under special charters, varying in their provisions.

Since 1848 married women have had separate rights to real and personal property in New York State. They may carry on business, and may sue or be sued on their own account. A husband may convey directly to his wife, and a wife to her husband. Absolute divorce is granted only for adultery. Women may practice law. No youth under eighteen and no woman under twenty-one may be employed in a factory for more than 60 hours in one week, nor may any child under thirteen be so employed at all.

MILITIA. In 1900 there were 1,639,395 men of militia age. The militia in 1901 numbered 14,410.

POPULATION. The population of the State by decades has been as follows: 1790, 340,120; 1800, 589,051; 1810, 959,049; 1820, 1,372,111; 1830, 1,918,608; 1840, 2,428,921; 1850, 3,097,394; 1860, 3,880,735; 1870, 4,382,759; 1880, 5,082,871; 1890, 5,997,853; 1900, 7,268,012. From fifth rank in 1790 the State advanced to first place in 1820, and has ever since held this position. The largest absolute increase and the largest per cent. of increase after 1860 were witnessed from 1890 to 1900. In that decade the rate of increase was slightly greater than that for the United States, being 21.2 per cent., as against 20.7 per cent. The growth during that time, however, was wholly on the part of the urban population. In 1900 the 83 cities of the State with a population of over 4000 each contained together 71.2 per cent. of the total population, only two other States having a higher per cent. of urban population. The large urban population accounts for the high average density per mile—152.6. This figure is exceeded in only three States.

The location of New York City, as the gateway to the large foreign immigration to the United States, has resulted in giving the metropolis an unusually large foreign element. In 1900 the foreign-born in the State numbered 1,900,425—nearly twice as many as in any other State. The striking characteristic of the foreign element in New York as compared with the country in general is the prominence of the Irish, Jews, and Italians. The State contains nearly four times as many Irish as any other State except Massachusetts; nearly three times as many Italians; and nearly as many Jews as all the rest of the country combined. Of the native white population, those born of foreign parents numbered 2,415,845 in 1900. There were 99,232 negroes, 7170 Chinese, and 5257 Indians. The female sex slightly outnumbers the male.

CITIES. The population of the 12 largest cities in 1900 was: New York, 3,437,202; Buffalo, 352,387; Rochester, 162,608; Syracuse, 108,374; Albany, 94,151; Troy, 60,651; Utica, 56,383; Yonkers, 47,931; Binghamton, 39,647; Schenectady, 31,682; Auburn, 30,345. The State sends 37 members to the National House of Representatives.

RELIGION. The large immigration into New York has resulted in a very rapid increase of the Catholic and the Jewish populations. Particularly in New York City have these two elements become prominent. Among the Protestant denominations the Methodists are the most numerous, followed by the Presbyterians, Baptists, Protestant Episcopalians, Lutherans, and Congregationalists. Protestantism in New York City is characterized by the prominence of the Protestant Episcopal Church, this Church being much stronger there than elsewhere in the Union.

EDUCATION. Several school teachers were brought to New Netherland by the Dutch West India Company, but under the English rule popular education was neglected by the Government. In the eighteenth century several private academies were established, and in 1754 King's College was founded, and was reorganized in 1784 as Columbia College. At the latter date the Regents of the University were constituted a supervisory authority over higher education. The first step toward public common schools was taken in 1789, when two lots of land were assigned to each township for gospel and school purposes. But it was not until 1812 that an active movement set in to establish a State system. In 1854 a State Department of Public Instruction was organized, and soon afterwards the plan of free common schools was adopted, and State taxes for schools were very largely increased. The various schools are under the immediate direction of district trustees, and of boards of education in the towns and cities. The State superintendent exercises a general supervision over the common schools. The Regents of the University, a board of nineteen members elected for life, with four State officers *ex-officio*, continue to supervise secondary education. This board incorporates all higher institutions, distributes the State grants to academies and high schools, and for this purpose conducts a system of secondary school examinations and certificates which embraces this phase of public education throughout the State.

School attendance is compulsory between the ages of eight and sixteen years. The illiterate population of the State is 5.5 per cent. of the total population of ten years of age and over. The proportion of illiterates is 1.2 per cent. for native white, 14 per cent. for foreign white (12.5 in 1880), and 12.8 per cent. for colored. According to the school census of 1901 the school age (five to eighteen) population of the State was 1,620,287, of whom 1,242,416 were enrolled in the public schools in the same year. The average attendance in 1901 was 873,157, as against 642,984 in 1890. There were 35,591 teachers employed in the public schools of the State in 1901, of whom

5147 were males. The percentage of male teachers has shown a constant decrease since 1880, when it amounted to 26 per cent. The total school revenue was $38,469,277 in 1901, of which $26,451,363 was derived from local taxes, $3,500,000 from State taxes, $272,477 from the permanent school fund, and $8,245,437 from other sources. The expenditure per pupil of average attendance in 1901 was $41.68—the highest expenditure of any State in the Union. Normal education is provided by 16 public normal schools which had 5426 students in 1901. The State maintained in 1901 383 high schools, with 63,549 students. There were besides 199 private high schools and academies, with an attendance of about 11,000.

The most important as well as the oldest university is Columbia, in New York City. There is no State university, but Cornell University, in Ithaca, awards certain State scholarships on examinations. The other important institutions are Union College, in Schenectady; New York University, New York City; Hamilton College, Clinton; universities at Syracuse, Rochester, and Buffalo; Colgate University, Hamilton; Hobart College, Geneva; the Catholic colleges of Manhattan, Saint Francis Xavier, and Saint John's, all in New York City; and the College of the City of New York. Vassar College, at Poughkeepsie, and Barnard College, now part of Columbia University, are two of the leading women's colleges in the country. Among the fifteen theological seminaries the most noted is the Union, in New York City. There are seven law schools, twelve medical schools, three dental, and four schools of pharmacy. In each of these professions there are systems of State examinations required of all who wish to practice in New York. The New York Society Library, founded in 1700, claims to be the first in the State. In 1838 the Legislature set aside part of the income from the United States deposit fund for the establishment of a district library system, and this State aid is now distributed by the Regents of the University.

Charitable and Penal Institutions. The State boards of charities, lunacy, and corrections are each appointed by the Governor and Senate. The board of charities exercises an advisory supervision over the State and local charitable institutions and private institutions to which public charges are committed. It visits and inspects over 500 institutions, containing more than 60,000 inmates. A law of 1902 provides for the appointment by the Governor and Senate of a fiscal supervisor of State charities; and another law of the same year provides that the Governor, the president of the State Board of Charities, and the State Comptroller act as a commission to approve plans, specifications, and contracts for the construction of State institutions. These include an industrial school at Rochester, an asylum for feeble-minded children at Syracuse, one for feeble-minded women at Newark, a custodial asylum at Rome, an asylum for orphan Indian children at Iroquois, houses of refuge at Hudson and Albion, reformatory for women at Bedford, Craig colony for epileptics at Sonyea, women's relief corps home at Oxford, soldiers' and sailors' home at Bath, school for the blind at Batavia, hospital for crippled and deformed children at Tarrytown, and a hospital for the treatment of incipient pulmonary tuberculosis at Raybrook. There are a number of private institutions which receive State appropriations. A total of 15,780 persons were supported in the county almshouses during the year ending October 1, 1900, and also over 70,000 were supported at the city and town almshouses. In addition more than 209,000 persons received temporary relief during that period. The various institutions under the supervision of the board expended $16,107,000 during the year ending September 30, 1900.

The board of lunacy has supervision over the State insane hospitals. These are located at Utica, Poughkeepsie, Middletown, Buffalo, Willard, Binghamton, Ogdensburg, Rochester, Wards Island, Kings Park, L. I., Flatbush, L. I., Gowanda, Matteawan, and Dannemora. In 1900 their inmates numbered 23,267. There are also 20 institutions and private houses authorized to receive the insane. These had in the same year 934 patients. The maintenance of the State insane hospitals for the year ending September 30, 1900, cost $3,594,873, or $164.79 per patient. The State penitentiaries are county institutions, of which there are six, located respectively in the counties of New York, Kings, Erie, Albany, Monroe, and Clinton. These receive short-term convicts committed for minor offenses. Counties not having penitentiaries of their own send this class of convicts by contract to the penitentiary of some other county. Convicts sentenced for terms exceeding one year are sent to the State prisons at Ossining (Sing Sing), Auburn, and Clinton, or to the reformatories at Elmira and Napanock, and to the one for women at Bedford. There are also houses of refuge for women at Hudson and Albion. The total prison population in 1902, including that of county jails, the New York City prisons, and workhouses, was 96,932, as against 149,677 in 1898. The more frequent application of the law of suspended sentence and the abolition of the fee system in the various counties are thought to have been largely responsible for this decrease. The Elmira Reformatory has acquired a widespread reputation because of its system of instruction and trainng. The prisoners committed to it have the advantage of an indeterminate sentence and a parole law. In New York, since 1888, death by electricity has been substituted for hanging as the penalty for murder.

HISTORY.

New York Bay was discovered by Verrazano in 1524, but though Portuguese, French, and Spanish navigators, in all probability, visited the harbor during the sixteenth century, no important explorations were made before 1609, when almost simultaneously Samuel de Champlain, the founder of Quebec, in August, and Henry Hudson, sailing in the *Half Moon* under the Dutch flag, in September, entered the limits of the present State. Champlain's action in lending the Huron Indians aid against the Iroquois imbued the Five Nations with an implacable hatred for the French, and to a great extent determined in advance the fate of their colonizing schemes in America. Hudson's account of New Netherland, as he named the region, and of the great river, called at first Mauritius and then North, and finally Hudson, which he had ascended to the highest navigable point, led Dutch merchants, eager for furs, to dispatch trading vessels to the new country in 1610 and subsequent years. Just below Albany, Captain Christiænsen built Fort Nassau in 1613 (abandoned in 1617), and about the same time a number of traders built their posts on Manhattan Island. A trading company, organized in 1615, concluded two years later at Tawasantha, near Albany, a treaty with the Iroquois, who remained to the last friends of the Dutch. With the founding of the West India Company in 1621 a fairly active immigration began. A number of Walloons brought over by Captain May in 1623 were settled on Manhattan Island, on Long Island, and up the Hudson at Fort Orange (later Albany), founded in 1622. In 1626 Peter Minuit was made director-general of the company, and bought Manhattan Island from the Indians. (See NEW YORK CITY, section on *History.*) The greater part of the population of New Netherland, 200 in number in 1625, were agents of the company, whose object in the main was trade and not colonization; and as it guarded its monopoly jealously and offered few inducements to permanent settlers, progress for a few years was slow. Quickly, however, individual directors discovered the advantageous facility with which the Indians might be brought to part with their lands, and in 1629 the patroon system, a system of feudal tenure on an extensive scale, was established. Kilian Van Rensselaer purchased a large tract of land in the neighborhood of Albany, and Michael Pauw bought Staten Island and Pavonia. Ships from Holland stocked these great estates with colonists, tools, and animals. The acquisition of land continued under Wouter Van Twiller (q.v.), who came over in 1633, and under Kieft (q.v.), who succeeded Van Twiller in 1638. The abandonment of the company's trade monopoly was followed by a large influx of colonists, among whom were many English Puritans and French Huguenots. The population was cosmopolitan even in 1643, when, according to Father Jogues, 400 or 500 inhabitants spoke eighteen different languages and were divided into Calvinists, Lutherans, Catholics, Puritans, Baptists, and other more minute denominations. Wars with the Algonquin Indians, caused by the greed of Kieft, brought the colony near to destruction. The settlements around New Amsterdam were wiped out and the town itself was threatened. In the moment of highest danger Kieft was forced by popular demand to appoint a council of eight to assist him in carrying on the war. This was the beginning of representative government in New York. Peter Stuyvesant (1647-64) appointed a council of nine to advise him and acted in systematic opposition to it. Sincerely solicitous for the welfare of the colony, he reserved it for himself to determine in what that welfare consisted and how it was to be attained. Defying alike the popular will and the orders of the States-General in Holland, he ruled, arrested, confiscated, silenced public speech, and dictated the outline for the Sunday sermon. New Amsterdam received a burgher government in 1653, but Stuyvesant had the appointment of the magistrates. He upheld bravely the rights of the company against the Swedes on the Delaware, whom he dispossessed, and the English in Connecticut and Long Island, but the citizens grew weary of him and yielded in 1664 to an English fleet under Colonel Nicolls, which had come to enforce the Duke of York's title to the region. New Netherland became New York, and was ruled by the Duke's Governors (a Legislature was refused), and the 'Duke's laws.' Taken by the Dutch in 1673, it was returned to England in the following year. At the time of the English occupation New Netherland had a population of about 8000, comprising many nationalities, with the Dutch predominant. Life in the colony had not that deep spiritual tinge which it bore in New England, but it was more gracious and more free. The churches were well supported, and the school system was excellent, but breweries and drinking-shops found their place in the order of things. In religion a broad toleration, in social life a hearty gayety and timely hospitality marked this cosmopolitan colony of well-fed traders and farmers.

The Dutch did not take kindly to the English rule in the beginning. The desire of the people for some share in the government remained unsatisfied. Complaints against the arbitrary imposition of taxes and customs culminated in a demand, expressed in the form of petitions, for a popular assembly, and this was finally granted in 1683, when a provincial assembly summoned by Governor Dongan passed the Charter of Liberties, granting freedom of religion to all Christians, and the suffrage to all freeholders. An important treaty with the Iroquois in 1684 confirmed the alliance between them and the English and made them definitely the enemies of the French, who retaliated with punitive expeditions into the country, in 1687 under Denonville, and later, repeatedly, under Frontenac. In 1686 New York and Albany obtained new charters, but in the following year the provincial assembly was dissolved, absolute rule was restored, and New York became a part of the Dominion of New England, under Governor Andros. The Revolution of 1688 in England found two parties in the colony, the richer classes who were loyal to James II., the popular majority in favor of William of Orange. Exaggerated reports of Catholic intrigues caused Jacob Leisler (q.v.) to seize the fort at New Amsterdam in the name of William and Mary. A committee of safety made him commander-in-chief, and the popular assembly in 1689 gave him autocratic power. He held the fort against a force of troops from England, but willingly laid down his authority when Governor Sloughter, the King's appointee, arrived. The clergy and the wealthy merchants hated Leisler as the champion of popular ideas, and brought about his death on a charge of treason in 1691.

The period from 1690 to the Revolution was marked by almost continuous disputes between the Governor and the Assembly on the questions of the Governor's salary, the collection and the disposal of the revenue, the control of the courts, and the establishment of an endowed Church. Of the Governors the larger number were impecunious peers sent to America to grow fat as best they might. They bargained with the Assembly for an increase in salary, participated in gigantic land frauds in common with minor officials and prominent citizens, and in one instance, the notable case of Governor Fletcher (1692-98), shared in the profits of piracy. There were, however, Governors of a far higher character, men like Bellomont (1698-1701), to whom the rehabilitation of Leisler's memory is due, Robert Hunter (1710-19), or William Burnet (1720-28), who was an ardent champion of the royal power, but nevertheless an honest man, and zealous for the welfare of the province. But in spite of political turmoil the growth of the colony was rapid and uninterrupted. In 1720 the population consisted of 31,000 whites and 4000 negroes; in 1756 it comprised 83,000 whites and 13,000 negroes, and in 1771 168,000 whites and negroes. The first newspaper, the *Gazette*, a Government organ, was published in 1725, and the second, the *Weekly Journal*, an opposition sheet, appeared in 1733. For his criticism of the Governor's conduct the editor of the *Weekly Journal*, John Peter Zenger (q.v.), was brought to trial for libel in 1734, but, supported by the people and the Assembly, he won his case and vindicated the freedom of the press in New York. In 1746 the Assembly appropriated £250 toward the foundation of King's College. The people who fought for the freedom of the press and established King's College were the same who in 1741, thrown into a paroxysm of fear by the baseless rumors of a negro insurrection, murdered 31 negroes and drove out 71 others by due process of the law. In the early French and Indian wars New York suffered heavily, for, owing to the factious disputes between the Governor and the Assembly, the border was left without any troops and the frontier settlements were swept clean by the French and their Indian allies. In 1690 Schenectady was destroyed. Sir William Johnson kept the Iroquois friendly to the English, and the alliance with them was strengthened at the Albany Convention of 1754 (q.v.). By the Treaty of Fort Stanwix in 1768 a definite line of delimitation between the English and the Indian territory was traced.

As early as 1762 petitions and remonstrances against the oppressive commercial laws had been submitted to Parliament and the King. In 1764 the Assembly appointed a committee to correspond with the other provinces concerning the common cause, and in October, 1765, a colonial Congress assembled at New York. The imposition of the stamp duty was followed by the outbreak of disorder, in which the Sons of Liberty (q.v.) were prominent, and non-importation agreements were entered into by the people. Though the commercial interests of the colony suffered greatly, the Assembly refused to vote supplies for the troops, and on January 18, 1770, the Sons of Liberty and the British soldiers fought the battle of Golden Hill on John Street in the city of New York. There was peace till 1773, when the arrival of tea ships aroused the Sons of Liberty to renewed activity. By 1775 the Provincial Assembly had become devotedly Tory, and unrepresentative of popular opinion. Its last session occurred on April 3d. On April 20th a Provincial Congress, comprising representatives of seven counties outside of New York City, met at New York, and elected delegates to the Continental Congress. Upon the news of the battle of Lexington a committee of 100, in which the more conservative element among the revolutionists predominated, took possession of the Government and issued a call for a provincial convention, which assembled July 10, 1776, at White Plains, and subsequently removed to Kingston, where it adjourned April 20, 1777, after drawing up a constitution for the State of New York. For military events during the War of the Revolution, see UNITED STATES.

The Articles of Confederation were ratified in 1778. Two years later New York ceded its public lands in the West to Congress, and in 1786 it terminated its dispute with Massachusetts by granting it the right of preëmption to about 6,000,000 acres of land in the western part of the State. Of this vast tract more than 3,500,000 acres came by purchase into the possession of Robert Morris (q.v.), who disposed of a large area, embracing a considerable part of that section of the State, to a number of citizens of Amsterdam, who in 1798 were authorized by the Legislature to hold land within the State. This tract came to be popularly known as the Holland Purchase. Land speculation was entered into on an extensive scale, and the region filled up rapidly with immigrants from New England. The dispute regarding the possession of Vermont, to which New York laid claim, was settled by the erection of an independent State, Vermont being admitted into the Union in 1791. The fear of too strong a central government and the desire to retain possession of its rich custom-house made New York ill-inclined toward the newly framed Federal Constitution. Two of its three delegates withdrew from the Federal convention, and only after ten States had adopted the Constitution did a State convention ratify it, by 30 votes to 27 (July 26, 1788). From the very outset party lines were sharply drawn in the State. The Federalists were led by Alexander Hamilton, John Jay, and General Schuyler. Among the leaders of the various factions of the Republicans were the two Clintons—George, and after him De Witt—the Livingstons, and Aaron Burr. Federalist from 1795 to 1800, the State became Republican after that year, and passed under the domination of De Witt Clinton, who remained in power till 1822 except for a brief period of eclipse between 1815 and 1817. Politics during this period were venal, and personal ambitions determined the attitude of factions. The followers of the ascendent faction were rewarded with the grant of bank charters and valuable franchises, and, favored by the provisions of the Constitution, which gave the power of appointment to office and removal to a council of appointment (in 1821 there were 15,000 offices, military and civil, at its disposal), the spoils system was developed to perfection and was introduced later by Van Buren into national politics. To De Witt Clinton is due the rise of the canal system which brought such prosperity to the State. The project of an Erie Canal had been discussed by Gouverneur Morris in 1777; it was revived by Clinton in 1810, and work on the Erie Canal was begun in 1817 and terminated in 1825. The success of the undertaking brought about Clinton's election to the Governorship in 1824 and 1826, though his political following had really been shattered.

Clinton was succeeded in power by the Albany Regency (q.v.), a group of men headed by Martin Van Buren, Silas Wright, William L. Marcy, and John A. Dix, who made machine politics an exact science. Personal rivalries and short-lived popular movements determined the general course of events. From 1836 to 1842 the anti-Masonic agitation (see ANTI-MASONS), assiduously fanned into life by Thurlow Weed, was powerful enough to decide the outcome of State elections. The anti-rent troubles originating in the grievances of the farmers against their landlords—the successors of the patroons and the great land companies—lasted from 1836 to 1846, when feudal tenure was abolished by the new

Constitution. (See ANTI-RENTISM.) The attitude of the Democrats toward such questions as anti-Masonry, State and national banks, and the canal system, was not uniform. Dissensions between the Conservatives (see HUNKERS) and the Radicals (see BARNBURNERS) enabled the Whigs to carry the State in 1838. After 1840, when the Liberty Party arose, the anti-slavery feeling was strong in the agricultural parts of the State, and in 1848 the Barnburner Democrats, led by Van Buren, broke away to aid in forming the Free-Soil Party. The Whigs and Know-Nothings gained and lost power in swift succession before the Civil War broke out. The mercantile and manufacturing classes in 1860 advocated peace at any price, but the mass of the people were Unionist. The reaction following upon the disasters of the first year and a half of the war put the Democrats into power. In July, 1863, occurred the draft riots in New York City. (See DRAFT RIOTS IN NEW YORK.) The war measures of President Lincoln were denounced violently by the State authorities, and the election of 1864 was bitterly fought, the outcome being decided in favor of the Republicans by the votes of the men at the front.

The economic development of New York has continued uninterrupted after the war, and has fully justified its title of the 'Empire State.' Its history, however, has been characterized by much of that corruption which has marked the post-bellum politics of many States. The period in general presents a dead level of partisan rule relieved by occasional spasmodic upheavals of civic virtue. The gubernatorial power, nevertheless, has been repeatedly in the hands of able men, several of whom attained national eminence. From 1863 to 1871 New York City was ruled by the notorious William M. Tweed (q.v.). In 1875, and again in 1899, frauds in connection with the management of the State canals, involving high officials and others, together known as the Canal Ring, were discovered. In the assignment of public contracts much dishonesty was displayed. The State Capitol at Albany and the county court house at New York are monuments of what patient industry may accomplish in the way of nursing a modest estimate into an enormous defalcation. Many attempts, however, were made to remedy political evils by legislation. Laws were passed to check lobbying, to insure honest party primaries, and to reform the civil service. The question of tax reform was an important subject of legislation after 1880, and brought the State into conflict with the powerful railway, gas, and insurance corporations upon the question whether their capital stock and the value of their franchises were subject to taxation or not. The rise of the Labor Party in 1886 was the cause of much important labor legislation. Laws limiting the hours of daily work and protecting women and children in factories and shops were passed in 1892 and subsequently. Much attention has been devoted to the preservation of the Adirondack forests. In 1867 the public schools of the State were made entirely free, and in 1875 primary education was made compulsory.

The Constitution of 1777 was revised in 1821; the councils of revision and appointment were abolished, and the Governor received the veto power. Many offices formerly filled by appointment were made elective, and, in general, the new Constitution represented a great advance toward democracy. This tendency was continued in the Constitution of 1846, which put an end to feudal tenure in lands, abolished the court of chancery, established a court of appeals, and made all judges of the higher courts elective. By amendments adopted in 1869 (when a new Constitution framed in 1867 was rejected by the people), 1874, and 1882, further reforms in the judiciary were carried out, negro voters were freed from the property qualification hitherto imposed upon them, penalties for bribery and corruption in office were established, and the canals were freed from toll. Of the thirty-four amendments submitted to the people by the Constitutional Convention of 1894, the most important among those adopted were concerned with the reform of the judiciary, the shortening of the Governor's term to two years, and the reapportionment of the legislative districts of the State.

New York is an uncertain State both in national and State elections, and the influence exerted by its large electoral vote on the outcome of Presidential contests has given it the well-earned name of the 'pivotal State.' Notable cases were the elections of 1844, 1848, and 1884. In the Presidential election of 1844 James K. Polk, the Democratic candidate, received 170 votes in the electoral college as against 105 votes cast for Henry Clay, the Whig candidate. The 36 electoral votes of New York, which Polk carried by a small plurality, were sufficient to decide the election. In 1848 the dissensions in the Democratic Party in the State enabled Taylor to secure the Presidency. In 1884 Cleveland, the Democratic candidate, carried the State by a plurality of 1149 and secured the Presidency. New York voted for the Republican candidates from 1796 to 1808. In 1812 it cast its vote for De Witt Clinton, who had been nominated by the section of the Republican Party opposed to the domination of the Congressional caucus, and had been indorsed by the Federalists. It voted for Monroe in 1816 and 1820, divided its vote among Adams, Crawford, Clay, and Jackson in 1824 (26 out of 36 for Adams), and between Adams and Jackson in 1828 (20 out of 36 for Adams). It was Democratic in 1832, 1836, 1844, and 1852, and Whig in 1840 and 1848. From 1856 to 1864 it was Republican, and then entered on a course of vacillation. It voted for Seymour (Democrat) in 1868, Grant (Republican) in 1872, Tilden (Democrat) in 1876, Garfield (Republican) in 1880, Cleveland (Democrat) in 1884, Harrison (Republican) in 1888, and Cleveland (Democrat) in 1892. The State went decidedly Republican on the money question in 1896 and 1900. The following is a list of the Governors of New York as a colony and a State:

DIRECTORS-GENERAL OF NEW NETHERLAND

Cornelis Jacobsen May	1624–25
William Verhulst	1625–26
Peter Minuit	1626–33
Wouter Van Twiller	1633–38
William Kieft	1638–47
Peter Stuyvesant	1647–64

ENGLISH COLONIAL GOVERNORS

Richard Nicolls	1664–68
Francis Lovelace	1668–73

DUTCH OCCUPATION

Anthony Colve	1673–74

ENGLISH COLONIAL GOVERNORS

Edmund Andros	1674–83
Thomas Dongan	1683–88
Francis Nicholson (Lieutenant-Governor under Governor-General Andros)	1688–89
(Jacob Leisler)	1689–91
Henry Sloughter	1691
Major Richard Ingoldsby (acting)	1691–92
Benjamin Fletcher	1692–98
Richard Coote, Earl of Bellomont	1698–1701
John Nanfan (acting)	1701–02
Edward Hyde, Lord Cornbury	1702–08
John, Lord Lovelace	1708–09
Richard Ingoldsby (acting)	1709–10
Gerardus Beekman (acting)	1710
Robert Hunter	1710–19
Peter Schuyler (acting)	1719–20
William Burnet	1720–28
John Montgomerie	1728–31
Rip van Dam (acting)	1731–32
William Cosby (acting)	1732–36
George Clarke	1736–43
George Clinton	1743–53
Danvers Osborne	1753
James de Lancey (acting)	1753–55
Charles Hardy	1755–57
James de Lancey (acting)	1757–60
Cadwallader Colden (acting)	1760–61
Robert Monckton	1761
Cadwallader Colden (acting)	1761–65
Henry Moore	1765–69
Cadwallader Colden (acting)	1769–70
John Murray, Lord Dunmore	1770–71
William Tryon	1771–77

STATE GOVERNORS

George Clinton		1777–95
John Jay		1795–1801
George Clinton	Democratic-Republican	1801–04
Morgan Lewis	" "	1804–07
Daniel D. Tompkins	" "	1807–16
John Tayler (acting)	" "	1816–17
De Witt Clinton	" "	1817–23
Joseph C. Yates	" "	1823–25
De Witt Clinton	" "	1825–28
Nathaniel Pitcher (acting)	" "	1828–29
Martin Van Buren	Democrat	1829
Enos T. Throop (acting)	"	1829–31
Enos T. Throop	"	1831–33
William L. Marcy	"	1833–39
William H. Seward	Whig	1839–43
William C. Bouck	Democrat	1843–45
Silas Wright	"	1845–47
John Young	Whig	1847–49
Hamilton Fish	"	1849–51
Washington Hunt	"	1851–53
Horatio Seymour	Democrat	1853–55
Myron H. Clark	Whig	1855–57
John A. King	Republican	1857–59
Edwin D. Morgan	"	1859–63
Horatio Seymour	Democrat	1863–65
Reuben E. Fenton	Republican	1865–69
John T. Hoffman	Democrat	1869–73
John A. Dix	Republican	1873–75
Samuel J. Tilden	Democrat	1875–77
Lucius Robinson	"	1877–79
Alonzo B. Cornell	Republican	1879–83
Grover Cleveland	Democrat	1883–84
David Bennett Hill (acting)	"	1884–86
David Bennett Hill	"	1886–92
Roswell P. Flower	"	1892–95
Levi P. Morton	Republican	1895–97
Frank S. Black	"	1897–99
Theodore Roosevelt	"	1899–1901
Benjamin B. Odell	"	1901—

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NEW YORK. The chief city of the State of New York, the commercial metropolis of the United States, the largest city of the Western Hemisphere, and after London the largest city in the world. It is situated at the mouth of the Hudson River, which enters the Atlantic Ocean through New York Bay, 205 miles in a direct line northeast of Washington, 715 miles east by south of Chicago, and 190 miles southwest of Boston; latitude of the City Hall, 40° 42′ N., longitude 74° W.

The climate, on the whole, is very healthful and enjoyable, but is subject to great extremes. As the continental climate extends to the Atlantic coast of North America, the temperatures of New York City depend, to an important extent, upon the meteorological conditions of the interior regions. The humidity due to the proximity of the sea tends to increase the discomfort both of oppressively hot and severely cold days. The average annual temperature is about 54° Fahr. The mean temperature of the three winter months is about 34°; spring, 52°; summer, 75°; autumn, 57°. July is almost invariably a little warmer than the other summer months. The temperature of the hottest day ranges from 90° to 99°, and the mercury sometimes falls to zero or even below. The annual precipitation is from 36 to 42 inches, the amount of snow being from 20 to 30 inches. Cyclonic storms from the West Indies occasionally bring very high winds, accompanied with a heavy fall of rain or snow.

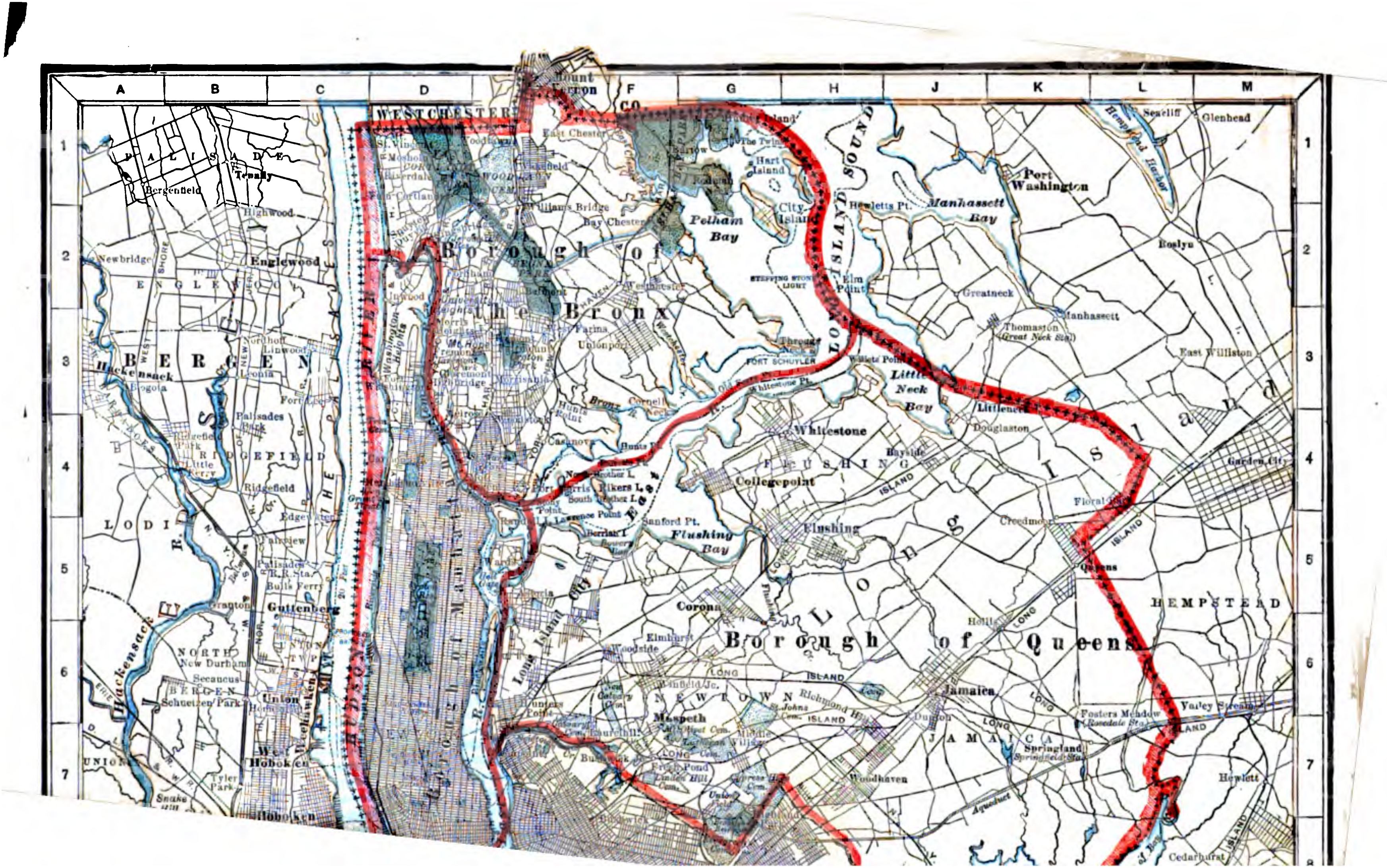
New York Harbor, one of the finest in the world, has an entrance about a mile wide, between Fort Hamilton, the southwest corner of the Borough of Brooklyn, and Fort Wadsworth, the point opposite on Staten Island. This entrance, known as the Narrows, leads into a fine bay bounded by New Jersey and Manhattan Island on the north, Long Island on the east, Staten Island on the southwest, and New Jersey on the west. It is about five miles wide and six miles long from north to south. The bronze statue, 'Liberty Enlightening the World,' by Bartholdi (see LIBERTY, STATUE OF), the largest statue of modern times, 151.41 feet in height, stands upon a pedestal 155 feet high on Bedloe's Island in the bay. The torch held aloft by the figure is lighted at night by electricity. Governor's Island, near the Battery, the southern point of Manhattan Island, containing 65 acres, is occupied by the United States Government for military purposes. Ellis Island, a mile and a half from the Battery, architecturally prominent, with a fine modern building, also belongs to the United States Government and is used as a landing place for immigrants. On Swinburne and Hoffman Islands, in the Lower Bay, are institutions of the Quarantine Station.

Previous to 1874 the city did not extend beyond Manhattan Island. At the beginning of that year parts of Westchester County were incorporated with it, and in 1895 more territory in Westchester County was annexed. In 1898 the city's boundaries were enlarged to include Kings County and part of Queens County, on Long Island, the whole of Richmond County (Staten Island), and part of the towns of East Chester and Pelham, south of Westchester County. The city, which embraces an area of 309 square miles, consists of five boroughs. These, in order of area, rank as follows: Queens (124 square miles), Brooklyn (66 square miles), Richmond (57 square miles), the Bronx (40 square miles), and Manhattan (22 square miles). The Borough of Manhattan consists of Manhattan Island (q.v.) and several small islands adjacent. The Borough of Brooklyn is coextensive with Kings County. (See BROOKLYN.) All that section of the city northeast of the Harlem River, with a number of islands, constitutes the Borough of the Bronx. It is nearly bisected by the Bronx River, and is mainly residential, its northern portion having a distinctly suburban character, though much of the southern part is closely built up. The Borough of Queens includes that portion of Long Island within the municipal limits, to the north and east of Brooklyn. It comprises Long Island City, Flushing, Jamaica, Newtown, and part of Hempstead. A number of the islands in Jamaica Bay belong to the Borough of Queens. Long Island City is noted for its great industrial establishments. The remainder of the borough consists of many pretty suburban villages and not a few tracts of farm land. The Borough of Richmond is coextensive with Richmond County, the whole of Staten Island. It is largely a district of residences, although it contains a great number of establishments. The seaside resorts in the boroughs of Brooklyn, Queens, and Richmond are frequented in summer by thousands. New York extends over a distance of more than 30 miles from the Yonkers line on the northeast to the southwest extremity of Staten Island.

WALL STREET ABOUT 1785.

Manhattan Island (q.v.), which contains the chief offices of the city, its greatest banks, business houses, museums, tenements, and palaces, lies between the Hudson, East, and Harlem rivers, and is 13½ miles long, with a greatest breadth of 2¼ miles at Fourteenth Street. The southern end of the island is laid out irregularly, the early settlers having built their houses wherever they saw fit, the streets being laid out afterwards. Above Canal Street there is greater regularity, while above Tenth Street the city is laid out, with a few exceptions, in blocks about 200 feet in length from north to south, and from about 400 to about 900 feet from east to west. The cross streets are 60 feet wide, as a rule, although there are a number 100 feet wide, placed at an average distance of half a mile apart, in order to facilitate heavy traffic. The avenues running north and south are generally 100 feet wide.

The great artery of New York is Broadway, which unfortunately is only 80 feet wide in the business section of the city, its width being nearly doubled in its northern half. On the east side of the city along the avenues D, C, B, A, First, Second, and Third, counting west from the East River, and in an adjoining area to the south, are the great tenement house districts. On the West Side, along the Hudson, and including the district between Seventh and Tenth Avenues, are manufacturing plants, lumber yards, gas houses, and also many cheap tenements. In the central part of the city, toward the southern end of the island, with Broadway as the main artery, are the largest banks and great commercial houses. Farther up is the retail shopping district, and above that are the homes of the well-to-do classes. Fifth Avenue, which but a few years ago was occupied solely by the homes of rich people, is becoming more and more a business thoroughfare as far as Fiftieth Street. Above Fiftieth Street, however, the character of the present structures—churches, fine club houses, and the spacious homes of the rich—will probably prevent great changes. In 1865, when Central Park was approaching completion, the districts on both sides of the park east and west were entirely unimproved. Along Fifth Avenue, from Sixtieth Street to One Hundredth Street, there were not a dozen houses, where to-day is a solidly built line of handsome dwellings. On the west side of the park the change has been still greater, but in addition to private dwellings there are hundreds of apartment houses. On Riverside Drive, the boulevard which skirts the Hudson River, there are both private residences and


A
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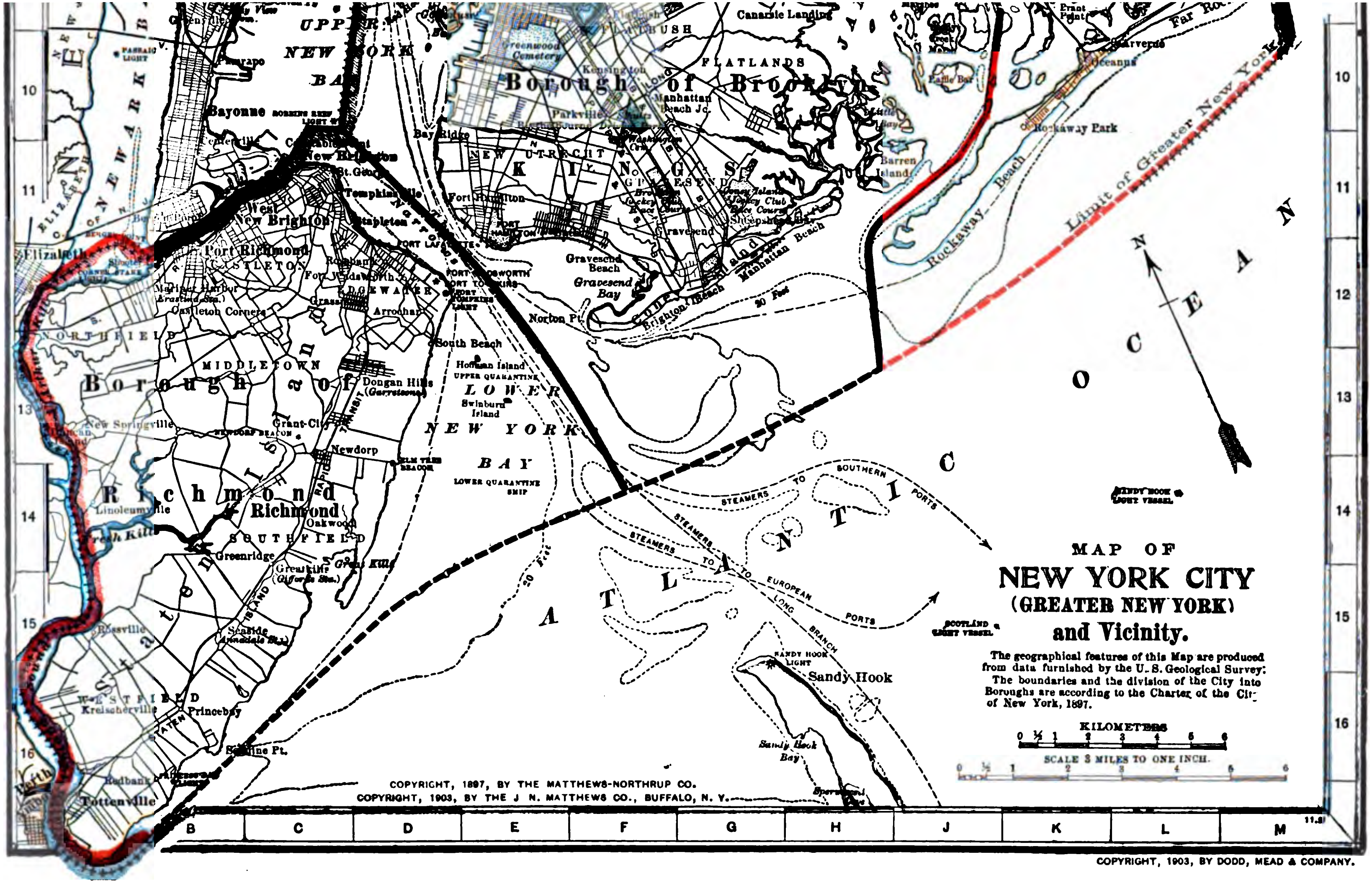
WESTCHESTER
Mount Vernon
East Chester
Williams Bridge
Bay Chester
Pelham Bay
Hart Island
City Island
Hewletts Pt.
Manhassett Bay
Port Washington
Hempstead Harbor
Seacliff
Glenhead
Roslyn
Greatneck
Manhassett
Thomaston (Great Neck Sta.)
East Williston
Garden City
LONG ISLAND SOUND
STEPPING STONE LIGHT
Elm Point
Throggs Neck
FORT SCHUYLER
Willets Point
Little Neck Bay
Littleneck
Douglaston
Borough of the Bronx
Fordham
Belmont
Westchester
Unionport
West Farms
Inwood
Washington Heights
Morrisania
Hunts Point
Cornell Neck
Casanova
Bronx R.
North Brother I.
Rikers I.
South Brother I.
Sanford Pt.
Flushing Bay
Berrian I.
Whitestone
Bayside
FLUSHING
Collegepoint
Flushing
Creedmoor
Floral Park
Queens
HEMPSTEAD
Long Island
Borough of Queens
Long Island City
Ward's I.
Corona
Elmhurst
Woodside
Winfield Jc.
NEWTOWN
Richmond Hill
Maspeth
Jamaica
Dunton
JAMAICA
Springland
Fosters Meadow (Rosedale Sta.)
Valley Stream
Woodhaven
Hewlett
Cedarhurst
Aqueduct
Borough of Manhattan
HUDSON RIVER
HARLEM R.
East R.
PALISADES
Bergenfield
Tenafly
Highwood
Englewood
Newbridge
ENGLEWOOD
BERGEN
Hackensack
Bogota
Leonia
Fort Lee
Palisades Park
RIDGEFIELD
Ridgefield
Little Ferry
Edgewater
Fairview
LODI
Palisades R.R. Sta.
Bulls Ferry
Granton
Guttenberg
NORTH BERGEN
New Durham
Secaucus
Schuetzen Park
Union
Weehawken
West Hoboken
Hoboken
Tyler Park
Snake Hill
UNION
Hackensack R.



MAP OF
NEW YORK CITY
(GREATER NEW YORK)
and Vicinity.

The geographical features of this Map are produced from data furnished by the U. S. Geological Survey: The boundaries and the division of the City into Boroughs are according to the Charter of the City of New York, 1897.

KILOMETERS
0 ½ 1 2 3 4 5 6

SCALE 3 MILES TO ONE INCH.
0 ½ 1 2 3 4 5 6

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apartment houses. Riverside Drive is one of the most beautiful avenues in the world. Uptown along the West Side there are miles of small, artistic private houses until the neighborhood of 110th Street is reached, where over large areas apartment houses are again the rule. The upper part of the island along the East Side is solidly built up with tenement houses. A rocky ridge, rising steeply from the Hudson, with an equally abrupt descent toward the east, extends through the upper part of Manhattan Island, rising finally into hills of nearly 250 feet elevation. These eminences, in part known as Washington Heights, offer charming sites for dwellings, and are in some places compactly built up, while extensive tracts are still covered with woods, presenting exquisite bits of scenery along the Hudson and Harlem rivers.

BROAD STREET IN 1796.

Blackwell's, Ward's, and Randall's islands, picturesquely situated in the East River, are used for city institutions for the care of the poor, sick, and disorderly. Contagious disease hospitals are maintained by the city on the small islands off Port Morris, in the Borough of the Bronx.

BUILDINGS. Viewed from the bay, the business part of the Borough of Manhattan presents a most extraordinary conglomeration of towering office buildings, varying from ten to twenty-five stories in height, huddled together in apparent confusion upon a strip of land less than a mile wide. Beginning at the Battery, the first building of importance is the Produce Exchange, a modern Renaissance structure of brick and terra cotta, with a fine tower 225 feet high. Opposite the Exchange, on Bowling Green, is the new Custom House, upon the site of the official residence built by the city for General Washington. From Bowling Green to Wall Street, Broadway is lined with immense business structures, each of them costing millions of dollars, occupied by the Standard Oil Company, the Manhattan Life Insurance Company, the Commercial Cable Company, the Union Trust Company, and other large corporations. The Consolidated Stock and Petroleum Exchange is at Broadway and Exchange Place. From Trinity Church, running east to the river, is Wall Street, a narrow thoroughfare so completely lined on both sides with buildings from twelve to twenty stories high, used by banks and financial institutions, as to resemble more a cañon than a street. Chief among the buildings here are the great banks, and the Sub-Treasury, a Doric building of granite, upon the site of the old City Hall, from the balcony of which Washington was inaugurated as first President of the United States. In Broad Street, which runs south from the Sub-Treasury, is the new Stock Exchange, costing $2,000,000. Opposite the Stock Exchange is the Mills Building, erected twenty years ago at a cost of $4,000,000. It was the first of the luxurious office buildings in the financial district. On the other side of Exchange Place is the Broad-Exchange, a twenty-story granite pile. Trinity Church, the most interesting of New York's churches, stands upon land granted by the English Government in 1697. The original plot embraced a tract of many acres running down to the Hudson River. The first church was completed in 1697, the present one in 1846. It is a Gothic structure of brown stone. In the churchyard are many monuments in memory of well-known persons. On Broadway, from Trinity Church to the City Hall, are some of the most imposing of the insurance buildings. That of the Equitable Life Assurance Society occupies a whole block. Here also is the building of the American Surety Company, with a cornice 307 feet above the pavement and a foundation extending 72 feet below the street. On the opposite side of Broadway is the main office of the Western Union Telegraph Company. In Cedar Street, a few doors from Broadway, is the Clearing House, maintained by the associated banks of New York. It is a beautiful structure of white marble. In Liberty Street is the palatial home of the Chamber of Commerce. At the junction of Broadway and Park Row stands the Post Office, a large and imposing composite structure, of Doric and Renaissance, upon a triangular plot. Opposite the Post Office is Saint Paul's Chapel, where Washington's pew is shown. Across the way is the old Astor House, a granite hotel which fifty years ago was considered the most luxurious establishment of its kind in the country. Above the Post Office is the City Hall, in City Hall Park. Near by are the entrance to the Brooklyn Bridge, the great buildings of the *World*, *Tribune*, and *Times* on the east, and the lofty structures of the Postal Telegraph Building and Home Insurance Company on the west. To the south is the Park Row Building, one of the tallest in the country, twenty-five stories high, not counting the towers. The City Hall is the most beautiful of New York's earlier buildings. It was begun in 1803 and finished in 1812 at a cost of $500,000. White marble was used for the front and sides, but brown stone for the back, as it was supposed that the city would not extend beyond it. Back of the City Hall is the

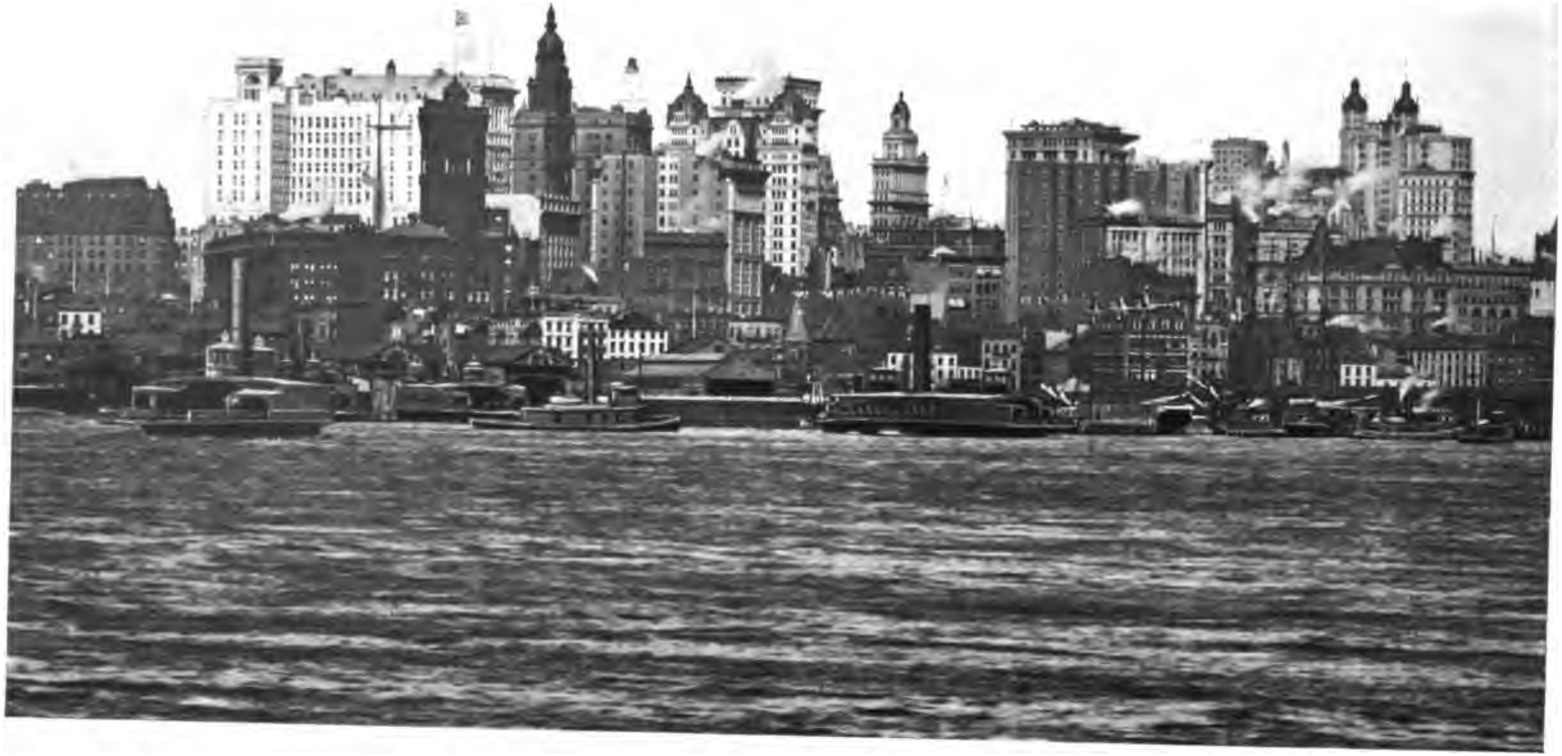
County Court House, a marble building in Corinthian style, and almost opposite, at the corner of Chambers and Centre Streets, is the new and palatial Hall of Records. The Criminal Courts Building, a superb structure on Centre Street, is connected with the Tombs Prison by a covered bridge. The Tombs, a nickname of the city prison, suggested by its orignal gloomy architecture in Egyptian style, rebuilt in 1898 and much enlarged, is now, architecturally, one of the finest of modern prisons.

Broadway, from Chambers Street to Tenth, is largely given up to wholesale trade, one of the most prominent features along the route, however, being the massive building of the New York Life Insurance Company. West of Broadway, below Canal Street, lies the great wholesale dry goods centre of the United States, and farther uptown are the wholesale dealers in straw goods, millinery, feathers, and ready-made clothing. Where Broadway changes its direction at Tenth Street, the character of business changes.

Here is Grace Church, one of the most attractive ecclesiastical edifices in New York. It is an ornate Gothic structure, built of white limestone. There are other buildings connected with the church, the whole forming a striking group. In this neighborhood are the Astor Library, long the most important library in the city, the Mercantile Library, and at Fourth Avenue and Eighth Street, Cooper Union (q.v.), a brownstone building erected in 1857. Union Square, once the limit of the retail business of the city, and until 1860 surrounded by private houses, is now wholly given up to business. At the lower end of Fifth Avenue, in Washington Square, stands the Washington Arch, erected by popular subscription at a cost of $128,000, and completed in 1892. It is 70 feet high. On the east side of Washington Square is the large building of New York University, housing the schools of Law and Pedagogy and the Graduate School, and various business establishments. It occupies the site of the celebrated Gothic collegiate structure pulled down in 1894-95. In the district north by east of Union Square lies Gramercy Park, and, at Second Avenue, Stuyvesant Square, on which stands Saint George's Church, with its lofty spires. At Eleventh Street and Second Avenue is the old home of the New York Historical Society, built in 1857. The new building of the society, at Seventy-sixth Street and Central Park West, will cost $1,000,000. The new Lying-In Hospital at Second Avenue and East Seventeenth Street is one of the handsomest structures of its class in the city. Bellevue Hospital, founded in 1826, occupies two blocks extending from Twenty-sixth to Twenty-eighth street on First Avenue to the East River; the City Morgue is situated in the grounds at the foot of Twenty-sixth Street. Broadway from Ninth Street to Thirty-fifth Street, Sixth Avenue, and Fourteenth and Twenty-third streets contain most of the great retail shops of the metropolis. When the *Herald* Building, copied after a Venetian palace, was built at Thirty-fifth Street and Broadway in 1894, there were but few large retail stores in the neighborhood. To-day the vicinity of Broadway and Thirty-fourth Street bids fair to become the centre of retail trade. One of the largest department stores in the country occupies the block on the west side of Broadway between Thirty-fourth and Thirty-fifth streets. Along the line of Broadway, from Twenty-third to Fifty-ninth street, are situated a number of important hotels, apartment houses, and the leading theatres of the city. At the angle of Broadway and Fifth Avenue, upon a triangle, 87 by 190 feet, stands a twenty-story wedge-shaped building known as the 'Flatiron,' visible for miles, and presenting a striking architectural contrast with the Madison Square Garden. The graceful tower of the latter, copied from the Giralda of Seville, is surmounted by a gilded statue of Diana. On the east side of Madison Square is the handsome office building of the Metropolitan Life Insurance Company. Another beautiful and imposing marble building is the Court House at Twenty-fifth Street and Madison Avenue, used by the Appellate Division of the Supreme Court.

Saint Patrick's Cathedral (Roman Catholic) on Fifth Avenue, between Fiftieth and Fifty-first streets, ranks among the most imposing Gothic edifices in this country. It is built of white marble in the form of a Latin cross, and its two beautiful spires rise to a height of 332 feet. It cost $2,000,000. The corner-stone was laid in 1858, and the church was dedicated on May 25, 1879. At Forty-second Street and Fourth Avenue is the Grand Central Station. Above Fifty-ninth Street, on Broadway, apartment hotels are the great feature of this thoroughfare. The first hotels of this character, in which the tenants furnish their own apartments, but take their meals in a common dining-room, appeared in 1888. To-day there are more than one hundred apartment hotels in Manhattan, each housing from 40 to 200 families, and many more are being built. One of the largest groups of apartment houses is that known as the Navarro, at Seventh Avenue and Fifty-ninth Street, built about sixteen years ago at a cost of $5,000,000. Another noted building of this type is the Dakota, at West Seventy-second Street, facing Central Park. One of the largest of the new apartment hotels is the Ansonia, at Seventy-fourth Street and Broadway, which covers a plot of land 200 × 400 feet, and is 16 stories high.

At 116th Street are the buildings of Columbia University, including a magnificent library, costing about $1,000,000. Near by are Saint Luke's Hospital and the beginnings of the great Protestant Episcopal Cathedral of Saint John the Divine. The building stands upon a rocky bluff overlooking the Harlem plains on the east. Various estimates of from thirty to fifty years as the time required to finish the building have been made, and the cost may be anywhere from ten to twenty million dollars. In vastness of dimensions and beauty of design it will take its place among the great cathedrals of the world. On Amsterdam Avenue, between 109th and 110th streets, the new building of the National Academy of Design is approaching completion, the well-known Venetian-Gothic building, formerly occupied by the Academy, at the corner of Twenty-third Street and Fourth Avenue, having been demolished in 1901. Facing Central Park on the west side of Seventy-seventh Street is the Museum of Natural History, one immense wing of which, the southern façade, is already complete. On the east side of the park, and within it, facing on Fifth Avenue at Eighty-second Street, is the Metropolitan Museum of Art. The Lenox Library occupies a massive limestone building fronting Cen-



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NEW YORK
VIEW OF THE SOUTHERN END OF MANHATTAN ISLAND

tral Park, between Seventieth and Seventy-first streets. Farther up Fifth Avenue at One Hundredth Street is the new Mount Sinai Hospital, one of the largest and most perfectly appointed in the country. At 123d Street and Riverside Drive is the tomb of General Grant, a mausoleum in classic style, covering an area about 100 feet square and rising 160 feet from the ground. It stands upon a bluff overlooking the Hudson. The cornerstone was laid in 1892 and the building was dedicated on April 27, 1897. The bodies of General Grant and his wife lie in twin granite sarcophagi in the crypt under the dome. Farther north, in the Borough of the Bronx, are the handsome library and other buildings of New York University.

Parks. The first proposal to make a public park for New York was about the beginning of the last century. In 1802 some citizens advocated the setting aside for this purpose of twenty acres around the Collect Pond, a sheet of water situated where the Tombs prison now stands, which was used in summer for boating and in winter for skating. The scheme was rejected, on the ground that the proposed park would be too far from the city. Washington Square, at the beginning of the century the Potter's Field, was redeemed about 1840, and a little later Union Square and Madison Square were cleared of squatters and laid out as parks. It was William Cullen Bryant who first proposed to make a large public park in the upper part of the city. In 1840 he suggested the appropriation of a strip of land known as the Goose Pasture at Sixtieth Street. His plan was to take a section running across the island from river to river. A strip of land was finally appropriated for a public park, but running north and south instead of east and west. Work was begun in 1857. Central Park is now one of the most beautiful pleasure-grounds in the world. It contains 840 acres. About 400 acres are wooded, this area including specimens of nearly every tree and shrub that can be made to grow here. There are nine miles of drives, with thirty miles of foot-paths and other roads; many bridges, archways, and tunnels; several lakes; a large reservoir a mile and a half in circuit; an imposing mall, lined with superb trees; and a large number of statues. Zoölogical and botanical gardens are also among its attractions. On fine days in summer from fifty to sixty thousand persons visit the park. Lawns are provided for free tennis courts, and there is a field for baseball and other games. One of the chief curiosities of Central Park is the Obelisk (see Cleopatra's Needles and Obelisk) presented to the city by the late Khedive of Egypt, Ismail Pasha, which was brought here in 1880.

In Central Park are an equestrian statue of Simon Bolivar, the gift of Venezuela; a bronze statue of Burns, presented by resident Scotchmen; a granite statue of Alexander Hamilton; a life-size bronze statue of Morse, erected in 1871 by the telegraphers of the country; a bronze statue of Sir Walter Scott by John Steele; a bronze statue of Shakespeare by J. Q. A. Ward, unveiled on May 23, 1872, commemorating the poet's birth over 300 years previous; a bronze statue called "The Pilgrim," by Ward, commemorating the landing of the Pilgrims in 1620; an heroic bronze statue of Daniel Webster, by Thomas Ball; and busts of Beethoven, Cervantes, Humboldt, Schiller, and Thomas Moore. At the entrance to the park at Fifty-ninth Street and Eighth Avenue stands a marble monument to Columbus, a shaft surmounted by a statue, unveiled in 1892. At the Sixth Avenue and Fifty-ninth Street entrance is a bronze statue of Thorwaldsen, erected in 1894 by the Danes of New York. On the Plaza at Fifth Avenue and Fifty-ninth Street is an imposing equestrian statue of General Sherman by Augustus Saint Gaudens. Opposite the Lenox Library, at Seventieth Street and Fifth Avenue, is a memorial to Richard M. Hunt, the architect, consisting of a semi-circular bench with a bronze bust of Hunt, by French, and ornamental figures. The most notable statues in other parts of the city are the bronze figure of Peter Cooper, south of the Cooper Union, by Saint Gaudens; the bronze statue of John Ericsson, by J. Scott Hartley, at the Battery; the statue of Farragut, by Saint Gaudens, in Madison Square Park; the bronze statue of Garibaldi, in Washington Square, by Turini, presented to the city by the Italian residents; the colossal bronze statue of Horace Greeley, in Greeley Square, by Alexander Doyle; the bronze statue of Lafayette, by Bartholdi, in Union Square, presented by French residents in 1876; the bronze statue of Abraham Lincoln, in Union Square, modeled by H. K. Browne, and erected by popular subscription in 1867; the equestrian statue of Washington, in Union Square, also by Browne; and the colossal bronze figure of Washington, by J. Q. A. Ward, at the entrance of the Sub-Treasury in Wall Street.

The most important park of the city after Central Park is Brooklyn's pleasure-ground, Prospect Park. (For description, see Brooklyn.) The third in interest is Bronx Park, which includes an area of 661 acres on both sides of the Bronx River. It has superb botanical and zoölogical gardens, opened to the public in 1899. Van Cortlandt Park, north of Kingsbridge, is even larger in extent (1132 acres), but is as yet largely undeveloped. The old Van Cortlandt mansion here, erected in 1784, now serves as an historical museum. There are golf links, grounds for baseball, tennis, and polo, and a lake frequented in winter by thousands of skaters. Pelham Bay Park, on the Sound, near Baychester, is the largest of the New York City parks, containing 1756 acres. It is diversified by lakes and islands, and has a shore line of nine miles. These three suburban parks, the Bronx, Van Cortlandt, and Pelham, are connected by a driveway, maintained by the Park Department. On Manhattan Island millions of dollars have been spent in reclaiming and beautifying the strip of land along the edge of the Hudson River from Seventy-second Street to 130th Street, known as Riverside Park, and since 1901 a handsome viaduct and driveway across Manhattan Valley connects the Park with the northern heights. Morningside Park, the bluff at Columbus Avenue, between 110th and 123d Streets, has also been laid out with excellent taste. The Harlem River Speedway, extending for two miles along the western bank of the river from 155th Street to 208th Street, was completed in 1898. Above Manhattan Island are Crotona and Claremont Parks, in the vicinity of Tremont, and Saint Mary's Park (28 acres) at 149th Street. There are many squares and small parks throughout the city. The playgrounds and recreation piers, of which there are several, should be mentioned in connection with this phase of municipal activity. The Park Department has also under its care a well-stocked aquarium (q.v.) in the old Castle Garden at the Battery.

CHURCHES. There are over 800 churches in Manhattan and the Bronx, ranging in seating capacity from 200 to 2,000. The Dutch Reformed Church (32 societies) has the oldest church organization in New York. The finest of its churches is the Third Collegiate, at Fifth Avenue and Forty-eighth Street, which owes its ample endowment to fortunate real estate investments. Other handsome buildings of this denomination are the Bloomingdale Church, at Broadway and Sixty-eighth Street, and the Marble Church, at Fifth Avenue and Twenty-ninth Street. Next in antiquity is the Protestant Episcopal Church (94 parishes). Something has already been said of the parent church, Trinity, of the new cathedral of Saint John the Divine, and of Grace Church. This denomination possesses a number of notable buildings, several of which are chapels of Trinity, built and supported out of its endowment. Saint George's, the Transfiguration (in Twenty-ninth Street near Madison Avenue), Saint Thomas's, and Saint Bartholomew's are all fine examples of ecclesiastical architecture. The most noted Presbyterian church (71 churches) is that known as the Fifth Avenue, at Fifty-fifth Street. The Madison Square Church and the Brick Church, at Fifth Avenue and Thirty-seventh Street, are among the strongest organizations of the denomination. The John Street Methodist Episcopal Church (62 Methodist Episcopal churches) occupies the site of the first of this denomination in America, and is known as the cradle of American Methodism. The most noted Baptist church (49 churches) is that at Fifth Avenue and Forty-sixth Street. Among the Congregational churches is the Tabernacle. The old church which stood at Broadway and Thirty-fourth Street was sold, and a new one, built at Broadway and Fifty-sixth Street, was opened in 1905. All Souls', at Fourth Avenue and Thirty-fourth Street, is the oldest of the Unitarian churches, while the Divine Paternity, at Central Park West and Seventy-sixth Street, holds a similar position among the Universalist churches. There are 114 parishes of the Roman Catholic faith, the Cathedral of Saint Patrick, at Fifth Avenue and Fiftieth Street, being one of the finest church buildings of the city. The oldest of its churches is Saint Peter's, in Barclay Street, which stands upon the site of a chapel built in 1786. The first Jewish synagogue of the city (136 societies) was the Shearith Israel, founded about 1675, and now possessing a beautiful temple at Central Park West and Seventieth Street. The Temple Emanu-El, at Fifth Avenue and Forty-third Street, the Beth-El, at Fifth Avenue and Seventy-sixth Street, and the Temple Israel, in Harlem, are all fine buildings. Also noteworthy are the temples of the First Church of Christ (Scientist), Central Park West and Ninety-sixth Street, and of the Second Church, Central Park West and Sixty-eighth Street. The Young Men's Christian Association, which for 30 years had its headquarters at Fourth Avenue and Twenty-third Street, has now finished a new house on the same street, west of Seventh Avenue. The association has fifteen branch buildings. That at Madison Avenue and Forty-fifth Street, for railroad employees, was erected by the late Cornelius Vanderbilt. The Young Women's Christian Association has a beautiful home at 7 East Fifteenth Street.

EDUCATIONAL INSTITUTIONS. The number of schools within the jurisdiction of the city, omitting the Nautical School, exceeds 500. Of corporate schools, orphan asylums, and industrial schools there are above 50, with an average attendance of some 18,000. The College of the City of New York (q.v.), at Lexington Avenue and Twenty-third Street, was established in 1847 under the name of the New York Free Academy. It will soon move to handsome buildings, estimated to cost $4,000,000, at 138th Street and Convent Avenue. The Normal College, at Sixty-ninth Street and Park Avenue, has accommodations for 1600 students. There is also a State Normal School at Jamaica, in the Borough of Queens. An important work of the Department of Education is the lecture system, under which free evening lectures are given in a number of places from October to May. The Board of Education also provides free night schools. The most important of the private educational institutions is Columbia University (q.v.), on Morningside Heights. Barnard College (q.v.), for women, and the Teachers College, for both sexes, are affiliated with the university. The College of Physicians and Surgeons (the medical department of the university) occupies extensive buildings on Sixtieth Street, near Roosevelt Hospital. Barnard College and the Teachers College, with which is incorporated the Horace Mann School, also have suitable buildings of their own on Morningside Heights. New York University (q.v.) maintains professional departments in the Borough of Manhattan, and undergraduate and engineering schools at University Heights, in the Borough of the Bronx. Its main site, in the Bronx, on the heights overlooking the Harlem, is one of singular beauty. Here is the Hall of Fame (q.v.). The Union Theological Seminary, which has academic relations with New York and Columbia universities, is at Fourth Avenue and Sixty-ninth Street. It is one of the chief training schools for ministers of the Presbyterian Church. The Protestant Episcopal Church maintains its General Theological Seminary in a group of beautiful buildings, modeled after the Oxford college type, at Ninth Avenue and Twentieth Street. The new building of the Jewish Theological Seminary of America, in 123d Street, between Amsterdam Avenue and Broadway, was dedicated in 1903. Cooper Union occupies a prominent place among the educational institutions of the city. Its classes, with very few exceptions, are entirely free. The attendance is large. Saint John's College, at Fordham, in the Borough of the Bronx, the College of Saint Francis Xavier, and Manhattan College are important institutions under control of the Catholic Church. Cornell University (q.v.) maintains part of its medical department in New York City. Among independent professional institutions are the New York Law School; the New York Homeopathic Medical College and Hospital, the New York Medical College and Hospital for Women, and the Eclectic Medical College; the New York College of Dentistry and the New York Dental School; and the College of Pharmacy of the City of New York.

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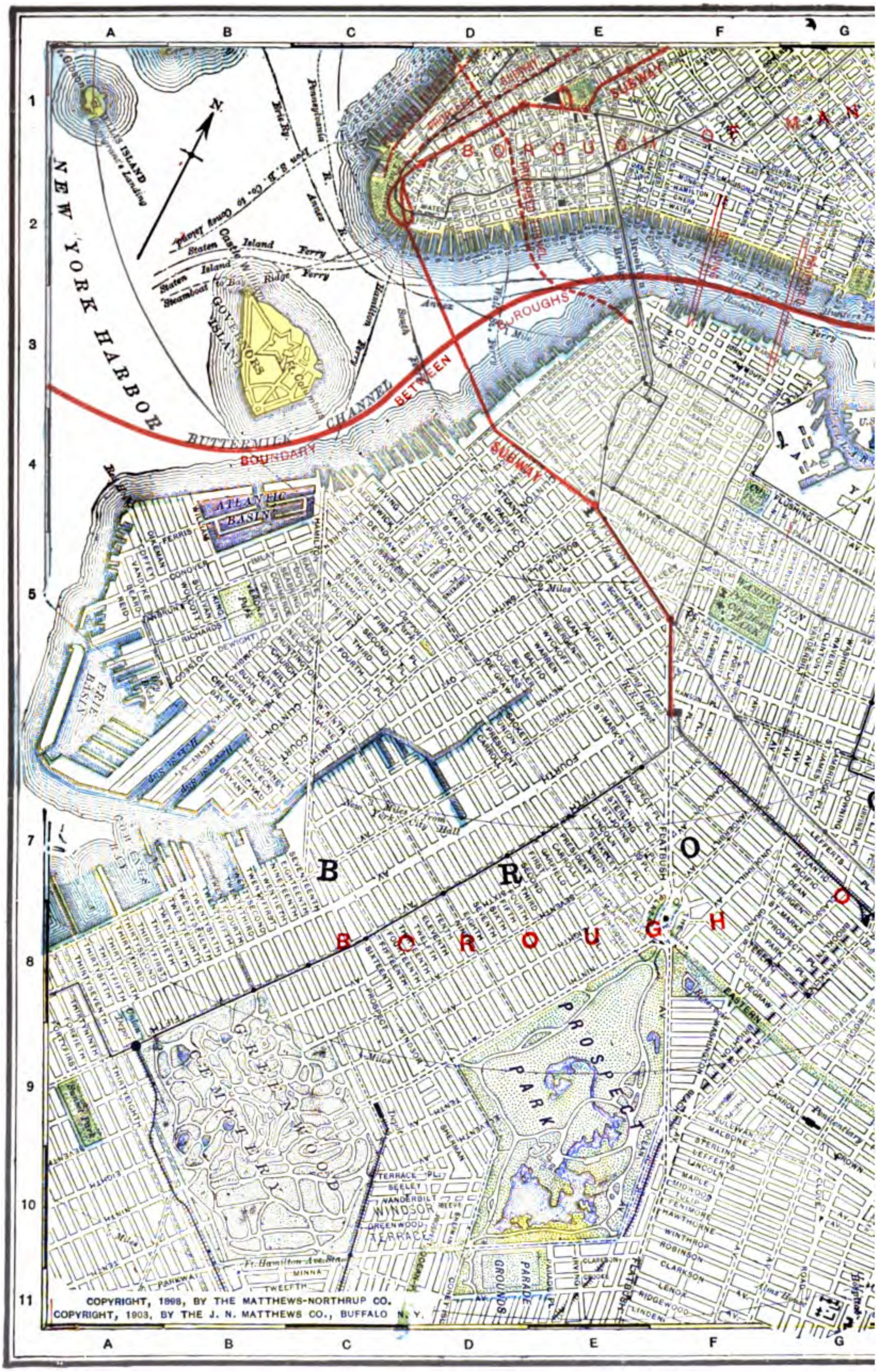
Booth. The University Club membership is restricted to graduates of colleges. Its club house, an imposing structure of granite, opened in May, 1899, at Fifth Avenue and Fifty-fourth Street, is one of the finest in the city. The New York Yacht Club also has a magnificent club house on West Forty-fourth Street.

New York has about 40 hotels that may be ranked as first-class, with as many more in the second class, and perhaps 100 of a lower grade. The largest and best-known is the Waldorf-Astoria. It is built upon the site of the family mansions in which lived for many years John Jacob Astor and William Astor, his brother. This structure covers the block between Thirty-third and Thirty-fourth streets, bordering Fifth Avenue, and having a depth of 500 feet. It is 16 stories in height, and contains over 1000 rooms for guests, a large ballroom, and a number of smaller apartments used for public dinners, concerts, etc. The Buckingham, at Fifth Avenue and Fiftieth Street; the Holland House, at Fifth Avenue and Thirtieth Street; the Murray Hill, at Park Avenue and Forty-first Street; the Manhattan, at Madison Avenue and Forty-second Street; the Netherland and the Savoy, at Fifth Avenue and Fifty-ninth Street, are large and luxurious hostelries, which accommodate from 800 to 2000 guests. Farther downtown, a number of the Broadway hotels, such as the Fifth Avenue, at Twenty-third Street, the Hoffman House, at Twenty-fifth Street, and the Imperial, at Thirty-second Street, are equally popular. Several immense hotels, among which may be mentioned the Plaza, at Fifty-ninth Street and Fifth Avenue, and the Majestic, at Seventy-second Street and Central Park West, are known as family hotels of the best type. The most luxurious restaurants in the city are Delmonico's, at Forty-fourth Street and Fifth Avenue, and Sherry's, almost opposite. In the business district the Café Savarin, in the Equitable Building, is well known.

CHARITIES. The great number of immigrants landing at the port of New York, the poorest of whom remain in the city, tends to increase the dependent class. The administration of public charities is under a separate department governed by a commissioner, who appoints two deputies and other subordinate officers. New York City differs from other large American cities in that it grants large subsidies to private charitable institutions, the amount spent in this way exceeding that apportioned to public charities. In 1901 the city maintained three almshouses, with 3646 inmates, and 11 hospitals, two of which are asylums for idiots, with 53,991 patients. Nearly all of the city institutions and some of the State and private institutions are located on Randall's, Ward's, and Blackwell's islands, in the East River. Sailors' Snug Harbor, a home for aged seamen, is on Staten Island. This institution derives an income of $250,000 from valuable Broadway real estate, with which it is endowed. The orphan asylums of New York are under private control. Private charity is active and thoroughly organized; and much has been done to correlate the different agencies by the Charity Organization Society of New York City. The society has a number of sub-committees in charge of the different districts into which the city is divided. The Brooklyn Bureau of Charities performs a similar function in that borough. Among the more important organizations which give attention to charitable work are the United Hebrew Charities, Children's Aid Society, Saint Vincent de Paul Society, and the Association for Improving the Condition of the Poor. The conditions in the crowded sections of the city have been greatly improved by the work of Social Settlements and similar institutions, of which there are a large number, some denominational, others nonsectarian. Manhattan alone has some 25, the best known of which are University Settlement and the Educational Alliance.

INTERCOMMUNICATION. The problem of passenger transportation within the limits of New York City and its residential areas offers peculiar difficulties. The wholesale business is at the lower end of Manhattan Island, and the shopping districts in the middle, while the dwelling districts are at the upper end, and across the waterways in the surrounding regions. The crowding and discomfort on the various car and ferry lines during the 'rush' hours surpass anything of the kind known in any other city of the world. There are car lines on almost all the thoroughfares leading north from the business district, the limit of surface transportation in this direction having been practically reached. The first elevated railroad was opened on Ninth Avenue in 1870, from the Battery to Fifty-ninth Street. The Sixth Avenue line, opened in 1878, extended from the Battery to the Harlem River, the upper half being on the line of Ninth and Eighth avenues. Similar lines were built on Third and Second avenues to the Harlem River, and later the Third Avenue line was carried across the Harlem River into the northern suburban districts. The elevated roads, on which it was found practicable to run trains by steam at a high rate of speed and at very short intervals, with a minimum of danger, soon proved utterly inadequate for the traffic. In 1886 the first cable line in Manhattan was established on 125th Street. In 1898 the underground electric trolley system was introduced and rapidly supplanted the cable all over Manhattan. The overhead trolley system still prevails in other portions of Greater New York. In 1902 the elevated roads began to run their trains by electricity. A contract was awarded in January, 1900, by a commission created for the purpose, for an underground rapid transit railway system running from one end of Manhattan to the other, with a branch, starting at 104th Street, to the Bronx. Work upon the subway was begun in February of that year. The time fixed by the contract for the completion of the system was four years and a half, and the original price was $36,500,000. The contractors were conceded the right to operate the road for fifty years. Thirty-five stations are provided for on the main line and 13 on the Bronx branch. An extension of the subway to Brooklyn was decided on in May, 1901. The cars are operated and lighted wholly by electricity. Express trains run on two central tracks.

There is a very extensive ferry system between Manhattan and the surrounding region. Besides the ferries to Brooklyn (q.v.), lines connect with Jersey City, Hoboken, Weehawken, Fort Lee, Staten Island, and other points. During the winter months the ferry traffic is somewhat impeded by occasional fogs and floating ice. The construction of the Brooklyn Bridge (see BRIDGE) in 1883 greatly facilitated communication with



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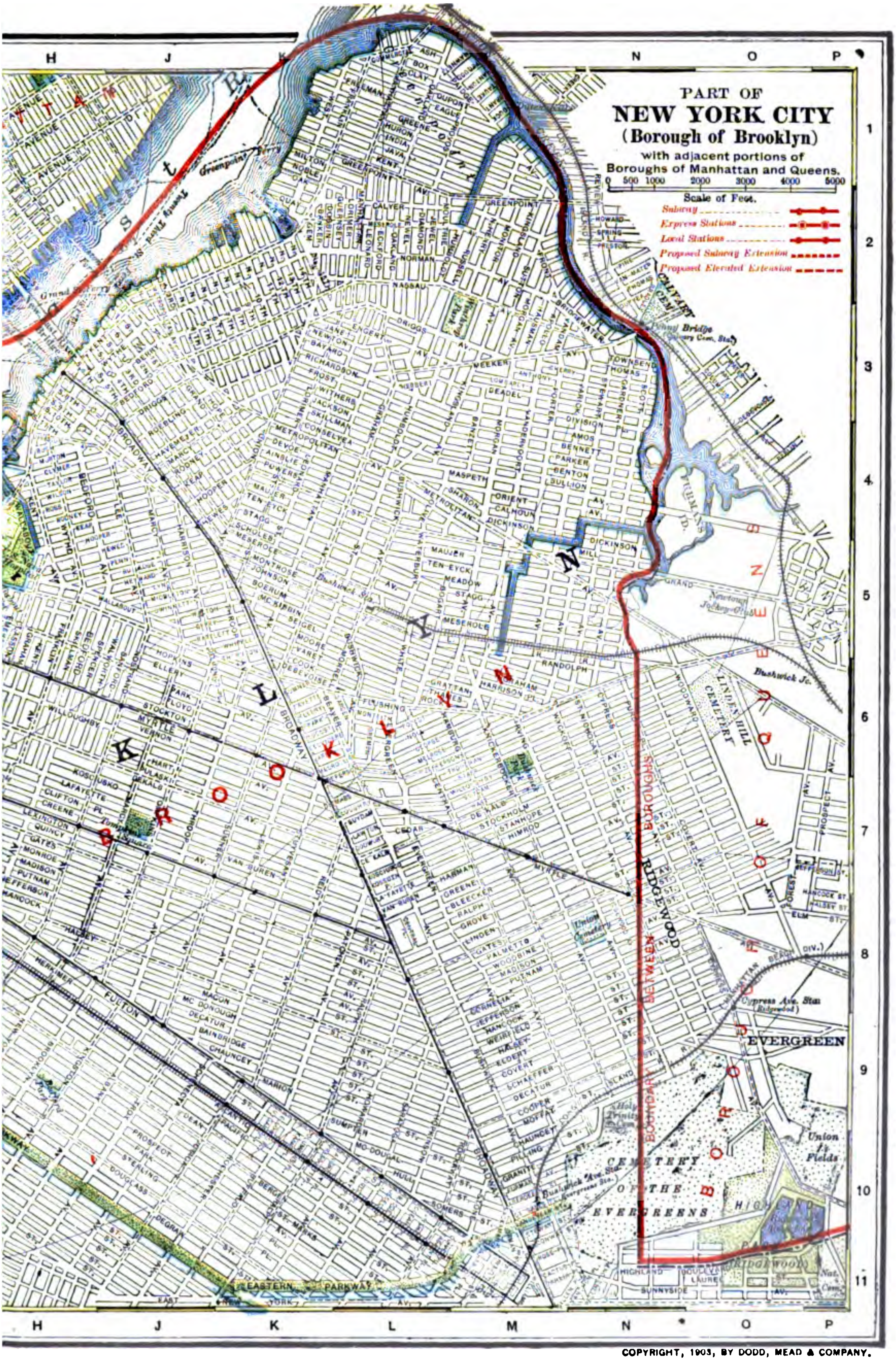

PART OF
NEW YORK CITY
(Borough of Brooklyn)
with adjacent portions of
Boroughs of Manhattan and Queens.

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lyn; but in recent years the bridge has wholly inadequate. A second bridge was in 1896, extending from Delancey Street, attan, to Broadway, Brooklyn; three other s are projected: from Grand Street, Man- n, to Williamsburg, Brooklyn; from Cor- Hook, Manhattan, to the Navy Yard, Brook- and from Fifty-ninth Street, Manhattan, to Island City, by way of Blackwell's Island. ermore, two tunnels to connect Manhattan Brooklyn have been planned, one by private ad companies (also connecting with the Jersey Shore), and the other by the city gh the extension of the subway. The Har- River is spanned by a number of costly s, Washington Bridge being perhaps the structure of its kind in the country, and Bridge, which carries the old Croton Aque- at an elevation of over 100 feet, being un- d among American stone bridges.

WSPAPERS. There are forty-eight daily news- s published in New York City, with ninety- eekly papers, and seventy-two monthly pub- ns, not including trade organs and religious als. The oldest of the daily newspapers are *ommercial Advertiser*, founded in 1797, and *vening Post*, founded in 1801, of which Wil- ullen Bryant was for nearly fifty years the . The *Sun*, founded in 1833; the *Herald*, ed in 1835 by James Gordon Bennett; the *ne*, founded in 1841 by Horace Greeley; the , founded in 1850 by Henry J. Raymond; *orld* (1860), the *Journal*, the *Press*, the *News*, and the *Staats-Zeitung* are the most tant of the morning newspapers. The *Even- ost*, the *Commercial Advertiser*, the *Mail xpress*, the *Telegram*, the *Evening Sun*, the *ng World*, and *Evening Journal* are the afternoon publications. See NEWSPAPER.

MERCE AND INDUSTRY. New York did not rise nmercial preëminence until the beginning of neteenth century. Its rise is due to its central on on the Atlantic seaboard, and especially excellent harbor, which lies at the entrance fine natural waterway, the Hudson River he Mohawk Valley, leading to the highly ctive North-Central portion of the United . The opening of the Erie Canal in 1825 he most important event in the business his- f the city. New York was already far in ce of its rivals before the building of rail- began, a fact which tended to make it a great point in their construction. It is difficult eremphasize the importance of New York entrepôt of trade. It is without a rival as ntre of the wholesale dry goods and whole- rocery business. Not only does it market n manufactures and the greater part of its ts, but the trade in many varieties of do- goods, produced outside of the city, cen- ere.

RBOR. The harbor proper consists of the and upper bays, the former covering about uare miles of anchorage, and the latter 14 e miles. Between the two is Staten Island. rincipal passage from one to the other is y of the east channel called the Narrows, at one point is only a mile in width. Small s may pass also on the west side of the . The harbor is approached from the ocean two directions, the principal one being from outheast. The Sandy Hook Bar stretches this entrance, about 20 miles from the lower end of Manhattan, the deepest channel having been originally 16 feet at mean low water. In 1884 the National Government provided for dredging this channel to a width of 1000 feet and a depth of 30 feet. In 1899 a provision was made for the dredging of another entrance channel farther to the east, 2000 feet wide and 40 feet deep, requiring an excavation about 7 miles in length. Work upon this channel is still in progress. The other entrance into the harbor is from Long Island Sound. From the Sound, the passage leads through Hell Gate, at Ward's Island, into the East River, which is about half a mile in width. The tide flows very swiftly through the river, especially the ebb-tide. Extensive improvements were begun on this course about 1868 and are still going on. The channel has been made amply deep and safe for coastwise traffic. In 1901 the battleship *Massachusetts*, drawing 27 feet of water, successfully passed through it. The great strength of the ebb-tide current serves to keep the port open in winter, and, in a measure, to prevent the deposit of sediment. The North River (Hudson), which is about one mile in width, does not carry as much sediment as most rivers. Some dredging, however, has been necessary.

The Sandy Hook entrance to the southeast is guarded by elaborate fortifications on Sandy Hook. (See FORT HANCOCK.) The passage through the Narrows is protected by Fort Hamilton on the east (Long Island) shore and by Forts Tompkins and Wadsworth on the west (Staten Island) shore. Besides the works at the east entrance of Long Island Sound, the approach from that direction is defended by fortifications on the closely approaching points, Throggs Neck and Willets Point, within the limits of the city, and on Davids Island, a few miles to the north. Governor's Island, just south of Manhattan, is also fortified.

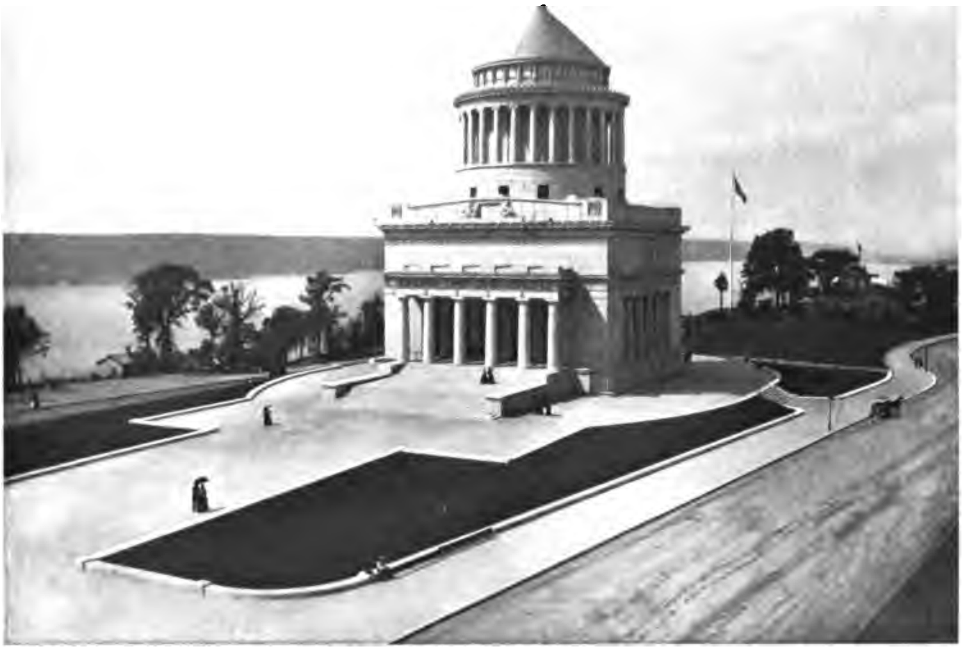
Almost the entire water front of Manhattan, about 22 miles, is deep enough to admit of heavy shipping, and the total frontage within the limits of the greater city is several times this. The docks already constructed occupy but a small part of the available space. Docks and piers naturally were built first on the lower end of Manhattan, the line gradually being extended northward on both sides of the island. The line is almost unbroken on the west side for a distance of about four miles, and many piers are still farther north. On the east docks are less numerous. In Brooklyn the docks extend along that portion of the shore opposite the lower end of Manhattan and farther south in Gowanus Bay. A part of the water front of Manhattan was acquired by the city from the Crown of England and subsequently State laws added to the portion belonging to the city. The greater part of the entire frontage, including in 1901 170 whole and 12 half piers out of a total of 224, is controlled by the city. The Brooklyn water front is owned mainly by private persons.

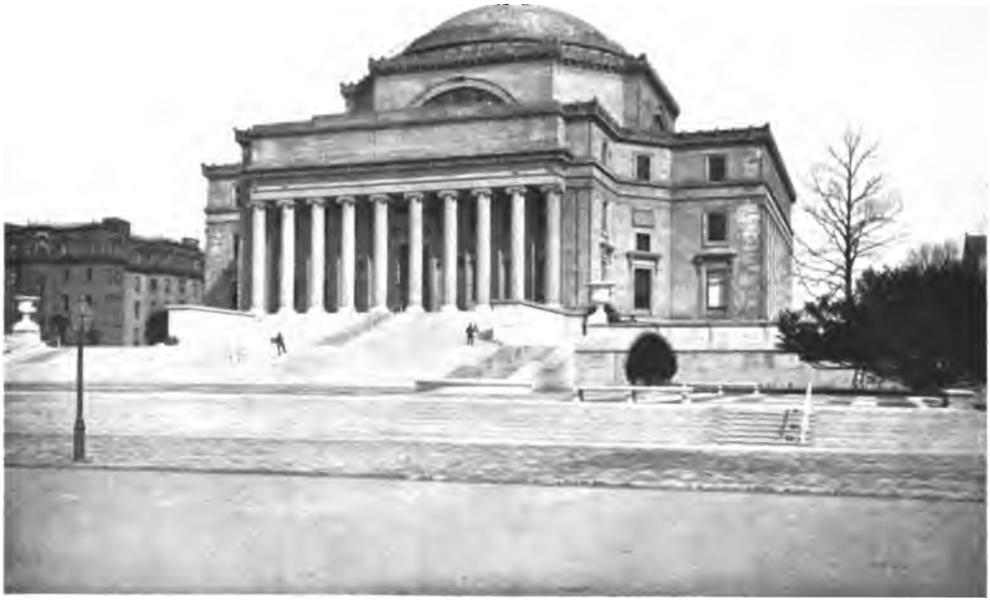
TRANSPORTATION. New York City has profited immensely from the advantages of internal transportation afforded by the Hudson River and the Erie Canal. In recent years the canal traffic has decreased. The canal is still of great importance, however, owing to its competition with the railway lines. All the railroads which approach New York from west of the Hudson River have their terminals in New Jersey. These lines are the Pennsylvania, the West Shore, the Erie, the New York, Ontario and Western, the Lackawanna, the Philadelphia and Reading, the Lehigh Valley, the Central Railroad of New Jersey, and the Baltimore and Ohio. The Pennsylvania Company has projected a tunnel from the New Jersey shore under North and East Rivers to Long Island, with a great station in Manhattan. The lines which approach from the north, the New York Central and Hudson River, and the New York, New Haven and Hartford, have a union passenger station, the Grand Central Station, under the control of the New York Central. The Long Island Railroad maintains terminals in Long Island City and Brooklyn. The daily traffic on all these lines to the suburbs is enormous.

Trade. The port of New York includes all the municipalities on New York Harbor and the Hudson River. In 1901 64 per cent. of the total imports and 35.60 per cent. of the total exports, or 45.73 per cent. of the total foreign trade of the United States, passed through New York, its commerce being five times that of the next largest American port. The imports for that year were valued at $527,259,906 and the exports at $529,592,978. While the trade is rapidly increasing, there has been in recent years a relative decrease, the port in 1882 having had nearly 57 per cent. of the total trade of the country. New York has practically a monopoly in the trade between the European countries and the Great Lake and Northwest region. On the other hand, its location places it at a disadvantage with the more southern Atlantic Coast ports in the trade with the Lower Mississippi and the Ohio Valley regions. Some of the leading imports of the country, such as rubber and elastic goods, silk goods and furs, are received almost wholly through New York. It also imports the bulk of manufactured goods generally, including manufactures of cotton, linen, and jute goods, jewelry and precious stones, chemicals, coffee, cocoa, and tobacco. It leads in imports of sugar. The relative rank of the city is much lower in respect to the principal exports of the country. It exports less than one-half of the animal products, less than one-fourth of the breadstuffs, corn, wheat, flour, etc., the shipments of the latter class having decreased in recent years, and only about one-tenth of the cotton. It exports a large part of the copper and most of the machinery. In 1901 878 sail and 2945 steam vessels engaged in the foreign trade cleared the port of New York. Their aggregate tonnage was 8,118,427. The volume of the coastwise trade greatly transcends that of the foreign trade. The transfer of freight at the port of New York is done almost wholly through the use of barges, lighters, etc., as there are no railroad tracks along the docks.

Manufactures. The value of the manufactured products of New York is considerably more than 50 per cent. greater than that of any other American city. Manhattan and Bronx alone rank first, Brooklyn alone ranks fourth. Of fifteen industries selected by the census of 1900 for comparison between the great manufacturing centres, New York City held first rank in eight. The total capital invested in manufactures in that year was $921,876,000, and the value of products aggregated $1,371,358,000. The industrial prominence of the city is not due to large iron and steel, textile or meat-packing interests—the industries which have been responsible for the growth of many American cities—but rather to a large group of manufactures peculiar to city life and mainly of local interest. The city's most important industry is the manufacture of clothing. In the census year 1900 the value of women's clothing (factory product) was $102,711,604, and of men's clothing, $103,220,201, besides a great amount of custom work and repairing, and dressmaking. The aggregate output of all industries in but two other cities exceeded the value of the clothing product of New York. The abundance of cheap, unskilled labor, in consequence of the large immigrant population, partially explains the growth of this industry. Much of the work is done in tenement houses and small workshops, and comparatively little in large factories. Sugar and molasses refining ranks second in value of the product, which in 1900 was $88,598,113. In the printing and publishing business, the value of which in 1900 was $78,736,069, New York ranks far above other American cities. Among other industries are the manufacture of foundry and machine-shop products, malt liquors, tobacco, cigars and cigarettes; the roasting and grinding of coffee and spices; the manufacture of millinery and lace goods, men's furnishing goods, fur goods, shirts, furniture, musical instruments, paints, and electrical apparatus and supplies. New York has hardly a rival in the variety of its highly finished manufactured articles. The sugar and molasses refining industry is confined mainly to Brooklyn. There are also in Brooklyn extensive foundries and machine shops, and establishments for the roasting and grinding of coffee and spices.

Government. The first charter of Greater New York went into effect January 1, 1898. But it was found defective in several important respects, and in 1901 the Legislature made radical changes. Under the amended charter, the Mayor is elected for two years. Much power and responsibility is given him, especially in the appointment and removal of administrative officers. The heads of 14 of the 15 administrative departments—law; police; fire; water supply, gas, and electricity; street-cleaning; bridges; parks; docks and ferries; health; public charities; corrections; education; taxes and assessments; and tenement houses—are appointed by the Mayor, as are also certain other officers, including three civil service commissioners. He may remove any of these officers except members of the board of education, aqueduct commissioners, trustees of the College of the City of New York, trustees of Bellevue and allied hospitals, and judicial officers. Legislation is in the hands of a single body, the board of aldermen, consisting of 73 members elected for two years, the president of the board being elected by the whole city. The aldermanic districts generally coincide with the districts into which the city is divided for the election of members of the State Legislature. The Mayor's veto is final when placed upon grants of franchise, but in other matters it may be overridden. Many interests are provided for through local government, the five boroughs being divided into 25 local improvement districts. In each borough a president is elected, in whom important powers are vested. The borough presidents control such matters as the grading and paving of streets, sewers, public baths, etc., and the presidents of Queens and Richmond have control also of street-clean-





NEW YORK

THE TOMB OF GEN. U. S. GRANT (UPPER)

THE LIBRARY OF COLUMBIA UNIVERSITY (LOWER)

ing. Each borough has a bureau of buildings, the superintendent of which is appointed by the borough president, and is subject to removal by him. In the smaller districts there are local boards of improvement, consisting of the president of the borough as chairman and those members of the board of aldermen who represent the districts within the area subject to improvement. The resolutions of the local board upon certain subjects must be submitted to the Mayor. Most of the offices in the departments are filled in accordance with civil service requirements.

Police, Fire, and Health Departments. The police commissioner appoints all members of the force from the eligible lists furnished by the civil service commission, and has power of dismissal. He is assisted by three deputies. The department includes also 15 inspectors and one captain to each 50 patrolmen. The total force in February, 1903, of men and officers was 7679. For patrol service the city is divided into 80 precincts, each having its own building with quarters for the men, cells for prisoners, and lodgings for homeless persons. Each precinct is in command of a captain under whom are several sergeants.

On January 1, 1902, the fire department of New York City had an active force of 2602 men. There were 137 engine companies, including 5 fire boats, and 44 hook and ladder companies. The companies constitute battalions, each under the command of a chief of battalion. The chief of department is at the head of the entire force.

The health department is administered by a board of health, consisting of a commissioner appointed by the Mayor, the commissioner of police, and the health officer of the port. The sanitary superintendent is chief executive officer of the board. A corps of medical inspectors is employed for the detection and prevention of disease, the inspection of tenement houses, and the enforcement of the sanitary code. There are also a vaccinating corps, a corps for disinfection, and one for the inspection of milk, meat, and other food products.

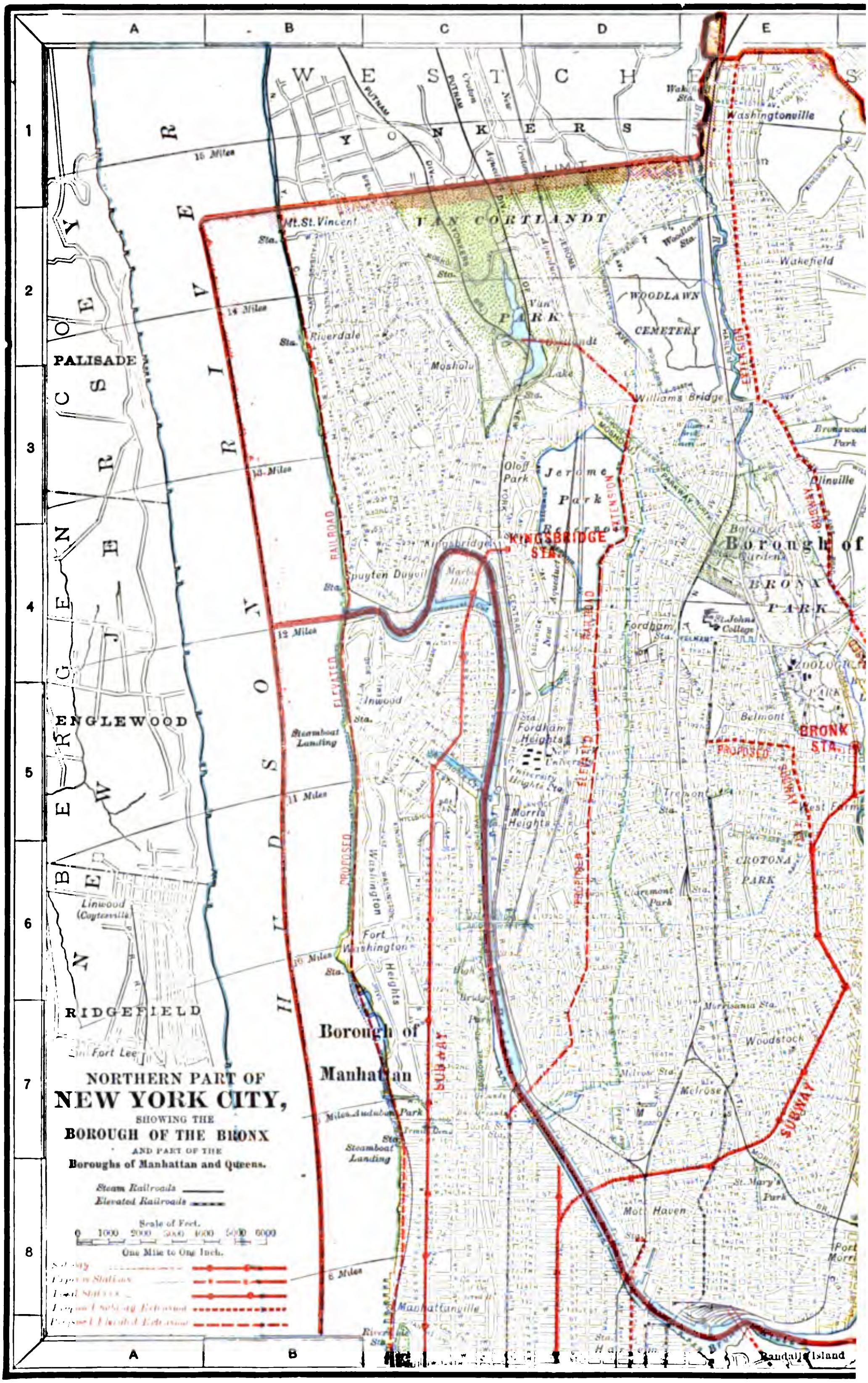
Water Supply. Manhattan and the Bronx have an excellent water supply, derived from the Croton River (q.v.), supplemented by the Bronx River. The Croton River, which is nearly 40 miles north of the City Hall, includes in its basin a number of small natural lakes and three artificial reservoirs, the largest of the latter being Croton Lake, in the main stream of the river. From this lake the aqueducts lead. There are a small receiving and a large retaining reservoir in Central Park, and a 'high service' reservoir at High Bridge. Another large reservoir is under construction on the site of Jerome Park, and plans have been made for a large distributing reservoir at 135th Street and Tenth Avenue. The storage system has a total capacity of more than 40,000,000,000 gallons. A new dam, the central masonry portion of which is 600 feet long and 260 feet high, is being constructed across the Croton River. This dam will add 21 square miles to the drainage area and increase enormously the storage capacity. There are also three smaller dams in course of construction. The supply reaches the city through two aqueducts, an old one with a capacity of 75,000,000 gallons a day and a new one with a capacity of 318,000,000 gallons a day. The average consumption of water in 1902 was more than 250,000,000 gallons a day. The Brooklyn water supply is obtained from small local streams, ponds, and wells. There is a large reservoir in the eastern part of the Borough of Brooklyn and a small one near the entrance to Prospect Park. The daily consumption in this borough is about 100,000,000 gallons.

Finance. The budget of New York is considerably more than three times that of any other American city, and greater than that of any other city in the world. The actual income for 1901 was $118,740,596, including $1,285,821 received from the State for schools. Of this amount, $76,886,091 was collected from property taxes; $5,557,593 from liquor licenses; $5,048,788 from special assessments; $8,050,900 from water rates; and $2,571,584 from docks and wharves. The total expenditures for the same year were $102,946,573 for maintenance and operation, and $53,451,000 for construction and capital outlay other than loans repaid. The principal items of expenditure for maintenance and operation were: schools, $19,731,629; interest on debt, $13,693,155; police department, $10,199,206; fire department, $4,739,993; hospitals, asylums, almshouses, and other charities, $4,754,380; water-works, $3,000,990. The principal items for construction were: streets, $8,109,494; schools, $5,471,460; ferries and bridges, $4,458,739; water-works, $3,450,870; docks and wharves, $3,322,938. There is a bonded debt of $426,174,823 and a floating debt of $6,306,472. Against this indebtedness there is a sinking fund of $121,340,920. The city's legal borrowing limit (exclusive of the water debt) is 10 per cent. of the assessed valuation. The basis of assessment is legally 100 per cent. of the value of both real and personal property. The valuable franchises which have been granted to private companies return an entirely disproportionate income to the city treasury.

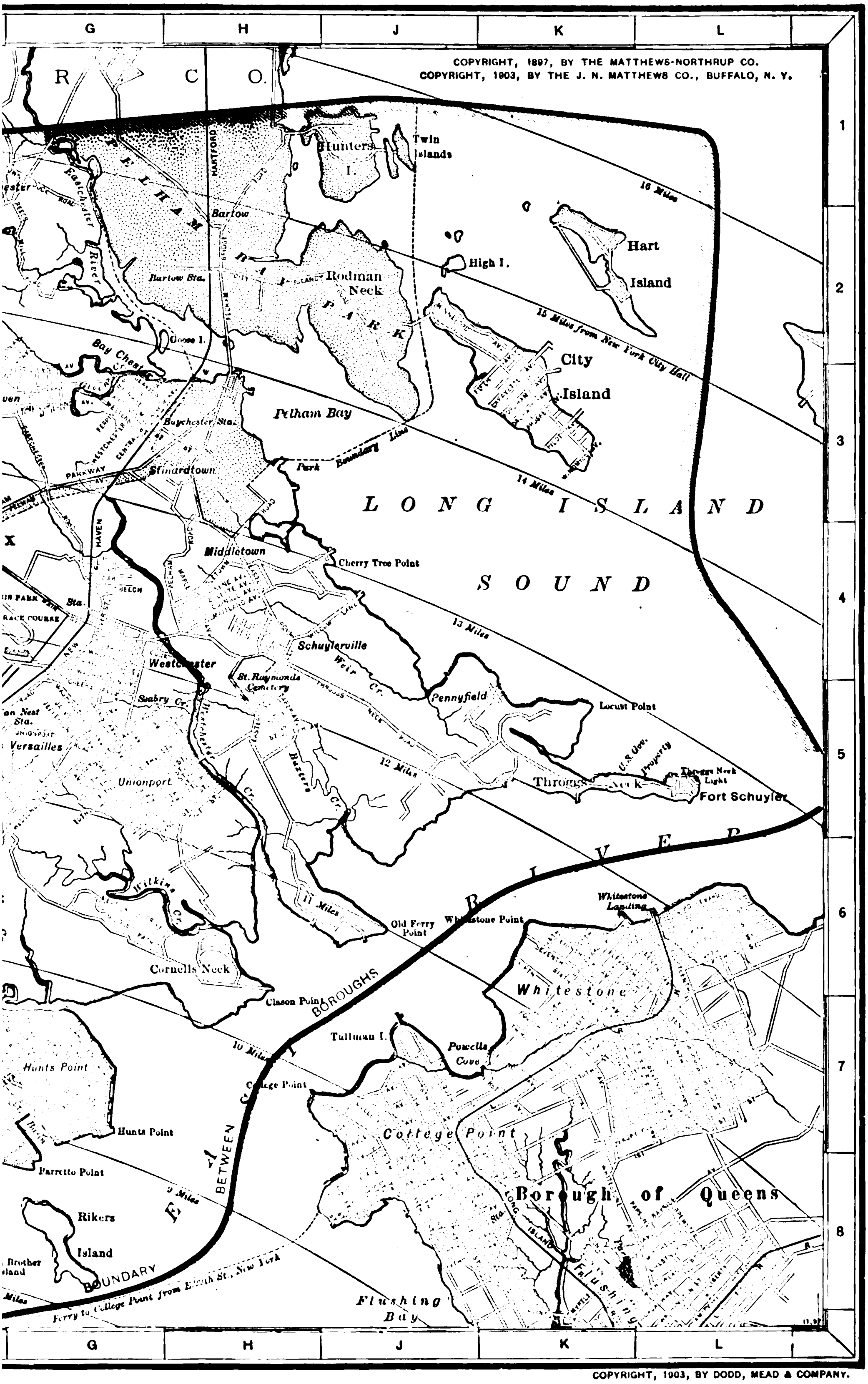
The expenses of Greater New York are much larger than were the combined expenses of the various component municipalities before consolidation. The increase in the first year after consolidation amounted to $15,000,000. This is due largely to the creation of more salaried offices and to increases in salaries. The salaries paid are the highest prevailing in any city of the world. There is a board of estimate and apportionment, consisting of the Mayor, Comptroller (elected by popular vote), president of the board of aldermen, and the five borough presidents (the presidents of Manhattan and Brooklyn having two votes each), which annually submits the budget to the board of aldermen. The board of aldermen cannot insert new items, increase the amount specified, or vary the stipulated terms and conditions; but there are certain items which it may reduce. The financial department is in charge of the Comptroller, and is divided into five bureaus. All officers in the department except two, one of whom is the city chamberlain, or treasurer, are appointed by the Comptroller.

Population. Greater New York has about twice the population of any other American city, and is exceeded only by London among the cities of the world. This has come about almost wholly in the nineteenth century, during which time the city grew at a rate never equaled. In the colonial period New York ranked below Boston and Philadelphia. In 1790 there was a population of 33,131; in 1800, 60,515; 1810, 96,373; 1820, 123,706; 1830, 202,589; 1840, 312,710; 1850, 515,477; 1860, 805,658; 1870, 942,292; 1880, 1,206,299; 1890, 1,515,301; and in 1900 (after the creation of a Greater New York), 3,437,202, including 1,850,093 in the Borough of Manhattan, 200,507 in the Borough of the Bronx, 1,166,582 in the Borough of Brooklyn, 152,999 in the Borough of Queens, and 67,021 in the Borough of Richmond. The suburbs on the New Jersey shore of the Hudson (Jersey City, Hoboken, etc.) contain about 300,000 inhabitants. Beyond these immediate suburbs we come to a section of New Jersey embracing Elizabeth, the Oranges, Montclair, Morristown, Plainfield, and many other places which are mainly suburbs of New York, in addition to the two great manufacturing centres of Newark and Paterson, also the homes of great numbers of New York business men. These places have a total population of about half a million. On the northeast the cluster of towns largely inhabited by persons doing business in New York extends beyond the boundary line of Connecticut. Among these may be mentioned New Rochelle, Rye, Portchester, Greenwich, and Stamford. The total population embraced within a radius of 25 miles from the New York City Hall is not far from five millions. As the city grew, the population of New York naturally tended to centre about the lower end of Manhattan, the business district. Inconveniences, too, incident to transportation across the river have aided in confining the population within the narrow limits of Manhattan Island, where the density of population is greater than in any other city whatsoever. The distribution of the population in Brooklyn is more normal. In 1900, 66.70 per cent. of the population of Manhattan and the Bronx lived in dwellings containing twenty-one or more persons, while in Brooklyn the corresponding percentage was only 25.70 per cent. In Chicago it was 16.63. The density per acre in the Borough of Manhattan was 129.2. The region of greatest density is the lower East Side, where in the Eighth Assembly District, covering 98 acres of area, there was in 1900 a population of 735.9 to the acre. In the densely populated section, tenement houses having an average height of five or six stories, inadequately lighted and ventilated, and otherwise lacking in sanitary facilities, are the rule. Several large model tenement houses have recently been built, notably those of the City and Suburban Homes Company. The housing problem, therefore, is one of the most difficult with which the city has to deal, and presents phases almost unknown in other large centres of population. A radical tenement house law, which went into effect in 1902, is effecting a great improvement. The problem of congestion is closely related to that arising from the presence in the city of large classes of mostly poor foreigners. The various foreign elements tend to form distinct colonies. In the Eighth District, above mentioned, 67.2 per cent. of the population in 1900 were foreign born, and the greater part of the remainder were children of foreign-born parents. In 1900 the foreign born numbered 1,270,080, or 37 per cent. of the total population of the city. In Manhattan alone, 41.5 per cent. of the total population was foreign born. New York has been always a strikingly cosmopolitan city. During the middle of the nineteenth century there was a very heavy German and Irish immigration to the city, but before the end of the century the immigration of these nationalities had greatly declined, and there had begun a heavy immigration from the south and east of Europe. According to the census of 1900, the principal foreign countries represented in the immigration to New York City in order of prominence were Germany, Ireland, Italy, Russia, Bohemia, Hungary and Austria, Poland, England, Scotland, and Wales. Few of the many Scandinavian immigrants to the United States have settled in New York. The large immigration from Austria-Hungary, Russia, and Poland consists almost wholly of Jews. Nearly one-fourth of the population of Manhattan are Jews. A large proportion of New York immigrants represent a class of unskilled laborers. The German immigrants, however, have always contained a large class of skilled artisans, who have participated in the more advanced industrial life of the city, and have contributed greatly to its social and artistic life. A much larger percentage of the Irish have been unskilled laborers. The Italians have come mainly from the poorer districts of southern Italy, and almost all are laborers. Most of the coarser labor of the metropolis is done by them. The Jewish immigrants, like the Italians, are extremely poor and mostly unskilled. The majority are employed in the manufacture of clothing; many, however, are small merchants. Both of these elements keep to themselves. It is in the parts of the city occupied by them that the density of population is greatest. The negro population in 1900 numbered 60,666, of whom nearly two-thirds were born outside of New York State. Of the total population of the city, 1,705,705 were males and 1,731,497 females.

HISTORY. Probably the first European to visit the vicinity of New York was Giovanni Verrazano, who came in 1524; in 1525 the Spanish navigator Gomez sailed into the harbor; and by 1600 the French seem to have begun an extensive trade with the Indians along the Hudson. In September, 1609, Henry Hudson (q.v.) explored the harbor and the river; in 1613 four trading houses were built on Manhattan Island—"Manhatanis" (meaning 'those who dwell upon an island') being the name applied to the aboriginal Delaware inhabitants; and in 1614 Adriaen Block, preparatory to exploring the New England coast, built here his little vessel the *Onrust*, or *Restless*, probably the second ship to be built in America. In 1614 the States General of Holland chartered the United New Netherland Company of Amsterdam, and in 1621 this was succeeded by the West India Company, chartered with power to make treaties, maintain courts, and employ soldiers. In 1623 permanent colonists, sent out by the Dutch West India Company, arrived under Cornelis May as Director-General or Governor. In 1624 May was superseded by Verhulst, who in turn was replaced in 1626 by Peter Minuit. Minuit in this year bought the island from the Indians for goods valued at 60 guilders, or $24.00 (about $120.00 in present values), and built near the present Bowling Green a small fort, Fort Amsterdam—the settlement itself, then having a population of 200, being called New Amsterdam. In 1628 a church was organized and the first clergyman, Rev. Jonas Michaelius, arrived at New Amsterdam.



NORTHERN PART OF
NEW YORK CITY,
SHOWING THE
BOROUGH OF THE BRONX
AND PART OF THE
Boroughs of Manhattan and Queens.



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Wouter Van Twiller was Governor of the colony from 1633 to 1638, William Kieft from 1638 to 1647, and Peter Stuyvesant from 1647 to 1664. In 1643 the Dutch, without provocation, massacred 120 Algonquin Indians, who had come to them for protection, and a bloody Indian war ensued, lasting for two years, and almost depopulating the settlement. In 1653 New Amsterdam, with a population of about 800, was incorporated as a city, and in the same year a wall 2340 feet long was built along the site of the present Wall Street as a protection against the English and the Indians.

In March, 1664, Charles II. granted New Netherland to his brother James, Duke of York, and on September 8th Col. Richard Nicolls with an English force took possession of the city and renamed it New York. Nicolls was Governor until 1668, when he was succeeded by Francis Lovelace. On August 9, 1673, the Dutch regained possession, and the province became New Netherland as before, the city becoming New Orange, and Anthony Colve replacing Lovelace as Governor. On November 10, 1674, the Dutch again gave way to the English, Edmund Andros becoming Governor; in 1686 the first city charter, known as the Dongan Charter, from Thomas Dongan, Governor in 1681-88, was issued (though it was never confirmed by James II.); and in 1689, Andros being overthrown, Leisler usurped control and held it until early in 1691, when he was executed for treason. See Leisler, Jacob.

In 1690 the first intercolonial Congress (called to consider an attack on Canada) was held in New York—Massachusetts, Plymouth, Connecticut, Maryland, and New York being represented—and in the same year the only Mayor elected by the people until after 1832 was chosen. Slavery had been introduced in 1625; in 1712 a negro insurrection was put down with much cruelty, twenty-one negroes being executed (some by burning, others by hanging, and one by breaking on the wheel); and in 1741 the discovery of a supposed plot, 'The Great Negro Plot,' caused a panic, during which four whites were executed, and 154 negroes were arrested, of whom 13 were burned at the stake, 18 were hanged, and 71 were transported. In 1693 William Bradford set up the first printing press in New York; in 1703 the first free school was opened; and in 1725 the first newspaper, the *New York Gazette*, was founded. A city library was organized in 1729, and a classical academy was opened in 1732. In 1731 a new charter, known as the 'Montgomerie Charter,' was granted to the city. In 1732 a monthly stage was established between New York and Boston, the trip taking two weeks each way, and in 1756 a Philadelphia stage, taking 'three days through only,' began running.

John Peter Zenger, who had founded the *New York Weekly Journal* in 1733, was arrested and prosecuted for libel by the authorities in 1734, but he was acquitted in the following year after a famous trial—his acquittal being regarded as the greatest vindication in the colonial period of the freedom of the press. See Zenger, John Peter.

In 1765 the Stamp Act Congress (See Stamp Act) met in New York, and on January 18, 1770, nearly seven weeks before the Boston Massacre, British soldiers killed one citizen and wounded three in a riot caused by the destruction by the soldiers of a liberty pole set up by the 'Sons of Liberty.' This riot, called the 'Battle of Golden Hill,' is ranked by some writers as "the first conflict of the War of the American Revolution." In 1774, during the excitement over the tea tax, a ship loaded with tea was sent back to England, and the cargo of another was thrown overboard. When news of the battle of Lexington reached New York, a 'Committee of Safety' assumed control of the city, and Governor Tryon took refuge on a British man-of-war. In the early summer of 1776 a large part of the American troops were quartered in New York.. On July 8th, in the presence of Washington, the Declaration of Independence was for the first time publicly read to them, and on the 9th the equestrian statue of George III., erected on Bowling Green in 1770, was torn down. On September 14, 1776, a short time after the battle of Long Island (q.v.), the city was evacuated by the Americans and was occupied on the following day by the British, who held it until November 25, 1783—'Evacuation Day.' On September 15, 1776, a large portion of the city was destroyed by fire. During the British occupation the city was the refuge of Loyalists, who came from all quarters to take advantage of British protection, many of the more wealthy and influential residents joining their ranks. From 1785 to 1790 Congress met in New York in the old City Hall, at the corner of Wall and Nassau streets, and here Washington was inaugurated, April 30, 1789.

In 1785 a manumission society was formed and the Bank of New York was organized. In 1789 the Tammany Society (q.v.) or Columbian Order was organized. During an epidemic of yellow fever, from October, 1794, to July, 1795, more than 600 persons, and during another in 1798 more than 2000 persons, died. In 1790 the population numbered 33,131, and the city limits were extended to the lower line of the present City Hall Park. In 1805 the population was 78,770, and since then, especially after the War of 1812, when immigration greatly increased, the growth has been very rapid. In 1807 Fulton's steamboat, the *Clermont*, began running regularly between New York and Albany. In 1812 a steam ferry to Long Island was opened, and a line of Sound steamers was established in 1818, while in 1819 the *Savannah*, built in New York, successfully crossed the Atlantic. The Erie Canal, begun in 1817, was completed in 1825—the first boat, *Seneca Chief*, reaching New York on November 4th—and gave an extraordinary impetus to the growth of the city. In 1832 an epidemic of cholera caused the death of 4000 persons, and another two years later caused the death of nearly 1000. In 1835, December 16-19, occurred the most disastrous fire in the history of the city, the entire east side below Wall Street, including about 650 stores, the Merchants' Exchange, and the South Dutch Church, being destroyed, with a loss of almost $10,000,000. The financial panic of 1837 caused many failures, and the great destitution and suffering in the city led to the Bread Riots of that year. From 1820 to 1870 riots were frequent, one of the most serious being the Astor Place Riot (q.v.) of May 10, 1849, in which 141 soldiers were wounded, while 34 rioters were killed and many more were wounded. In the same year more than 5000 persons died of the cholera. Another riot occurred in 1857, growing out of a conflict between two police organizations, when the Seventh Regiment of militia was called out to preserve the peace. The Croton aqueduct was completed in 1842; and on July 14, 1853, the Crystal Palace Industrial Exhibition was opened on what is now Bryant Square. Another severe financial panic occurred in 1857, followed by suspension of banks and business failures.

On the approach of the Civil War many in the city seemed to favor the South, and in January, 1861, the Mayor, Fernando Wood (q.v.), proclaimed secession to be 'a fixed fact,' and proposed that an independent commonwealth, to be called 'Tri-Insula,' be formed out of Manhattan, Long, and Staten Islands. The city, however, loyally supported the Union during the war, sending to the front 116,382 soldiers at a cost of about $14,500,000. In July, 1863, occurred the Draft Riots (q.v.), lasting three days, during which business was suspended, property worth more than $1,500,000 was destroyed, and more than 1000 lives were lost. The city suffered for several years from frauds, perpetrated by the 'Tweed Ring,' which controlled municipal affairs, but in 1871 the 'Ring' was convicted of having robbed the city of more than $20,000,000, and was effectually broken up. (See Tweed, William M.) In 1869 a financial panic, caused by the effort to 'corner' gold, culminated on 'Black Friday' (September 24th), gold then being at 162½. The financial panic of 1873 caused the greatest suffering in New York City, although its growth continued unabated. On May 24, 1883, the Brooklyn Bridge was formally opened, and in 1886 the Bartholdi Statue of Liberty was unveiled. New York has been the scene of many imposing processions and celebrations: On the occasion of Lafayette's visit in 1824; the celebration of the opening of the Erie Canal in 1825; the funeral processions of Lincoln, April 25, 1865, and of General Grant, August 8, 1885; the laying of the Atlantic cable, 1858; the opening of the Brooklyn Bridge; the centennial celebration of Washington's inauguration as President of the United States, in 1889 (from April 29th to May 1st); the Columbian celebrations of October, 1892, and April, 1893; the reception to the Santiago fleet in 1898; and the Dewey reception in 1899.

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NEW YORK, College of the City of. A public institution of learning in New York City, established by the Board of Education of the city in 1848, and originally known as the Free Academy. Collegiate powers were granted to it in 1858, and in 1866 it assumed its present name. The members of the Board of Education were ex-officio trustees of the college until in 1900 a separate board of trustees was created, composed of nine members appointed by the Mayor, with the president of the college and the president of the Board of Education as ex-officio members. In 1882 the requirement of one year's previous attendance at the public schools of the city was repealed, and the college was thrown open to all young men of the city. In 1900 the length of the course was increased from five years to seven, comprising three years' attendance in the preparatory department and four years of collegiate work. There are five courses of study, leading to the degrees of B.A. or B.S. The M.A. and M.S. degrees are conferred after two years of additional study. Instruction and the use of text-books and apparatus are free to students. The college was one of the first institutions to establish a separate chair of English and to make manual training a part of the curriculum. In 1902 the process of securing a new site for the college, then situated at Lexington Avenue and Twenty-third Street, was completed. The new home of the college is located in the block bounded by 138th and 140th streets, Saint Nicholas Terrace, and Convent Avenue. Ground was broken on March 10, 1903, and the erection of new buildings, estimated to cost $4,000,000, was begun. In 1903 the collegiate department had an attendance of 817, and the preparatory department 997. The instructors numbered 110. The buildings and grounds on the old site were valued at $846,500, and the new grounds at $800,000, the total value of the college property being $1,646,500, and its income $299,362. The library contained 34,911 volumes and 2000 pamphlets. During the first half century of the history of the institution there were but two presidents, Horace Webster (1848-69) and Gen. Alexander S. Webb (1869-1901), both graduates of West Point, and the discipline and curriculum have been greatly influenced by that institution. In 1903 John Huston Finley, professor of politics at Princeton University, became president.

NEW YORK ACADEMY OF SCIENCES, The. An association incorporated in 1818 as *The Lyceum of Natural History in the City of New York*, which was exchanged in 1876 for the present name. In 1902 the Academy was empowered by legislative enactment to obtain funds and erect a building for scientific uses, and to exercise such other powers as appertain to the scope of such institutions. Membership in the Academy consists of four classes: active members, fellows, corresponding members, and honorary members. Fellows are chosen from the active members in virtue of their scientific attainments. The number of corresponding members is limited to two hundred, and honorary members to fifty. The following sections of the Academy are in active operation: astronomy, physics, and chemistry; biology; geology and mineralogy; anthropology and psychology. The Academy publishes Annals and Memoirs.

NEW YORK BAT. See Red Bat.

NEW YORK HISTORICAL SOCIETY. A society formed for the collection and preservation of materials relating to the national, civic, or ecclesiastical history of the United States in general, and the State of New York in particular. The idea of such a society was first agitated in Massachusetts in 1789 by John Pintard, but it was not until November 20, 1804, that the New York Historical Society was organized by a number of leading citizens, among them De Witt Clinton, Anthony Bleecker, and Peter G. Stuyvesant. The history of the society since that time has been one of earnest effort in the formation of a library and museum, a gallery of paintings, a department of antiquities, and other features in which it has been eminently successful. The library has a choice and valuable collection of books, lithographs, maps, manuscripts, engravings, etc., besides a collection of works on heraldry. The picture gallery contains 889 paintings, of which about 200 are portraits, and 600 pieces of sculpture, mostly portrait busts and medallions. The collection includes the New York Gallery of Fine Arts, the works of the American Art Union, the Bryan Gallery of Old Masters, the Durr Collection, and the original water colors prepared by Audubon for his work on natural history. In the department of antiquities there is the Abbott collection of Egyptian antiquities, considered one of the greatest in the world. The society spent the first five years of its existence (1804-09) in old Federal Hall, on Wall Street. It occupied rooms in the Government House from 1809 to 1816; in the New York Institution from 1816 to 1832; in Remson's Building, Broadway, from 1832 to 1837; in the Stuyvesant Institute from 1837 to 1841; and in the New York University from 1841 to 1857. Since 1857 it has been installed in the building at 170 Second Avenue.

NEW YORK PUBLIC LIBRARY. The New York Public Library, Astor, Lenox, and Tilden foundations, was formed by the consolidation on May 23, 1895, of the Astor Library, the Lenox Library, and the Tilden Trust.

The Astor Library, incorporated January 18, 1849, was founded by John Jacob Astor, who bequeathed $400,000 to establish a free public library; gifts from other members of the Astor family trebled its buildings, added largely to its book collections, and increased its endowment to $941,000 in 1895. Opened February 1, 1854, with about 80,000 volumes, in 1895 it had 267,147 volumes.

The Lenox Library, incorporated January 20, 1870, received from James Lenox his library, art collection, its site and building, and an endowment amounting to $505,500 in 1895. It was not a general reference library, but an institution for the exhibition and scholarly use of book rarities. In 1895 it contained 86,000 volumes.

The Tilden Trust was incorporated March 26, 1887. To it (before incorporation) Samuel Jones Tilden had bequeathed his private library, 20,000 volumes, and the bulk of his estate, over $5,000,000, to establish a free public library. The will was contested and the trust provisions declared invalid. By a compromise agreement the executors secured for the trust about $2,000,000, part of the share of one of the heirs.

The new corporation had an endowment of about $3,446,500, owned the Astor and Lenox library sites, and possessed 353,147 volumes and pamphlets. Through an address to the Mayor legislative permission was secured May 19, 1897, for an issue of bonds by the city to construct a building on the reservoir site at Forty-second Street and Fifth Avenue, and to contract with the library for its occupancy. Plans were adopted November 10, 1897, and the corner stone was laid November 10, 1902.

On December 11, 1900, the New York Free Circulating Library offered to consolidate; the offer was accepted and on February 25, 1901, reorganization was completed. The following libraries also came into the system: Saint Agnes Free Library on August 1, 1901; Washington Heights Free Library on December 1, 1901; the New York Free Circulating Library for the Blind on February 21, 1903; and the Aguilar Free Library on February 28, 1903. By these accessions the circulation department consisted on March 1, 1903, of 18 branch libraries, owning 320,816 volumes.

On March 12, 1901, Andrew Carnegie offered to give about $5,200,000 to erect branch libraries in New York City, if the city would furnish sites and maintain the branch libraries when built. An act passed April 26, 1901, permitted the city to accept such a gift, and in a contract executed July 17, 1901, between the city and the library acting as Carnegie's agent, the city agreed to provide 42 (later increased to 65) sites in Manhattan, Bronx, and Richmond, on which the library agreed to erect buildings with funds provided by Carnegie, the city agreeing to pay annually for their maintenance one-tenth of the sum expended by Carnegie. The first building so erected, on East Seventy-ninth Street, for the Yorkville branch, was opened December 13, 1902; the second, for the Chatham Square branch, was opened in the summer of 1903; four more will be ready by the end of the year.

In the new institution the 500 periodicals received in 1895 have increased to 4500 in 1903; the annual receipts of 12,483 volumes and 2599 pamphlets in 1895 increased to 65,381 volumes and 87,868 pamphlets in 1902; the 94,331 readers consulting 260,694 volumes in 1895 increased to 165,434 readers consulting 410,671 volumes; and the total of 353,147 pieces available to readers in 1895 amounted to 1,131,961 on March 1, 1903.

NEW YORK UNIVERSITY. An institution of higher learning in New York City. It had its inception at a meeting of citizens of high business and professional standing in the rooms of the New York Historical Society, January 4, 1830, when a committee of nine was elected to proceed in the establishment of a new university on a liberal and comprehensive foundation. The committee secured a long list of subscribers to the undertaking and finally merged its existence into that of the first University Council elected by the subscribers, October 16, 1830, and chartered April 18, 1831. The original university building was erected in 1835 on Washington Square. The University College was opened in 1832; the Law School in 1835; the Medical School in 1841; the School of Applied Science (formerly Civil Engineering) in 1862; the Graduate School in 1886; the School of Pedagogy in 1890; the Veterinary College (incorporated with the university) in 1898; and the School of Commerce in 1900. The greatest era of development in the history of the university was the period between 1890 and 1900. In 1891 the grounds on University Heights overlooking the Harlem River were acquired, and in 1894 the College of Arts and Pure Science and the School of Applied Science were removed to the new site, the schools of Law and Pedagogy and a part of the Graduate School remaining in a new structure on Washington Square. The various schools hitherto loosely connected were now reorganized into one university system. The university in 1902 comprised six faculties besides the School of Commerce, the Woman's Law Class, and the Summer School, having in all 212 professors and instructors, and 2101 students. (1) University College confers the degrees of B.A. and B.S. (2) The University Law School (coeducational) confers the degrees of LL.B., LL.M., and J.D. (3) The Medical College, together with the Veterinary College, confers the degrees of M.D., D.S., and D.V.S. (4) The School of Applied Science confers the degrees of C.E. and M.E. (5) The Graduate School confers the degrees of M.A., M.S., Ph.M., and Ph.D. (6) The School of Pedagogy confers the degrees of Pd.M. and Pd.D. The School of Commerce, Accounts, and Finance confers the degree of B.C.S. (bachelor of commercial science). The Summer School had in 1902 12 instructors and 113 students. The library of the university contained in 1902 over 55,000 volumes, including the Oswald Ottendorfer Collection. The campus covers about 22 acres, and its chief architectural feature is the library building, completed in 1900, at a cost of $750,000. An open colonnade known as the Hall of Fame (q.v.) extends partly around the library, overlooking the Harlem. The total value of the buildings and grounds in 1902 was $2,945,342; the endowment was $2,080,179; the gross income $467,839, and the total value of the college property $5,025,522. The government of the university is vested in a Senate consisting of the chancellor, the deans of the several schools, and six professors elected, one from each school, together with advisory members. The chancellors of the university have been James Matthews, Theodore Frelinghuysen, Isaac Ferris, Howard Crosby, John Hall, Henry M. MacCracken.

NEW YORK WEASEL. See WEASEL.

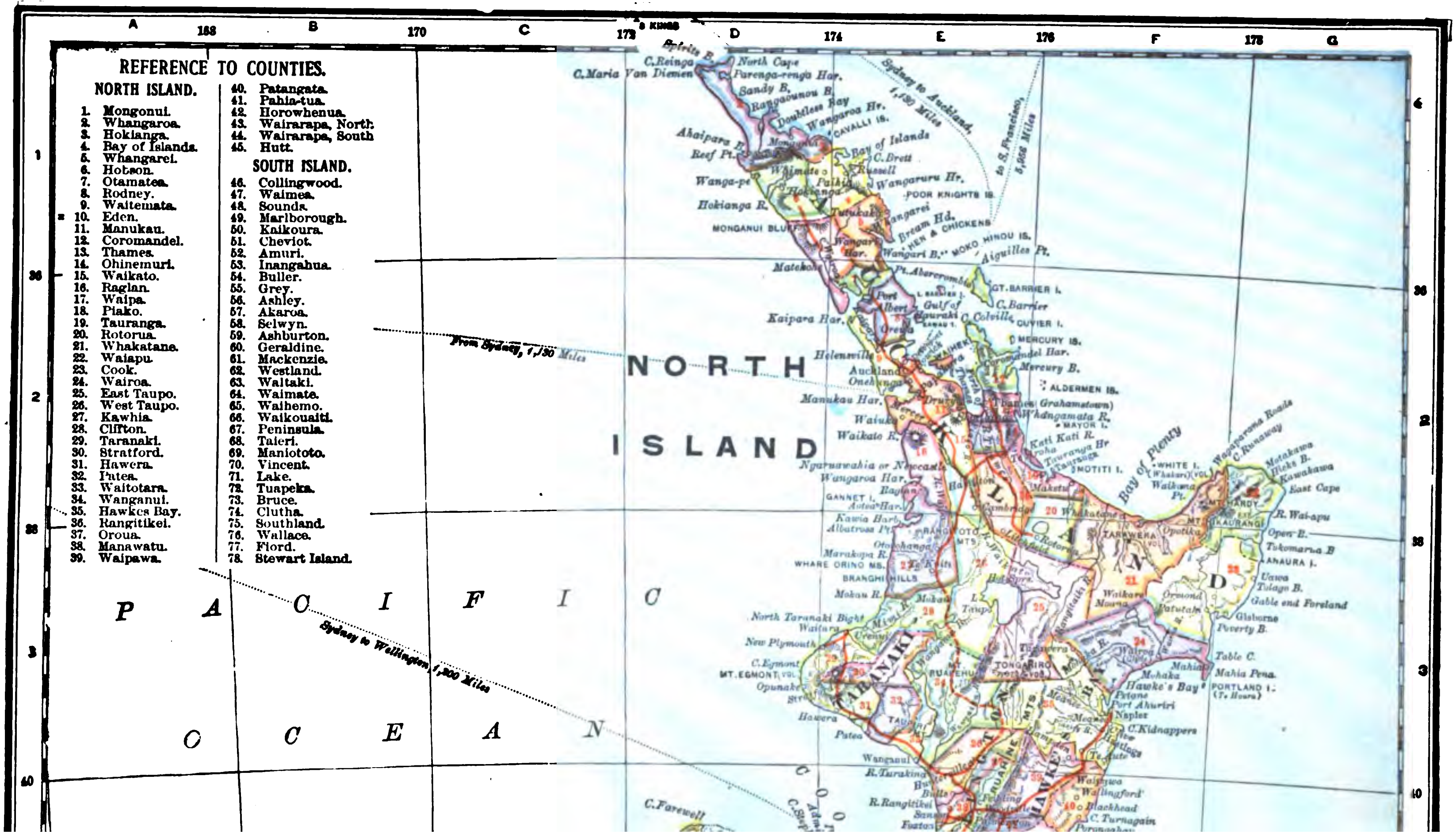
NEW ZEALAND, *zē'land*. A British colony in the South Pacific Ocean, situated between latitudes 34° 25′ and 47° 17′ S., and between longitudes 166° 26′ and 178° 36′ E., a little more than 1000 miles southeast of the Australian continent. New Zealand proper consists of two large islands, North Island and South or Middle Island, separated by Cook Strait, from 16 to 100 miles wide, and of a smaller island, Stewart Island, lying 25 miles south of South Island, from which it is separated by Foveaux Strait. Several of the outlying groups, known as the Auckland, Chatham, Cook, Kermadec islands, and other small islets, are also attached to the colony. The area of North Island is 44,468 square miles, of South Island 58,525, and of Stewart Island 665 square miles. The total area of the colony is estimated at 104,471 square miles, being nearly equal to that of Italy, to which peninsula the shape of New Zealand bears a striking resemblance.

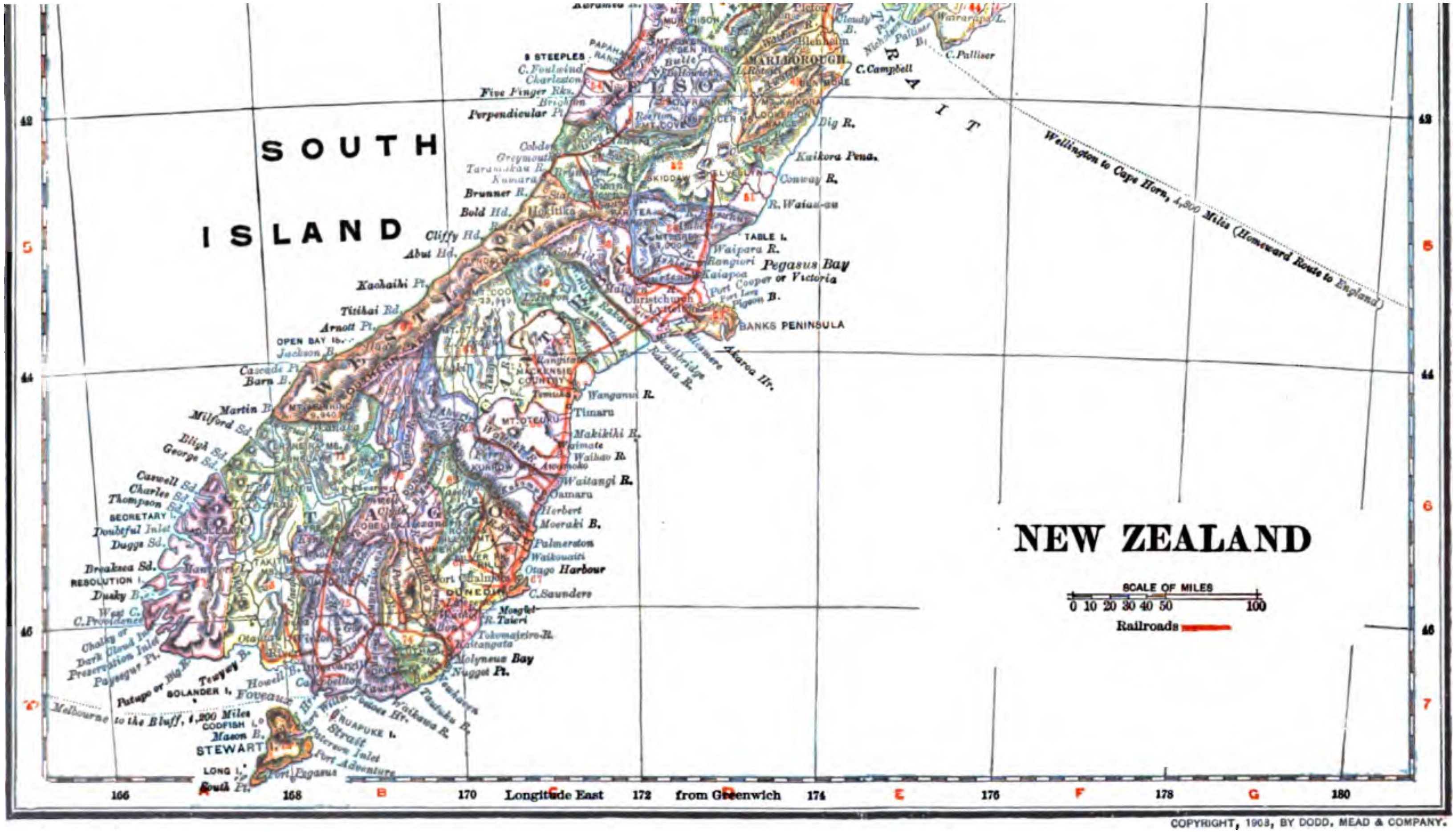
TOPOGRAPHY. The surface of North Island is in the main gently undulating, with low hills and table-lands densely forested. There are, however, several volcanic peaks in this island, from 4000 to over 9000 feet high. Of these Tarawera and Tongariro, on the mainland, and Whakari, in the Bay of Plenty, are active volcanoes, while the highest extinct cones are Ruapehu (9715 feet) and Mount Egmont or Taranaki. The latter is a solitary peak standing at the west entrance to Cook Strait. It is 8270 feet high, and its summit is covered with perpetual snow. South Island differs in a marked degree from North Island. It has no volcanoes, but along its whole western coast runs a lofty and rugged mountain range known as the Southern Alps, which rivals the European Alps in its wild mountain scenery. It has a height of from 8000 to over 12,000 feet, Mount Cook, the highest point, being 12,349 feet above the sea. It is deeply cleft, with numerous ravines and precipices, while on the western slope there are great glaciers, in some places reaching within a few hundred feet of the sea. The range is generally covered with forests to the snow line. On the eastern flank of the Alps is a plateau bounded by a lower range running through the centre of the island, from which the land descends in terraced, grassy plains to the eastern coast.

The coast-line of New Zealand measures about 3000 miles, two-thirds of which forms the coast of North Island, which is much indented with bays, two of them almost separating the northwestern peninsula from the mainland. Really good harbors, however, are few, as most of the bays are obstructed by bars. The best harbors are those of Auckland and Wellington. The rivers are small and unimportant, the largest being the Waikato, in North Island. The lakes by contrast are interesting. Those in North Island are of volcanic origin. The largest is Lake Taupo, with a diameter of 22 miles and an enormous depth. The region surrounding it is full of hot springs and geysers, among which rose the famous pink and white terraces of siliceous deposits which were destroyed by an eruption in 1886. In South Island, along the eastern slope of the Alps, extends a series of elongated mountain lakes supposed to be, like the deep fiords of the southwest coast, of glacial origin. The largest is Wakatipu, which is said to rival Lake Lucerne in beauty. Though its surface is 1060 feet above sea-level, its bottom is in some places 500 feet below.

CLIMATE. The climate is varied, but in general equable, with no intense heat or cold. The mean temperature for January is 68° in the north and 58° in the south; for June it is 51° in the north and 40° in the south. Frost is almost unknown in North Island. The rainfall varies from 28 inches in the east to over 100 inches on the west coast. The coast districts are very windy, which fact contributes toward rendering the climate healthful.

FLORA. The flora is poor in species, but two-thirds of the indigenous forms are entirely peculiar to the islands, and 26 of its genera are represented nowhere else. The forests as well as the vegetation generally are characterized by a dull monotonous green, there being very few plants with conspicuous flowers. Though the flora is related to that of Australia, as well as to South America and the Antarctic islands, some of the most common Australian genera, such as Eucalyptus and Acacia, are absent. The ferns, mosses, and hepaticas are especially abundant and characteristic, large tracts of


REFERENCE TO COUNTIES.
NORTH ISLAND.
1. Mongonui.
2. Whangaroa.
3. Hokianga.
4. Bay of Islands.
5. Whangarei.
6. Hobson.
7. Otamatea.
8. Rodney.
9. Waitemata.
10. Eden.
11. Manukau.
12. Coromandel.
13. Thames.
14. Ohinemuri.
15. Waikato.
16. Raglan.
17. Waipa.
18. Piako.
19. Tauranga.
20. Rotorua.
21. Whakatane.
22. Waiapu.
23. Cook.
24. Wairoa.
25. East Taupo.
26. West Taupo.
27. Kawhia.
28. Clifton.
29. Taranaki.
30. Stratford.
31. Hawera.
32. Patea.
33. Waitotara.
34. Wanganui.
35. Hawkes Bay.
36. Rangitikei.
37. Oroua.
38. Manawatu.
39. Waipawa.
40. Patangata.
41. Pahia-tua.
42. Horowhenua.
43. Wairarapa, North.
44. Wairarapa, South.
45. Hutt.
SOUTH ISLAND.
46. Collingwood.
47. Waimea.
48. Sounds.
49. Marlborough.
50. Kaikoura.
51. Cheviot.
52. Amuri.
53. Inangahua.
54. Buller.
55. Grey.
56. Ashley.
57. Akaroa.
58. Selwyn.
59. Ashburton.
60. Geraldine.
61. Mackenzie.
62. Westland.
63. Waitaki.
64. Waimate.
65. Waihemo.
66. Waikouaiti.
67. Peninsula.
68. Taieri.
69. Maniototo.
70. Vincent.
71. Lake.
72. Tuapeka.
73. Bruce.
74. Clutha.
75. Southland.
76. Wallace.
77. Fiord.
78. Stewart Island.
NORTH ISLAND
PACIFIC OCEAN
From Sydney, 1,130 Miles
Sydney to Wellington, 1,300 Miles
Sydney to Auckland, 1,130 Miles
to S. Francisco, 5,658 Miles
Bay of Plenty
Hawke's Bay
TARANAKI
North Cape
East Cape
C. Farewell
A
B
C
D
E
F
G
168
170
172
174
176
178
1
2
3
4
36
38
40



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open land on the lower hills and plateaus being covered with ferns, among which the palm-like tree-ferns, reaching a height of 30 to 40 feet, are prominent. The Nikau palm (*Rhopalostylis sapida*) is found in North Island, this being the extreme southern limit of true palms. One of the most common forest trees is the magnificent kauri pine (*Dammara australis*). It yields fine timber and a valuable gum, and has been recklessly cut by settlers. The output of this gum in 1900 was 11,116 tons, valued at £607,919.

FAUNA. The fauna is, like the flora, characterized by a great paucity of species. There is probably not a single indigenous mammal, the dogs and rats found by the European discoverers having been almost certainly introduced by the natives. There are few reptiles, and no snakes, but several peculiar lizards. Insects are also few, as are the fresh-water fishes; and birds form almost the only group of animals that is well represented. There are about 150 species of birds, most of which are aquatic, and nearly all are peculiar to the islands. They include many beautiful forms, pigeons and parrots being especially numerous. The kiwi, a wingless and tailless bird of the size of a hen, is the sole survivor of a large group of similar birds, including the gigantic moa, which formerly inhabited New Zealand. A considerable number of European forms, both plants and animals, have been introduced, wild pigs being very common.

GEOLOGY AND MINERALS. North Island is essentially volcanic in structure and origin, while South Island consists largely of ancient metamorphic and sedimentary rocks, slates, granites, and Silurian sand and limestones, with small areas of Mesozoic and Tertiary strata. Coal is found under a considerable area in South Island, and to some extent in North Island. Gold exists chiefly under the glacial drift and in the sands along the seashore. Silver, copper, tin, antimony, manganese, and chrome-iron are also found.

MINING. Up to the end of the year 1900 the total mineral product amounted to £75,997,890, of which £57,406,100 was gold. The most productive gold districts are Otago, which yielded over £22,000,000, Westland, nearly £18,000,000, Auckland, and Nelson. As compared with other Australasian States, New Zealand ranks second in the total gold and third in the total mineral output. The most productive period of gold-mining was from 1862 to 1873, in which period nearly one-half of the whole yield was secured. There was some reyival in the industry from 1890 to 1900. The gold exported in 1901 amounted to £1,753,784. The mining of gold by the dredging method has developed extensively in the Clutha River bed and other streams of that district. Most of the gold from South Island was secured either from this method or from hydraulic sluicing. Gold from the Auckland district was secured from quartz only, as was also much of the Westland product. The cyanide process is being adopted, thus resulting in a greatly increased per cent. of the ore saved. The next most important mineral mined is coal, the total production of which through 1900 was valued at £7,688,393. The output has increased steadily from 299,923 tons in 1880 to 1,093,999 in 1900. In 1900 the yield of kauri-gum (resin) was 11,116 tons, valued at £607,919. The total yield to the end of 1900 amounted to £10,329,831. Small quantities of silver and silver-lead, and a few other minerals also, are mined.

AGRICULTURE. Agriculture together with grazing is the leading occupation. The climatic conditions are more favorable for general agriculture than in any of the States of the Australian Commonwealth. The rainfall is more adequate, and the per acre yield of all crops much greater. The largest farm district is on the east coast of South Island. In 1902 there were in the colony 62,786 agricultural holdings, with a total of 34,911,573 acres occupied (over one-half the total area), of which 26,982,486 acres are under private ownership, the balance being held by the Government. About two-thirds of the total area is supposed to be adaptable to agriculture or grazing. The total area under crops increased from 68,506 acres in 1861 to 1,044,777 in 1891, and to 1,578,958 in 1900-01. Nearly one-half of the acreage is under green crops, mainly turnips and rape. The principal other crops in the last-mentioned year were oats, 449,534 acres; wheat, 206,465; barley, 30,831; hay, 68,023; potatoes, 28,524; and maize, 14,232 acres. English grasses grow much better in New Zealand than in Australia, and the acreage sown in grass—10,244,739 in 1899—was 14 times more than that of the Australian Commonwealth. The per acre yield of the artificial grasses is many times that of the natural grasses in Australia. In 1900 there were in addition to the sown pasture land 21,857,909 acres of improved land in the occupied holdings that were available for stock feeding.

STOCK-RAISING. Probably no other country of similar area equals New Zealand in the extent of its sheep-grazing interests. The number of sheep increased steadily from 2,761,583 in 1861 to 20,230,829 in 1894, and has since remained at a little below this figure. Recent years have shown a rapid increase in the number and a decrease in the size of flocks. Another change has been the tendency to raise sheep for meat rather than for wool exclusively. Both cattle and horses are steadily increasing in number, the former numbering in 1900 1,256,680 and the latter 266,245. In the same year there were 250,975 swine. In recent years dairying has rapidly developed and there is an extensive production of butter and cheese. The industry is carried on by the factory method through the co-operation of small farmers.

MANUFACTURING. The number of hands employed in the manufacturing industry increased from 22,095 in 1885 to 25,633 in 1890, and 27,389 in 1895. The value of the products increased still more rapidly, being £9,549,360 in the last-named year. The largest item in this amount was frozen and preserved meats, followed by the tanning and wool-scouring products, and the products of saw-mills, grain-mills, clothing and boot factories, butter and cheese factories, iron and brass works.

TRANSPORTATION AND COMMERCE. In 1902 there were 2235 miles of railway in operation, the total cost of construction being £18,170,722. The province owns and operates nearly the entire railway system. In 1901-02 the net earnings amounted to £622,349. In 1901-02 there were 7,356,136 passengers carried, or more than twice the number carried in 1891-92. There are tramway systems in all the principal towns. The extensive insular coast line and many harbors afford excellent facilities for water transportation from one part of the country to another. Considering the smallness of the population, the foreign commerce is large. In 1900, 616 vessels entered New Zealand ports, with a tonnage of 854,632. Of these 372 were from the Commonwealth States, 83 from the United Kingdom direct, and 161 from other countries. The total tonnage has more than doubled since 1881. The value of imports increased from £6,260,523 in 1890 to £10,646,096 in 1900, and the value of exports increased during the same period from £9,811,720 to £13,246,161. Almost the whole of the imports is for home consumption and the domestic exports are of domestic origin. Nearly three-quarters of the total exports are contributed by the agricultural and pastoral industries, wool being the largest item, followed by frozen meat, butter and cheese, and grain. The export of frozen meat began in 1882 and increased steadily until 1900, when it was estimated at £2,123,881, almost the whole of which went to England. Gold and kauri-gum are also important exports. About three-fifths of the imports are from the United Kingdom, and over three-fourths of the exports are to that country. In the trade of the colony the Australian States rank second and the United States third. The imports from the United States are much in excess of the exports to the United States. Auckland, Wellington, Bluff Harbor, Littleton, and Dunedin are the largest ports.

Banks. Owing to the active participation of the colonial Government in the economic life of the community, the field of private banking is a comparatively limited one. In 1890 there were five commercial banks, and in 1900 the same number. The deposits have increased from £343,316 in 1857 to £15,570,610 in 1900. Of the five banks two are New Zealand institutions proper and the other three are branches of the Australian banks. The Bank of New Zealand is the most important institution and is semi-governmental in its nature. Four out of the six directors are (according to the act of 1898) appointed by the Government, which is both a heavy shareholder and depositor. Of the total deposits this bank has almost 50 per cent. The whole amount of loans made by all five banks in 1900 was £12,084,744, of which 30 per cent. were made by the Bank of New Zealand. These five banks are also banks of issue. Their notes are not legal tenders, but can be made so for a limited time by a proclamation of the Governor. In 1866 there were six private savings banks. These still existed in 1900, with 31,475 depositors and £855,792 deposits; but the law of 1867, which established the postal savings system, prohibited the organization of other private savings banks.

Forty-six banks were established under the postal system in 1867, and in 1900 there were 445. The number of accounts increased from 2156 in 1867 to 197,408 in 1900, and the sum of deposits from £71,197 to £5,809,552. Nearly every family has an account. The public trustee does the work usually done in the United States by the private trust companies. Also, the land registration offices compete with the private banks in holding real estate mortgages. The high development of the coöperative spirit in New Zealand has also made the building societies and friendly societies successful. The governmental insurance system attracts a considerable amount of the people's savings.

Government. The Parliament is composed of two bodies, the Legislative Council and the House of Representatives. The former consists (1902) of 44 and the latter of 80 members. They hold office for seven years except such as were elected prior to September, 1891, who hold for life, as all members did before that date. There are 80 members in the other House. They are elected for three years. All registered adults of either sex who have resided in the colony one year and three months in the electoral district can vote. There are four native Maoris in the Lower House, elected by the adult (male and female) native population. The administrative function is in the hands of a Governor, appointed by the Crown, and the Ministry of eight members. The Governor has the power of veto over bills or can submit bills for consideration. He summons, prorogues, and dissolves Parliament. For purposes of local government the country is divided into counties and boroughs, road districts and town districts.

Finance. The participation of the Government in industrial activities resulted in large annual receipts and expenditures and in a heavy debt. The receipts from taxation increased from £1,755,414 in 1880-81 to £3,042,890 in 1900-01, and receipts from other sources increased during the same period from £1,529,628 to £2,864,026. In the fiscal year ending in 1901 the receipts from the customs amounted to £2,180,862, being the most important single source of revenue. In the same year the receipts from the railroads were £1,720,641; from stamps, including post and telegraph, £903,935; from land tax, £294,584; and from the income tax, £173,809. The total expenditure increased meanwhile from £4,019,850 to £5,479,704, and the public debt from £28,185,711 to £49,591,245. There was a sinking fund in 1901 of £1,033,494. The largest items of expenditure are the public debt charges, £1,745,616, and railways, £1,144,832. Other important items are education, £481,087; post and telegraph, £416,364; and the constabulary and defense, £347,448. The rate of increase of the debt of the colony has not been nearly so rapid as that of its wealth.

Defense. All the principal ports are strongly defended by means of batteries, torpedo-boats, and submarine mines. All males between seventeen and forty years and unmarried men between seventeen and forty-five are liable to military service. In 1901 there was a volunteer force of 17,000 men.

State Activities. New Zealand has become well known because of the various ways in which the functions of the State have been extended. The tendency in this direction was well developed prior to 1890, but became especially marked about that time. The movement has been the outgrowth largely of the influence exerted by organized labor upon legislation. The power of this element has been exercised through the existing political parties, and not through the agency of any politico-socialistic organizations such as have generally sought to advance radical movements in other countries. The experiment, for instance, has been made of preventing strikes and lockouts and adjusting questions at issue between labor and capital by compulsory conciliation and arbitration. Provisions are made by which either employers or trade unions may bring the dispute before a board of conciliation, and if a satisfactory agreement is not reached the question can be carried to the central court of arbitration. The decision made by this court is final and is enforced, the award against an association, however, being subject to a maximum limit of £500. In practice the plan has accomplished the purpose intended, strikes and lockouts having been wholly prevented. A number of other measures affecting labor have been carried into effect, such as factory inspection, prevention of child labor, specification of hours of labor, and the occurrence of holidays. A system of old-age pension provides that all persons of good character who are over sixty-five years of age and have been twenty-five years in the colony may be pensioned if their income falls below specified limits.

Another phase of State activity receiving much attention has been the public land policy. The attempt is being made to secure and retain the public ownership of the land, and freehold is gradually giving way to perpetual lease. The policy of compulsory purchase has resulted in the breaking up of many large holdings held largely for speculative purposes, and has secured a genuine settlement upon such lands. Ordinarily purchases are affected by friendly negotiations, and compulsion is not often necessary. Prior to March, 1902, £2,117,352 had been paid for 107 estates. In order to make a settlement and improvement of the land possible by persons of small means, the Government advances loans to the settlers. The interest charged is 5 per cent. Over £3,000,000 has been lent in this way. Lands that are leased are leased for 999 years subject to certain conditions of residence and improvements. The annual rental is fixed at 4 per cent. on the cash price or 'prairie value' of the land, and there is at no time a right to purchase the freehold. District land boards have charge of the transfer of lands. The State has assumed the ownership of a number of utilities, including railroads, telegraphs, and telephones, and engages in the life insurance and the banking business. The results have been generally satisfactory to the advocates of the system. The colony has also taken an advanced position in regard to taxation. The colonial property tax consists solely of a progressive land tax. The system exempts small farmers entirely. Local communities have the privilege also of restricting tax levies to their land values. There is a progressive income tax. New Zealand has created the office of public trustee, whose incumbent has care of intestate estates, certain private trust estates, etc. Any property-owner has the right of appointing him executor. A local option law provides that licensed liquor houses may be abolished by a vote of three to two in any district, and that the number of them must be reduced if demanded by a majority of the electors. The question is voted upon every three years.

Population. The population of New Zealand (exclusive of Maoris) increased from 79,711 in 1860 to 626,050 in 1890, and to 772,719 in 1901, the density of population being 7.39 to the square mile. The males numbered 405,992, females 366,727. Since 1841 the per cent. of increase has exceeded that of Australia for every decade except 1881-91. In the decade 1891-1900 the excess of arrivals over departures was 27,211. The population of North Island slightly outnumbers that of South Island. The population is quite homogeneous, being almost wholly from the United Kingdom. There are, however, not a few Germans and Scandinavians. The immigration of colored races has been checked by restrictive governmental measures. The Chinese have decreased in number and were only 2792 in 1901. The Maoris have decreased from 70,000 (estimated) in 1840 to 46,518 in 1901, including 5762 half-castes, but the decrease seems to have been checked. The natives are allowed, within limitations, to manage and dispose of their land (about 5,000,000 acres), and they have a measure of local self-government. They welcome the advantages of education for their children and engage to some extent in agriculture. The population of the largest cities in 1901 was as follows: Auckland, 34,213, with suburbs, 67,226; Wellington, the capital, 43,638, with suburbs, 49,344; Christchurch, 17,538, with suburbs, 57,041; Dunedin, 24,879, with suburbs, 52,390.

Religion. The principal churches are the Church of England, predominating in Canterbury; the Presbyterian, which dominates in Otago and Southland; the Wesleyan and the Roman Catholic.

Education. The public system of education is in charge of a Government department, with a minister at its head. School attendance is compulsory between the ages of seven and thirteen. The schools are secular and the primary grades are free, small fees being charged for secondary courses. In 1900 there were 132,897 pupils enrolled at the State schools. Of them, 107,912 were in average attendance. There were in the same year 15,550 pupils enrolled in private schools, mainly Roman Catholic. The Government maintains 85 village schools, which had an attendance of 3109. Besides a number of art schools, there are mining, agricultural, and engineering institutions. In 1900-01 the Government expended £481,087 on education. The New Zealand University is an examining body, which has five affiliated colleges located respectively at Dunedin, Christchurch, Auckland, Wellington, and Canterbury. Each of these has the advantage of land grants, the income from which is annually supplemented by colonial grants.

History. New Zealand was discovered by Tasman in December, 1642. In October, 1769, Captain Cook landed at Poverty Bay, and in 1773 and 1777 explored the shores of the islands. The period before European colonization was characterized by fierce wars among the native tribes, marked by extensive conquests on the part of the celebrated chieftain Hongi (1820-28). In 1814 Rev. Samuel Marsden established a mission in the Bay of Islands. Other missionaries rapidly followed, and the natives were speedily converted to the outward forms of Christianity. A British resident was appointed at the Bay of Islands in 1833, and in the following year British troops were employed against the natives. In September, 1839, an expedition, under the auspices of the New Zealand Company, arrived at Port Nicholson, the first body of immigrants reaching that place in January of the following year. In February a number of native chiefs, in the Treaty of Waitangai, placed themselves under the authority of the British Government, and in May the sovereignty of Great Britain over the islands was proclaimed. Colonization was rapid and the alienation of the Maori lands proceeded steadily. In 1850 the New Zealand Company surrendered all of its interests in the colony to the British Government, and in 1853 a constitutional act was promulgated for the colony, the first representative assembly being opened in 1855. From 1860 to 1866 there were formidable native uprisings, and spasmodic outbreaks did not cease until about 1870. Since that date the relations with the native population have been almost uniformly peaceful, and the Maoris have made rapid strides in civilization, attaining even a share in the government. In 1870 an act was passed establishing the New Zealand University. About this time, too, occurs the first beginnings of the policy of State participation in economic affairs, with the commencement of railway construction under public supervision in 1871, and the establishment of a Public Trust Office in 1872. An educational act providing for the free and compulsory instruction of all children was passed in 1876. In 1879 a measure was enacted looking toward the establishment of manhood suffrage, although the one-man one-vote principle was not in complete operation until 1890. In September, 1893, the franchise was extended to women.

The movement toward State socialism came prominently to the front in 1890, in which year the labor element exercised an important influence on the elections to the General Assembly. Since that year the progress in that direction has been rapid. Numerous labor laws have been passed, looking toward the amelioration of the condition of the working classes, while land legislation has been carried on with a view of bringing the soil into the possession of small owners. Thus, in accordance with an act of 1892, large areas of Government land have been leased in perpetuity to small tenants, the right of purchase being denied. In the same year the Government was authorized to acquire land for the purpose of settlement, and in 1894 this power of the Government was made compulsory. In the same year an act was passed authorizing Government loans to farmers on mortgage; in 1895 a Family Homes Protection Act prohibited homesteads from being mortgaged or sold for debt. As early as 1891 the property tax had been repealed, and a graduated tax on incomes and unimproved land values substituted, the income tax not being levied on incomes derived from land. Labor legislation culminated in the Industrial Conciliation and Arbitration Act of August 31, 1894, by which disputes between employers and employees were subjected to the decision of State tribunals. In 1898 an Old Age Pensions Bill was passed. In 1900 a form of workingmen's accident insurance was adopted. New Zealand rendered loyal support to the British Empire in the South African War, its mounted contingents constituting a very useful part of the British forces.

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NEW ZEALAND FLAX. See FLAX, NEW ZEALAND.

NEW ZEALAND SUBREGION. In the Sclater-Wallace system of zoögeography, a subregion of the Australian Province, including New Zealand and all the surrounding islands south of New Caledonia. Its faunal characteristics are delineated in the article NEW ZEALAND, paragraph *Fauna*. Other views have been held in regard to the faunal relations of this isolated archipelago. Huxley made it a primary subdivision of his hemispherical region 'Notogæa' (q.v.). Recent zoölogists have been inclined to consider its features so distinct as to elevate it to primary rank and make it a full 'region,' coordinate with the Australian and other 'provinces.' See DISTRIBUTION OF ANIMALS.

NEXT FRIEND. An adult person, other than a guardian *ad litem*, who represents in an action another person who, by reason of infancy or other disability, is not legally competent to maintain the suit in his own behalf. The practice of permitting an incompetent person to sue by his next friend originated in England, where it was first authorized by the 'Statute of Westminster' passed in the reign of Edward I. Previous to that time an action in favor of an infant or other incompetent person could only be conducted by his regularly appointed guardian. The Norman-French term *prochein ami*, of which 'next friend' is the English equivalent, was employed in the above statute, and continues in use in many jurisdictions to-day. There is very little difference between the functions of a guardian *ad litem* and a person who sues as next friend, except that the latter usually represents a plaintiff, and in some jurisdictions the former is only appointed to represent a defendant.

A next friend is not a party to an action, but acts solely in a representative and advisory capacity. It follows, therefore, that most of the rules governing parties, as that the admissions of a party bind him, etc., do not apply to a next friend. He is, however, subject to such rules as relate to the conduct of the case. A next friend is considered as an officer of the court where he is appointed to protect the interests of an incompetent defendant. In some States where an infant is otherwise represented by a guardian, he may sue by a next friend to compel an accounting by the guardian where there is reason to believe that the latter is guilty of a breach of trust. In a few jurisdictions married women and persons of unsound mind may sue by a next friend. Usually, however, lunatics and those who are mentally incompetent are represented by committees or guardians. An action commenced by a next friend cannot be discontinued or settled without the consent of the court. A next friend only represents the incompetent during the litigation, which, however, is not considered as ended until an appeal is determined or the right to appeal has expired. See COMMITTEE; GUARDIAN; INFANT; LUNATIC; MARRIED WOMEN; PARTIES; and authorities where referred to under these titles.

NEY, nâ, MICHEL, Duke of Elchingen and Prince of the Moskva (1769-1815). One of Napoleon's most celebrated marshals. He was born January 10, 1769, at Saarlouis, the son of a poor cooper. He had but little education and worked as clerk to a notary and as foreman in a mine until 1788, when he joined a hussar regiment at Metz. He made the campaign of 1792 with the Army of the North and rose to be lieutenant. In April, 1794, he became captain in the Army of the Sambre and Meuse, and distinguished himself by his energy and his cool intrepidity. He was wounded at the siege of Mainz, fought bravely in 1795 at Altenkirchen, and for his services in storming the citadel of Würzburg and forcing the passage of the Rednitz was made in 1796 brigadier-general. His capture of Mannheim (March 28, 1799) gained him the rank of general of division, and after being severely wounded at Winterthur in May, he was placed in September in temporary command over the Army of the Rhine, and carried on a skillful game of strategy against the Archduke Charles of Austria, whom he prevented from uniting with Suvaroff against Masséna. He fought subsequently under Lecourbe and Moreau at Engen, Moöskirch, and Hohenlinden. Ney's republican principles could not withstand the blandishments of Napoleon, who persuaded him to marry, in 1802, Mlle. Auguié, a friend of Hortense Beauharnais, made him inspector-general of cavalry, and sent him on a diplomatic mission to Switzerland, where he brought about the Act of Mediation of February, 1803. In the same year he received command of the Sixth Corps of the Grand Army raised for the invasion of England, but soon to be turned against Austria. In 1804 he was made a marshal of the Empire. In the following year he defeated the Austrians at Günzburg (October 9th) and by his successful assault on the intrenchments of Elchingen brought about the capitulation of Ulm and gained for himself the ducal title (conferred in 1808). He fought at Jena in 1806, reduced the cities of Erfurt, Magdeburg, and Thorn, and by his timely arrival on the battlefield of Eylau (q.v.) prevented a possible defeat for the French. On June 14, 1807, Ney took the village of Friedland from the Russians after a bloody combat, and thus decided the outcome of the battle. He now became the idol of the army, while Napoleon bestowed on him the title of *Brave des braves.* In 1808 he was sent with the Sixth Corps to Spain. He overran Galicia, maintained an energetic warfare against the Spanish guerrillas, and added to his reputation for audacity and skill. In 1810 he was placed under the command of Masséna, to whom was intrusted the invasion of Portugal. Ney resented what he conceived a slight toward himself, and, though he fought with splendid courage on the retreat from Torres Vedras as commander of the rear guard (one of the greatest incidents in his career), he was guilty of gross insubordination, and in March, 1811, returned to France in semi-disgrace. His talents, however, made him invaluable, and in the Russian campaign (1812) he held command of the Third Corps. He distinguished himself at Smolensk and commanded the centre at Borodino (q.v.), where his efforts achieved the victory, his services being rewarded with the title of Prince of the Moskva. He commanded the rear guard on the retreat from Moscow, and by vigorous discipline and devoted heroism saved the remnants of the Grand Army from utter disorganization, notably at the disastrous passage of the Beresina. In the campaign of 1813 he won a victory over the Allies at Weissenfels (May 1, 1813), fought at Lützen and Bautzen in May, but was defeated by Bülow at Dennewitz (September 6th). He held the left of the French line in the battles around Leipzig and was with Napoleon in the defensive campaign of 1814 in France. After the taking of Paris by the Allies he insisted on Napoleon's abdication and hastened to offer his services to the Bourbons. He was made a peer of France, and a member of the council of war, and was placed in charge of the sixth military division. On news of Napoleon's return from Elba he was ordered to Besançon to resist the Emperor's advance, but on the night of March 13th he went over to Napoleon, summoning his troops to follow him, and on the 17th he joined the Emperor at Auxerre, moved to this act, no doubt, by the magic influence of his old commander, but influenced too by the humiliations to which he had been subjected by the returned nobles of the old régime. At the head of the First and Second Corps of the new army raised by Napoleon, he fought on June 16th at Quatre-bras (q.v.), and led the last charge of the Old Guard at Waterloo. After the battle he returned to Paris and advocated the recall of the Bourbons. Proscribed on July 24th, he remained in hiding in the country till August 5th, when he was discovered and brought to Paris and arraigned (December 5th) before a court-martial containing many of his old companions in arms. The court declared Ney out of its jurisdiction as a peer of France, and handed him over to the Chamber of Peers, which on December 6, 1815, by 139 votes against 17 found him guilty of treason and condemned him to death. He was shot the following day in the gardens of the Luxembourg. Consult: Dumoulin, *Histoire complète du procès du maréchal Ney* (Paris, 1815); Rouval, *Vie du maréchal Ney* (ib., 1833); Welschinger, *Le maréchal Ney, 1815* (ib., 1893).

NEZHIN, nyĕ'zhên, or **NEJIN**. A town in the Government of Tchernigov, Little Russia, situated on the Oster, about 80 miles northeast of Kiev. It has a philological institute, a gymnasium, and a Greek school. It is noted for the tobacco cultivated in its vicinity. Vegetables and fruit are also important products. The trade, formerly of great extent, has decreased since the rise of Taganrog and Rostov-on-the-Don. It was under Chmielnicki, in the seventeenth century, that Greek merchants settled at Nezhin, where they received special privileges. Population, in 1897, 32,100, including a number of Greeks.

NEZ PERCÉ, nâ pâr'sâ'. The leading tribe of Shahaptian stock (q.v.). They call themselves *Shaptin*, whence the stock name, but they were known as *Chopunnish* to some of the neighboring tribes, and were called *Nez-percé*, 'Pierced Nose,' by the French, in allusion to their former custom of wearing nose pendants. They formerly claimed a large territory in eastern Washington and Oregon and central Idaho, bounded on the east by the main divide of the Bitter Root Mountains and including the lower Grande Ronde and Salmon rivers, with a large part of the Snake and all of the Clearwater River districts.

Lewis and Clark traversed their country in 1805. In 1832 they sent a delegation to Saint Louis to ask for Christian missionaries and teachers. In response to their request a Protestant mission was established among them at Lapwai, Idaho, in 1837. Soon afterwards they entered into governmental relations, and they made their first treaty with the United States in 1855. By this they ceded the greater portion of their territory and were confirmed in the possession of a reservation including Wallowa Valley in Oregon. On the discovery of gold in the country, however, the miners rushed in, and in consequence a new treaty was forced upon the Indians by which they agreed to surrender all but a reservation at Lapwai in Idaho. Joseph, who occupied Wallowa Valley with his band, refused to recognize the treaty or remove to Lapwai. This refusal led to the Nez Percé War in 1877, in which, under Joseph's leadership, several severe defeats were inflicted upon successive detachments of regular troops. Joseph finally almost accomplished a masterly retreat toward Canada through Idaho and Montana, which was frustrated only by the arrival of Colonel (General) Miles, when the Indians were within 50 miles of the British line. Joseph surrendered on assurance of being allowed to return to his own country, but the promise was not kept. He and his band were deported to the Indian Territory, where in seven years they were reduced by disease from about 450 to 280. Their condition compelled attention, and in 1884 they were returned to the north, not however, to their old country, but to the Colville reservation in northern Washington, where they now reside. From an estimated total population of 2800 in 1863 the tribe has decreased to less than 1700, of whom about 1570 are on the (allotted) Lapwai agency, in northwestern Idaho, the rest under Joseph being at Colville, Wash. The general report of conditions in either band is not encouraging. Consult Mooney, "Ghost Dance Religion," in *Fourteenth Annual Report of the Bureau of Ethnology* (Washington, 1896). See Plate of American Indians, under Indians, American.

NGAMI, n'gä'mė, Lake. A lake in South-Central Africa, situated in Western Rhodesia, north of the Kalahari Desert (Map: Africa, G 7). It is one of the last remnants of the great inland sea which formerly seems to have occupied the vast lacustrine basin of which the Kalahari is a part. A gradual desiccation is still going on in this region, and Lake Ngami has diminished considerably since it was discovered by Livingstone in 1849. It is now little more than a marsh in the dry season, while during floods it may reach the dimensions of 10 by 30 miles. It receives the waters of the Kubanga, and discharges periodically eastward into the Makarikari Salt Basin.

NGAN-HWEI, n'gän'hwä'ē (Chin., peace, plenty). One of the eastern provinces of China, bounded on the north by the Province of Kiang-su, on the east by Kiang-su and Che-kiang, on the south by Kiang-si, and on the west by Hu-peh and Ho-nan (Map: China, E 5). Its area is estimated at from 53,000 to 55,000 square miles. It is divided into three parts, the hilly region in the south around Hwei-chow and Ning-kwoh with the Tsien-tang River, the central plain of the Yang-tse, and the northern part, drained by the River Hwai. The southern districts are famed for climate, fertility, and productions. The staples are fruits, cotton, hemp, silk, and iron. The numerous streams are used for navigation and for irrigation, their control showing great engineering ability. The province contains some of the most productive and beautiful parts of the Empire and is under a high state of cultivation. It suffered greatly in the Tai-ping rebellion, losing nearly half its population. Its present population is estimated at over 20,000,000. Capital, Ngan-king-fu (q.v.).

NGAN-KING-FU, n'gän'kĭng'fōō'. The capital of the Province of Ngan-hwei (q.v.), China, situated on the Yang-tse river, about 175 miles east of Hankow (Map: China, E 5). It still shows traces of its occupation during the Tai-ping Rebellion. It was opened to foreign trade in 1897. Its population is estimated at 40,000.

NGORNU, n'gôr'nōō, or **ANGORNU**, ȧn-gôr'nōō. A town of Bornu, Central Africa, on the southwest bank of Lake Chad, 15 miles southeast of Kuka. Owing to its low position, the town is occasionally flooded by the rising waters of the lake. Ngornu is an important commercial place and through its fairs an extensive trade is carried on in cotton, amber, and metals. Its population is estimated at from 20,000 to 50,000.

NIAG'ARA, Battle of. See Lundy's Lane, Battle of.

NIAGARA FALLS. See Niagara River and Falls.

NIAGARA FALLS. A city in Niagara County, N. Y., 22 miles north by west of Buffalo; on the Niagara River, and on the Erie, the Michigan Central, the Lehigh Valley, the New York Central and Hudson River, the West Shore, the Grand Trunk, and the Wabash railroads (Map: New York, B 2). It is the seat of Niagara University (Roman Catholic), opened in 1856, and De Veaux College (Protestant Episcopal), and has a public library, for which a $50,000 building was given by Andrew Carnegie. The New York State Reservation here, which includes Prospect Park, is 107 acres in extent; and there are three notable bridges connecting with Canada, one cantilever and two steel arch bridges. (See Bridge.) The vicinity possesses much of historic interest. Niagara Falls has long been noted as the foremost scenic resort of America. It is developing also into an important manufacturing centre, its growth being due to the utilization of the extraordinary power of the Niagara River and Falls (q.v.). Among the industrial establishments are flour and paper mills, planing mills, a foundry and machine-shop, a plant for the production of wheat biscuit, aluminum, carbide, and carborundum works, and electro-chemical works. Niagara Falls was chartered as a city in 1892, the former villages of Niagara Falls and Suspension Bridge being consolidated. The government, under the original charter, is vested in a mayor, elected biennially, and a common council, and in administrative officers who are appointed by the mayor. The water-works are owned and operated by the municipality. Population, in 1900, 19,457.

NIAGARA FALLS, formerly CLIFTON, or SUSPENSION BRIDGE. A town of Welland County, Ontario, Can., on the west bank of Niagara River, below the falls, 20 miles northwest of Buffalo. It is opposite Niagara Falls City, U. S., with which it is connected by three bridges and electric railways, and is the junction of the main lines of railways entering that city with the Grand Trunk Line of Canada. Its chief features are Wesley Park and Queen Victoria Niagara Falls Park, which covers an area of 154 acres, extends along the river for two and a half miles, and commands the finest views of the falls. Extensive works similar to those on the United States side are in course of construction to utilize the water power. Population, in 1901, 4244.

NIAGARA-ON-THE-LAKE. A town in Lincoln County, Ontario, Can., on Lake Ontario, at the mouth of the River Niagara, 36 miles distant by water from Toronto (Map: Ontario, D 4). Burned down in December, 1813, by the American General McClure on his retreat, it was rebuilt, and is known as a summer and pleasure resort with good bathing, boating, and fishing. Population, in 1901, 1258.

NIAGARA RIVER AND FALLS (Iroquois *Jorakare*, thundering water). The Niagara River flows from Lake Erie to Lake Ontario, and is the outlet for the whole drainage of lakes Superior, Huron, Michigan, Saint Clair, and Erie. The surface of Erie, where the river begins, is 326 feet higher than the level of Ontario, where it ends. The water is clear and pure. The river is 33 miles long, its general direction is from south to north, and it forms the boundary between New York State and the Canadian Province of Ontario. The volume of water which enters Niagara is 280,000 cubic feet a second. In its upper course it is very wide (below Grand Island from 2½ to 3 miles); just above Niagara Falls it is less than a mile in width, and below the falls it rushes headlong through a deep and narrow gorge to the cliff at Lewiston, where it emerges on the plain of Lake Ontario, and is again a broad and peaceful river.

As it emerges from Lake Erie and enters the plain, it is crossed by a low ridge of rock, in passing which the river is swift and troubled for about two miles. Then it is smooth again, flows slowly over the plateau, has an average depth of 25 feet, and its surface is interspersed with many small islands. For nearly three-fourths of its length it cannot be said to have a valley, for it flows upon the surface of the plateau, and its fall from the lake to the rapids above the cataract is only 20 feet. Then a sudden and complete change in its aspect occurs. It is dropped by the short rapids beginning a little above Goat Island 52 feet, which is the prelude to the fall over the majestic cataract, where it plunges 160 feet down into the plain, a total descent of 212 feet from the head of the rapids. At the foot of the American Falls there is no great depth of water, massive and broken rock in the bed having prevented the deep excavation that would otherwise occur; but the enormous mass of water, 20 feet deep at the centre and about nine-tenths of the whole volume, which thunders over the Canadian or Horseshoe Falls, has excavated a basin extending from shore to shore for 1½ miles below the falls that is fully as deep as the height of the falls. The effect of this deep basin or reservoir is to retard and smooth the waters so far that rowboats cross the river and the little steamer *Maid of the Mist* is able to approach the cataract. The basin is succeeded by the narrow gorge which continues to Lewiston, its width rarely equaling one-fourth of a mile, and its depth to the bottom of the river varying from 200 to 500 feet. Its walls are so steep that they can be climbed only at a few places, and they reveal the geologic structure of the plateau—the bedded rocks of limestone, shale, and sandstone lying almost horizontally. The fall of the river in the gorge, seven miles long, is about 100 feet. The confined waters pour tumultuously along at an estimated speed of 30 miles an hour, and the terrific onrush and battle of the waters make a spectacle that is equal to that of the falls themselves. About midway in the gorge the channel makes an abrupt, short turn to the left, and here the onslaught of the torrent has worn out a vast circular basin forming the celebrated Whirlpool. From the Whirlpool the channel is broader and less steep. The plateau ends abruptly at Lewiston, and its edge, where it steeply descends to the littoral plain of Ontario, is marked by a long escarpment parallel with the shores of the lake, known to geologists as the Niagara Escarpment, which rises to about 250 feet above the level of Ontario. The last seven miles of the journey is over the littoral plain with a fall of only about three feet.

The position of Niagara Falls marks the present extension of the work of the river in cutting this great gorge. It is not known by what channel or channels Lake Erie may have discharged its waters in pre-glacial times; but geologists have proved that the Niagara River began its existence during the final retreat of the great ice sheet; in other words, most students of glacial geology agree that the history of the river covers only a small part of the period since the beginning of the age of ice.

The great work of the river has been in excavating the gorge from Lewiston back to the present position of the cataract. The falls first poured over the edge of the escarpment at Lewiston and began to dig their way back through hard limestone and sandstone, interbedded with a coherent though softer shale, and for a part of the distance the material was incoherent drift. The process of excavation may be observed at the falls. The rocks lie in layers and the upper covering of loose drift yields readily to the wash of the waters. Under the drift is hard limestone, called the Niagara limestone, 80 feet in thickness; beneath the limestone lies the softer Niagara shale, with a thickness of 50 feet; then for 35 feet is the Clinton group, an alternation of limestone, shale, and sandstone, the whole resting upon a bed several hundred feet in thickness of soft sandy shale, which is not known to be interrupted except by a single hard layer of sandstone from 10 to 20 feet thick. These shales and sandstone are called the Medina formation. The hard top layer of limestone projects like a shelf over the edge of the falls so that the water leaps from it and strikes the surface of the pool below. Now and then large blocks of the upper limestone break away and fall into the pool, due doubtless to the erosion of the softer shale beneath, the limestone thus being deprived of its support. Just how the shale is eroded, and how the harder rock beneath it is affected, is in doubt. It is observed in the Cave of the Winds, where visitors may pass behind one of the thinner segments of the falls, that spray and water are constantly dashing against the shale and probably wear it away. The shale is also calcareous, and this element in it being soluble, it is likely that solution has a part in the work of destruction. As the water contains no sediment, the Niagara River cannot use this agency, as most rivers do, to scour out its bed; but the broken pieces of rock that fall into the river below the cataract are undoubtedly potent in digging out and deepening the channel. Government engineers have discovered depths of 200 feet a half mile below the falls, and Gilbert and other geologists assume that the falls are scouring the river bed as deeply now as they did when they were situated farther down the stream. This is occurring in front of the Horseshoe Falls, but not at the American Falls, where the volume of water is comparatively small. The broken rock here piles up as a talus at the foot of the fall, and upon it the force of the descending water is spent.

The edge of the American Falls is retreating much less rapidly than that of the Horseshoe Falls. The average annual recession on the American side has been only about a half foot for the past fifty years; but the Horseshoe Falls have receded in fifty-two years from 150 to 230 feet along the western half of its edge, and 270 feet at the apex of its curve, making a recession of from four to six feet a year. If this rate of recession were constant, the proof would be conclusive that the gorge, from the Niagara escarpment to the falls of to-day, had been excavated in about 7000 years. But the thickness of the resistant bed at the crest of the falls is far from uniform; and there is evidence that at one period after the retreat of the ice the upper lakes found outlets through other rivers, and only Lake Erie was drained by the Niagara, whose small volume of water then must have been greatly inferior to that of to-day in its ability to excavate the gorge. The assured fact is that the gorge is gradually being cut back toward Lake Erie.

About a half mile above the brink of the falls, Goat Island divides the river into two unequal streams, the one on the American side being comparatively shallow and narrow, and discharging over the American Falls, while most of the river swings around to the left of Goat Island and discharges over the Horseshoe or Canadian Falls. The resemblance of the outline of these falls to a horseshoe has been destroyed by the more rapid recession of the central part of the cataract edge. The American Falls are 1060 feet wide, and the water is very shallow as it plunges over the edge, falling 167 feet. The Horseshoe Falls have a total width of 3010 feet, measured along the curve, or 1230 across the chord, a maximum estimated depth of 20 feet, and a vertical height of 158 feet. As the water is derived from the immense reservoirs of the lakes, there is little variation in the quantity, the differences in volume depending not so much upon precipitation as upon the strong winds which slightly retard or accelerate the movement of the surface waters of Lake Erie to the mouth of the river. The normal flow pouring over the cataract is about 500,000 tons a minute.

The falls, being one of the great scenic attractions of the world, are visited every year by many thousands of tourists. From the time when Father Hennepin discovered them in 1678, and wildly estimated that they were over 500 feet in height, they have never been adequately described. A realizing sense of the grandeur of this prodigious green flood pouring into an abyss where it is half lost in the masses of ascending mist can be obtained only by personal observation. Sightseeing has been greatly facilitated, and visitors protected from imposition since 1885, by the conversion of the land on both sides of the falls into public parks. The New York State Reservation contains 107 acres, and the Queen Victoria Niagara Falls Park on the Canadian side 154 acres. Since these banks became Government properties, the mean industrial structures that marred them have been torn down, and the wonderful spectacle may now be enjoyed at leisure from shady avenues, artificial platforms, and other advantageous points of view. Trains on the Canadian side wait for a few minutes to give the passengers a glimpse of the vast sheet of water curving over the Horseshoe Falls. An electric trolley line has been built through the gorge along the brink of the river on the American side and connects by the Queenstown bridge with the electric line skirting the Canadian heights along the gorge and extending past the Horseshoe Falls to Chippawa; a railroad also skirts the United States edge of the gorge, so that visitors may see its entire length and take in the terrific features of the rapids and the whirlpool. Many visitors enter the Cave of the Winds, approach the falls on the steamer *Maid of the Mist*, or enjoy the superb general view from the middle of the upper arch bridge or the high terrace below the Horseshoe Falls on the Canadian side. Several days are required even for a cursory examination of all the attractions of the place. The bridge thrown across the river a little below the falls was long regarded as a wonder of engineering. This suspension bridge for pedestrians and carriages, built of steel about 250 yards below the American Falls, had a span of 821 feet. It has been replaced by an arch bridge. The cantilever, 910 feet long, spanning the gorge some distance above the Whirlpool, was the first bridge of the kind to be built in America; the railroad steel arch bridge, 300 feet below the cantilever, has a carriageway below the track.

It is only in recent years that important attempts have been made to utilize the energy of Niagara Falls for industrial purposes. The largest plant is that of a power company which generates electricity by leading water through a canal from above the falls to a wheel pit in which are turbines, the water discharging through a tunnel into the river below the falls. Many industries at the falls are using the electricity, and Buffalo, 22 miles distant, takes it for its city railroads and other power purposes. Over three-fourths of the power generated, however, is consumed in the neighborhood of the falls.

NIAGARA FALLS
FROM THE AMERICAN SIDE

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NIAGARA SERIES. The lowest division of the Upper Silurian (or Silurian) system of rocks. It is made up of a series of sandstones, limestones, and shales, which are grouped together under the Medina, Clinton, and Niagara stages. The rocks of the Niagara series are found in central and eastern New York, and extend southward through Ohio, Pennsylvania, Virginia, eastern Kentucky, and Tennessee, and westward through Illinois, Missouri, and Iowa. They are also known westward in Illinois, Wisconsin, and Indiana. Many of the beds are very persistent. The Oneida conglomerate at the base forms the bold scenery of the Shawangunk Mountains, in New York; the Clinton division carries a bed of red hematite iron ore which is found from New York to Birmingham, Ala., where it forms the basis of a large steel industry. The limestone and shale of the Niagara epoch are seen at Niagara Falls, where it is the undermining of the limestone, due to the wearing away of the shale, which has caused the falls. Fossils are found in great abundance in most of the rocks. See SILURIAN SYSTEM; CLINTON STAGE.

NIAM NIAM, nê-äm′ nê-äm′, or ZANDEH. A numerous people of Negro-Hamite blood on the Nile-Congo-Chad water-shed north of the Welle River, Southeastern Sudan, between 4° and 7° north latitude and 25° and 29° east longitude. They are negroes, brachycephalic, muscular, of medium height, and brown color. They are noted for their cannibalism. Their houses are conical, with clay walls and thatched roofs; the kitchen hut and sleeping hut for boys form part of the dwelling group. They are hunters and agriculturists, excel in textile work and handicraft in clay, wood, and iron, and play on a five-stringed harp. They fight with throwing knives, swords, assegais, clubs, and shields. Numbering over two millions, they are divided into small sovereignties, partly independent, partly under the Congo Free State. Consult: Stanford, *Africa* (London, 1895); Deniker, *Races of Man* (London, 1900).

NIAN′TIC, or **NEHANTIC.** A small Algonquian tribe, formerly occupying the southwestern coast of Rhode Island, adjoining the Narraganset (q.v.), who claimed dominion over them. Their principal village was at Fort Neck, on the Great Pond in Charlestown. By refusing to join the hostiles in King Philip's War of 1675-76, they were able to preserve their territory and tribal organization, and at the close of the war the Narraganset who submitted to the English were settled with the Niantic, and the whole body thenceforth took the name of Narraganset. A detached body, supposed to have been cut off from the main tribe by an invasion of the Pequot, resided on Niantic Bay, in Connecticut. They were subject to the Pequot, and with them were nearly destroyed in the war of 1637, the few survivors gradually wasting away by emigration and disease until none were left in the original territory. The present Narraganset of Rhode Island are chiefly of Niantic descent, so far as their Indian blood is concerned.

NIAS, nê′äs′. An island in the Indian Ocean, belonging to the Netherlands, and situated 65 miles from the west coast of Sumatra (Map: Australasia, B 2). It is 65 miles long, 20 miles wide, and has an area of about 1800 square miles. It is mountainous and surrounded by coral reefs, and the soil is very fertile, the chief products being rice, sugar, and pepper, the latter amounting to over 100,000 pounds annually. The inhabitants, whose number is estimated at 200,000, are a Malay people closely akin to the Battaks. They are somewhat lighter in color of skin than many of the Malayan tribes, and are sometimes classed as Indonesians. In head-form they tend toward dolichocephaly. The island has suffered much from intertribal wars, and the slave trade continued here with unusual persistency. Consult: Modigliano, *Un viaggio a Nias* (Milan, 1890); Sundermann, "Kleine niassische Chrestomathie," in *Bijdragen voor de taal- land- en volkenkunde van Nederlandsch Indie*, ser. v., vol. vii. ('sGravenhage, 1892); id., *Kurzgefasste niassische Grammatik* (Mörs, 1892); id., *Deutsch-niassisches Wörterbuch* (ib., 1892).

NIATA, nyä′tä, or **NATA**, nä′tä. A breed of deformed cattle, long existent in Argentina, but now very rare. These animals greatly interested Darwin as an example of a variation, believed to have originated early in the eighteenth century among the Patagonian Indians, and to have remained constant for a long period. They have very short, broad foreheads, upturned noses, lips withdrawn, showing the teeth, and a ludicrous facial resemblance to pug dogs. They are remarkable for 'breeding true,' and the amount of influence exerted on the hybrid offspring when crossed with other cattle. Consult Darwin, *A Naturalist's Voyage* (London, 3d ed., 1860; New York reprint, 1899). Compare PREPOTENCY.

NIBELUNGEN, RING DES. See RING OF THE NIBELUNGEN.

NIBELUNGENLIED, nē′be-lụng′*e*n-lēt′ (Ger., Song of the Nibelungs). A great German epic, composed by an unknown poet on the basis of earlier German songs, traditions, and possibly Latin poems, at the beginning of the thirteenth century. The original form of the poem is probably in none of the ten complete MSS., but that known as B seems closest to the original. A seems an abridgment, C an enlargement of B, and to one of these three types all the MSS. and fragments belong. The song falls into two parts, the first dealing with the wooing, marriage, and murder of Siegfried, the second with the vengeance of his widow, Kriemhild. The scene of the former is the Burgundian court of Gunther and his wife, Brunhilda, at Worms, of the latter the Hunnish court of Etzel or Attila; but both parts appear to have got their present form among the Franks, whence the legends spread over Germany and to Scandinavia, where we find them much modified in the *Edda* and the *Thidreksaga*. The outline of the story is this: Siegfried, King of the Nibelungs in Nether Germany, wooes Kriemhild, sister of the Burgundian King Gunther, for whom he procures to wife Brunhilda, Queen of Iceland, by wearing a magic cloak, and is rewarded with Kriemhild's hand. Brunhilda discovers the deception and procures the murder of Siegfried by Hagen. To avenge herself, Kriemhild accepts the suit of Etzel and invites Gunther with his brothers and courtiers to visit her. Hagen perceives her intent, buries the Nibelungen treasure in the Rhine, and, after vain efforts to dissuade the King, accompanies him. The Burgundians are attacked in a hall and all are finally killed, not without loss to Etzel of Kriemhild, of their son, and of all his warriors, save only Dietrich von Bern (Theodoric of Verona) and his companion, Hildebrand, hero of the *Hildebrandslied.* Then follows in all MSS. a *Lament* (*Die Klage*) older than the *Song* and also anonymous. The historical substratum of the legend is the defeat of the Burgundian King Gundahari by Attila in 437. Kriemhild seems identical with the girl Ildico (Hilde), who was with him at his death, according to Jordanes, but the actual Theodoric belongs to a later period, and if Siegfried be, as many have thought, identical with Arminius, he is more than four centuries earlier. Others regard Siegfried, with Brunhilda, as mythical. The poem derives such unity as it has from various forms of the conflicting claims of double allegiance. In Kriemhild there is the conflict between wife, sister, and mother; in Siegfried between husband and vassal; in Hagen between chivalric honor and allegiance; and in Rüdiger, Etzel's great vassal, between hospitality and loyalty. Thus in one form or another that faithfulness (*Treue*) that Heine said was the strongest characteristic of the German nation is the mainspring of tragic action. But the *Song* lacks unity of inner structure. Passages of deep feeling and pathos alternate not alone with those of fierce, rugged strength, but with others trivial, grotesque, or even, as in Gunther's wedding, downright burlesque. The episodes, too, are so inartistically welded that a school of critics, Lachmann at their head, even thought they could distinguish the elements of compilation; but this position is now generally abandoned. The history of the Nibelungenlied is not without interest. For centuries it was quite forgotten. Bodmer (q.v.) printed fragments of it in 1757, but it was received with indifference by scholars and with contempt by King Frederick II. The national spirit roused by the War of Liberation was more favorable to the legend. A soldiers' edition was printed in 1815, and in the next year Karl Lachmann published his epoch-making study. Since then the Nibelungenlied has grown steadily in scholastic and popular favor till its contents have become part of German literary consciousness. It has been. the subject of critical studies by the Grimms, Müllenhoff, Zarncke, Bartsch, and Scherer; has been edited several times in its three versions, and well translated into modern German by Simrock, Bartsch, and Freytag. There are English versions by Lettsom (1850), Foster-Barham (1887), and Birch (1887).

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NIB′LO'S GARDEN. A former New York theatre on Broadway, near Prince Street, established in 1828 under the name of the Sans Souci, and later the property of William Niblo. It was famous as the home of the spectacular drama during the second half of the nineteenth century. It was twice burned and rebuilt, and was finally torn down in 1900.

NICÆA, nī-sē′ȧ, or **NICE,** nēs (Gk. *Νίκη*, *Nikē,* Νικαία, *Nikaia,* city of victory). A city of Bithynia, in Asia Minor, situated at the eastern end of Lake Ascania. It was built on the site of an older town by Antigonus (B.C. 316) and received the name of Antigoneia, which Lysimachus changed to Nicæa, in honor of his wife. It was a handsome town and of great importance in the time of the Roman and Byzantine emperors; all the streets crossed each other at right angles, and from a magnificent monument in the centre the four gates of the city were visible. It was early the residence of a Christian bishop, later of an archbishop. In 1078 it was captured by the Seljuks. In 1097 it was taken by the Crusaders. Theodore Lascaris (q.v.) made it the capital of his dominions in Asia Minor in 1206, and it remained the seat of an independent Greek State until 1261, when Michael Palæologus, Emperor of Nicæa, restored the Byzantine Empire. It fell into the power of the Osmanlis in 1326. Nicæa's chief importance in history is in connection with the two church councils held there. (See NICÆA, COUNCILS OF.) At the present time it is a small village called Isnik, with many interesting ruins. The church in which the council is said to have been held is now a mosque.

NICÆA, COUNCILS OF. Two ecumenical councils of the Christian Church, held at Nicæa in Bithynia. (1) The first was convened by the Emperor Constantine in 325 to settle the Arian controversy. Of some 1800 bishops in the Empire, 318 attended the council. The total number of delegates, including presbyters and others, was probably more than 1500. The eastern provinces were largely represented. Many of the members were venerable and illustrious men, among whom were Eusebius of Cæsarea, eminent for learning; Athanasius, then only a young deacon, attendant on the Bishop of Alexandria, small and insignificant in person, but conspicuous for intellect, eloquence, and zeal; Arius, a parish priest of Alexandria, 60 years old, tall and emaciated in person, wild, sometimes almost to madness, in manner ascetic, and negligent in dress, yet having a sweet voice, and fascinating speech; Paphnutius, a martyr of the Upper Thebaid, whose right eye had been dug out with a sword, and the empty socket seared with a hot iron; Paul of Neo-Cæsarea, also a martyr, scarred by the brand of hot iron which had crippled both his hands; Jacob of Nisibis, who had spent years as a hermit in forests and caves, subsisting on plants and roots; Spiridion of Cyrus, continuing, even after his ordination, a literal shepherd; Hosius of Cordova, the ablest and best of the Western delegates; two Roman presbyters, influential as representing Pope Sylvester, who was kept at home by the infirmities of age; a Persian bishop from the eastern frontier, and a Gothic bishop from the north. Constantine's object in convening the council, as announced in his opening address, was to heal the divisions in the Church. At the opening of the discussions on the nature of Christ there seemed little prospect that the Emperor's prayer for harmony among the delegates would be answered. Accusations and recriminations were bandied to and fro without regard to his presence. The first sessions were devoted chiefly to a discussion of the Arian views, accompanied with an examination of Arius himself. He maintained that the Son of God was a creature, though indeed the most exalted of all; that He had been made out of nothing; that there was a time when He did not exist; and that, in His own free will, He was capable of right and wrong. The first attempt to reach a decision was made by producing an ancient creed of Palestine, the basis of that which was ultimately adopted, but opposed at first by the orthodox—the more violently because the Arians were willing to adopt it. A letter having been read from Eusebius of Nicomedia, in which he declared that to assert the Son to be uncreated would be to say that He was of one substance (ὁμοούσιος) with the Father, the expression was laid hold of as furnishing the very test for which they were seeking. For the confession of faith adopted at the end of the deliberations, see NICENE CREED.

Another controversy determined had reference to the time for observing Easter. The question was, Ought the Christian passover to be celebrated on the same day as the Jewish—the 14th day of the month Nisan—or on the following Sunday? On the one side were the apostolic traditions, and on the other the Catholic spirit seeking separation from Jewish ideas. At the date of the council the Judaic time was observed by the principal Eastern churches, and the Christian time by the Western churches, with a part of the Eastern. The decision was in favor of the Christian time. Some smaller matters also were decided by the council, and 20 canons passed on various subjects pertaining to morality and religion. For a minute and picturesque description of this council, consult: Stanley, *History of the Eastern Church* (London, 1861); also Boyle, *A Historical View of the Council of Nice, with a Translation of Documents*, in Cruse's translation of Eusebius (New York, 1856).

(2) The second council of Nicæa was convened in 786 by the Empress Irene and her son Constantine, dissolved because of the tumults raised by the image-breaking party, and reassembled the following year. Three hundred and seventy-five bishops attended from Greece, Thrace, the isles of the Archipelago, Sicily, and Italy. The council was occasioned by the Emperor's ill-judged severity in forbidding the use of images for any purpose, and causing them everywhere to be removed and destroyed; and by the violent opposition to his course. For the history of this controversy, see IMAGE-WORSHIP.

NICAN′DER (Lat., from Gk. Νίκανδρος, *Nikandros*). A Greek physician and poet, born at Colophon, in Asia, about B.C. 150. Of his numerous works only two poems are extant: the Θηριακά (nearly one thousand hexameter lines), on remedies against the wounds inflicted by venomous animals; and Ἀλεξιφάρμακα (more than six hundred hexameter lines), on poisons and their antidotes. Among his lost works was the Ἑτεροιούμενα, which is said to have been one of Ovid's sources for his *Metamorphoses*. He is frequently quoted by Pliny, Galen, and other ancient writers as an authority on all matters relating to toxicology. Consult the edition by Schneider, revised by Keil (Leipzig, 1856).

NICANDER, nė-kän′dĕr, KARL AUGUST (1799-1839). A Swedish poet, born at Strengnäs. He studied at the University of Upsala. A prize from the Swedish Academy for his poem *Tassos död* (1826) gave him an opportunity to go to Italy (1827). After his return he lived in want almost to the day of his death. His earliest important poem was *Runesvärdet* (1821); this was followed by a collection of poems and tales, *Hesperider*, and the poem *Minnen från Södern* (1831), containing his recollections of Italy, a land which appealed strongly to his imagination. His best poem, *Lejonet i öknen* (1838), is a eulogy of Napoleon. A collection of his poems appeared at Stockholm in 1839-41 (4 vols.; 5th ed. 1883).

NICARAGUA, nĕ′kȧ-rä′gwȧ (from *Niquirao*, *Nicarao*, a Nahua tribe inhabiting the country in the sixteenth century). The largest of the Central American republics excepting Guatemala. It is bounded on the north by Honduras and on the south by Costa Rica. Its frontage on the Caribbean Sea is about 300 miles; that on the Pacific, 200 miles. It extends between latitudes 10° 41′ and 15° N. and longitudes 83° 15′ and 87° 40′ W. (Map: Central America, E 4). Civilization is centred in the western third of the country. The settlements extend scarcely 100 miles inland from the Pacific. The wide Caribbean slope has no towns of importance excepting Bluefields and Greytown (San Juan del Norte). The low and hot Caribbean plain is under the influence of the moist trade winds which nurture the most luxuriant tropical vegetation. Almost impassable virgin forests, inhabited by scattered bands of Indians, spread from the western mountains to the Caribbean; but though this larger part of the country is rich in valuable timber and its higher lands contain the centres of gold-mining, it is the home of few white men. The higher and drier regions of the western mountain ranges with the plain between them are, on the other hand, adapted for planting and other industries, and have attained considerable development. The estimated area is about 49,000 square miles, about the same as that of Louisiana.

TOPOGRAPHY. The Caribbean coast is low and poorly supplied with harbors. It has three ports, none of them adapted for large ships. Greytown, in the delta of the San Juan River, formerly had a splendid harbor with 30 feet of water at low tide, but during a flood in 1855 the river widened and deepened the Colorado branch of the delta so that most of the river now discharges south of Greytown in Costa Rica, leaving Greytown harbor, which has also been silted by the sea, very shallow. The port of Gracias á Dios is also shallow. Bluefields, on a large lagoon, is the most important east-coast port. The Pacific coast is high, and the water is deep close to the shore. The harbor of Corinto is one of the best-protected ports on the Pacific, and San Juan del Sur has a small but deep and safe harbor. Saint Andrews, Old Providence, and Great and Little Corn islands, near the Caribbean coast, are centres of banana and cocoanut growing.

Geographically Nicaragua is divided into distinct zones by two chains of mountains, which, more or less broken, and with numerous flanking spurs, traverse the Republic in a northwest and southeast direction parallel with the Pacific coast. The western or coast range is a part of the mountain system extending through most of Central America. In Nicaragua it is only ten to twenty miles from the Pacific, and its nearness to the ocean accounts for the fact that no considerable streams discharge from that slope into the Pacific. This western range, with the depressed plain lying between it and the eastern range, forms the principal line of volcanic energy and is marked by a number of extinct and active volcanoes built up by outpouring lava. None of them reaches 7000 feet above sea-level. Masaya (2972 feet) was violently active at different periods from the time of the Spanish Conquest until 1772, when a vast mass of lava was ejected from its crater, covering a tract of land eight miles long by two wide. It was dormant between 1861 and May, 1902, when it resumed activity. Coseguina (over 3000 feet) had a terrific eruption period in 1835, but has since been inactive. The Spaniards founded the city of Leon Viejo at the foot of Momotombo, but the eruption of 1609 so alarmed the citizens that they removed en masse 23 miles from the town they had founded and established new Leon on its present site. In recent years this volcano has ejected dust and scoria without inflicting damage. Other well-known volcanic summits are Telica, Las Pilas, Mombacho, Zapatera, Ometepe, etc. The severe earthquakes recorded in Nicaragua are associated with its volcanic phenomena.

The eastern range enters Nicaragua from Honduras and extends in a general southeastern direction to the coast north of the San Juan River, about 50 miles from its mouth. It sends out numerous spurs toward the Caribbean, between which flow the many rivers of the country. Between the eastern and western ranges lies the great interior basin, about 300 miles long and 100 miles wide, where the population and industries are in great part centred, chiefly near the west shores, or a little to the north and west of the two great lakes of the country. The dominating topographic features are thus the wide, low, rolling plain of the east, interspersed with mountains and spurs, and, toward the northwest, with highlands; the two cordilleras; the depressed plain between them with its two large lakes; and the steep, narrow Pacific slope.

Hydrography. In the plain or basin between the ranges are two large lakes, Managua and Nicaragua, connected by the river Tipitapa and collecting the drainage of the basin, which has an area of about 12,000 square miles. The larger lake, Nicaragua, comprises over 3000 square miles, and is 110 miles long. Its longer axis is parallel with the Pacific, from which it is only eleven miles distant at the nearest point. It is from 12 to 200 feet deep, with its surface about 106 feet above the sea-level. It receives the waters of the shallower Lake Managua (32 miles long by 16 wide). The waters of these lakes are carried to the Caribbean by the San Juan River, which has an average width of 1500 feet, and a minimum discharge of about 10,000 cubic feet per second. Its course is 120 miles, and it is navigable for small-draught steamers except at a few rapids, which offer obstruction in the dry season. The river has recently played little part in the commerce of the country, but in the construction of the Nicaragua Canal it was proposed to use its waters for many miles. The other rivers are mainly to the north of the San Juan, east of the mountain ranges, and drain the wide, forested plain. Most important among them are the Segovia or Wanks, about 300 miles in length, but with a narrow drainage basin, which does not carry a volume of water proportionate to its length; the Rio Grande, about 230 miles long, navigable for small vessels for 100 miles from the sea if a channel were cut through its bar; and the Bluefields River, navigable for 65 miles, its banks lined with banana plantations, whose crop is carried on the river to Bluefields for shipment to the United States. The Pacific coast rivers are unimportant.

Climate. The climate is very warm, but not unhealthful, the prevailing trade winds mitigating the discomforts of the temperature, which varies little, seldom rising above 85° or falling below 70°. The seasons are divided into the wet and the dry, but on the Caribbean side they are not well defined, as rain falls nearly every day in the year. The precipitation at Greytown is 200-250 inches annually, while in the west, in the higher land, the precipitation is only 65-80 inches. The soil is very productive. On the Caribbean slope it is mainly reddish clay covered by leaf humus, and the cultivated regions of the west have a deep, black soil, in which fertilizing lavas and volcanic dust are large constituents.

Flora. The eastern plain is covered with trees of great size, beneath which is a thick growth of bushes and vines. There are 54 varieties of trees suitable for hardwood lumber; 40 varieties supplying industrial or medicinal gums, balsams, resins, fibres, oils, extracts, food, drink, and spices; and 74 varieties of fruit trees, of which 17 are wild and 57 cultivated. Rubber abounds, but the supply has been depleted by ruinous methods of collection. For this reason rubber-collecting, except in the Bluefields district, has been prohibited until 1907, though it may be gathered from cultivated trees on rubber plantations which are now being opened. It is believed that the cultivation of rubber will be successful. The resources of the forest are enormous, but as yet are little utilized. Citrus fruits flourish, especially in the western part of the country. The cultivation of most tropical crops is considerably developed and has a great future.

Fauna. Animal life is very rich and varied, particularly in the moist eastern regions. The principal mammals are the jaguar, cougar, wild swine, deer, monkeys, squirrels, and opossums. Alligators are found in the rivers and along their shores, and turtles, snakes, some very poisonous, and insect life are superabundant.

Geology and Mineral Resources. The Caribbean plain is alluvial. Far inland behind the plain are the highlands of Segovia, Matagalpa, and Chontales, composed of Paleozoic and Mesozoic strata, with granite and basalt intrusions. The gold diggings are found chiefly in these highlands. The broad depression between the mountains extending from near the Gulf of Fonseca to the lakes and the valley of the San Juan is mainly Paleozoic, with a deep covering of volcanic dust and tufa. The country west of the lakes is formed to a great depth of matter ejected from the line of volcanic fissures and cones, which pass through or appear above it. On this erupted mass are situated most of the larger towns, and here is the dwelling place of over seven-tenths of the population. American and British companies do most of the mining. At present only gold mines are worked in Nicaragua, though silver-mining yielded great returns in the sixteenth and seventeenth centuries. The gold mines, about 50 in number, have contributed largely to the wealth of the Republic. Those of Chontales yield from one-fourth of an ounce to two ounces of gold to the ton of ore; those of Nueva Segovia from one and a half ounces to three ounces. The total production in the past ten years has been from 20,000 to 70,000 ounces a year. Tin, nickel, antimony, arsenic, and other metals and minerals have been located, but as yet are not economically important.

Agriculture. The rich farming regions of the west are capable of vastly greater development than has yet been attained. The coffee plantations (many of them belonging to Germans) yield the principal crop, the berry being grown throughout the highlands of the north and northwest. The largest crop was produced in 1902—30,000,000 pounds. Cocoa is of superior quality, but not enough is produced for the home market. The sugar industry is extending. Sugar-cane supplies the coarse brown sugar made at home and is used in the manufacture of aguardiente, a kind of rum. Cotton is indigenous, and of excellent quality, but is grown wholly for home consumption. Three crops of maize a year are raised on the same ground. Large areas, well adapted for tobacco farming, are still untilled. The rubber industry has latterly been waning. Rice is important, and the yam and sweet potato are the principal farinaceous crops. Bread fruit grows to perfection, and is an important article of diet. The banana industry is large and increasing. The cocoanut and black beans are produced abundantly, and the vegetables of the temperate zone thrive in the more elevated districts. Cattle-raising, particularly in the northwestern provinces, is one of the chief sources of wealth. Large haciendas are devoted to this industry, and many hides are exported.

Manufactures. Manufacturing enterprises are little developed. Coarse cotton fabrics are made, and most of the house furniture is supplied by local factories. Large quantities of cigars are produced and also roofing tiles and other forms of pottery. The Indian industries include the making of hammocks, superior straw hats, jewelry of gold and silver, potteries and carvings. The country depends for its manufactures chiefly upon imports.

Commerce. Trade statistics are not published, but the consular reports give an approximate idea of the volume of foreign commerce. The imports in 1901 were approximately $3,240,000; the exports, $2,736,000. Of the former, the leading items are cotton, food materials, and their products; of the latter, the leading items are coffee, bananas, gold, cattle, and woods. In 1901, 60 per cent. of the imports came from the United States, and 60 per cent. of the exports went to the United States. Great Britain and then Germany came next in the trade. In 1902 the imports from Nicaragua to the United States were about $2,000,000; the exports to Nicaragua, $1,350,000.

Transportation. About two-thirds of the foreign trade passes through Corinto. The Government has planned for regular direct steamship connection with New Orleans and Europe. Nineteen small vessels, including one steamship owned by Nicaraguans, are in the merchant trade, and four steamers ply on Lake Managua. There are very few good roads. The railroads are confined to the Pacific coast, and with the completion of the Central Division of the system in November, 1902, there is now a continuous railroad line from Corinto on the Pacific to Granada on Lake Nicaragua, with a branch to Diriamba in the coffee region. The total system in operation is about 200 miles, and practically all belongs to the Government. The latest addition to the service greatly improves the facilities for shipping coffee.

Banking. The Bank of London and Central America and the Agriculture and Mercantile Bank at Leon have branches in all the important cities, and transact most of the banking business, though many private capitalists also carry on banking.

Government. Nicaragua has a republican form of government. The Constitution (adopted in 1894 and amended in 1896) vests the law-making power in a Congress of one House, with forty members, elected for two years. The session of Congress is ninety days, opening without special convocation at the beginning of August. The President and Vice-President must be at least twenty-five years of age, and citizens of Nicaragua or of one of the Central American republics. They are elected for four years by direct suffrage. The President exercises administrative functions through a council of ministers, composed of the heads of the five departments of the Interior (Justice, Police, and Religion), War and Marine, Foreign Affairs, Finance, and Public Works. The Republic is divided into 13 departments, 2 comarcas, and 3 districts, each of which is under a Governor, who is also commander of the military forces in his department or district. There are a Supreme Court of Justice and two courts of second instance. The military forces comprise the active army, the reserve, and the national guard. The number of active troops varies; in 1900 the number was 2000; in time of war it may be 20,000.

Finance. The Government derives most of its revenue from the customs, in addition to which the liquor and tobacco duties yield a considerable amount. The largest items in expenditure are for the Departments of War and Marine, and of Fomento (exploitation). In 1902 the estimated revenues and expenditures each amounted to about $2,125,000. The foreign debt, incurred chiefly in the development of the railroad system, was about $1,312,000 in July, 1902. It is held in Great Britain, and is in arrears. The internal debt at the beginning of 1901 was about $3,300,000. Metric weights and measures and also the old Spanish denominations are employed. The system of money is the same as in Mexico, silver being the standard value. The silver peso was worth 36.1 cents in United States coin on January 1, 1903.

POPULATION. The census returns are largely estimates, the census of 1900 giving a total of 500,000, which is 80,000 more than the estimate for 1895, and may be exaggerated. Managua is the capital, with 30,000 inhabitants. Other large towns are Leon (45,000), Granada (25,000), Masaya (20,000), and Chinandega (20,000). The number of descendants of Spanish settlers is only about 17,000, the great mass of the population consisting of Indians, negroes, and mixed bloods. The Indians supply most of the labor and are docile and industrious. Most of the country people live in villages, many of them traveling several miles to their fields. The efforts to induce immigration have not been successful.

EDUCATION AND RELIGION. Education is in a very backward condition, and the majority of the people are illiterate. Less than 20,000 pupils attend the elementary schools. The universities at Leon and Granada, with instruction in law and medicine, have been consolidated. There are ten colleges. The only public library is supported by the Government at Managua, and is free to the public. A National Industrial, Commercial, and Scientific Museum has also been established there. The Roman Catholic faith is recognized in the Constitution as the State religion, but other forms of faith are not molested.

HISTORY. The coast of Nicaragua was first seen by Columbus in 1502 or 1503. In 1522 Gil Gonzales Dávila discovered Lake Nicaragua, and in 1526 Pedrarias Dávila led an expedition into the country. It was organized as an intendencia of the Captain-Generalcy of Guatemala in 1528. In 1821 Nicaragua, in common with the other Central American States, revolted from Spain, and was annexed to the Mexican Empire of Iturbide. Upon the downfall of that leader Nicaragua became an independent State, but joined the Confederation of Central America in 1823. That federation dissolved in 1839, and Nicaragua became once more independent. The strife of parties, however, and the play of personal ambition gave the country little peace. In 1841 a dispute arose with Great Britain concerning the rights of a native chief on the Mosquito Coast. This threatened at one time to lead to hostilities, but the matter was finally settled by a clause inserted in the Clayton-Bulwer Treaty of 1850 and by a separate treaty, in which Great Britain ceded all rights of a protectorate over the disputed territory to Nicaragua. The year 1855 was signalized by the famous filibustering expedition of William Walker (q.v.), whose attempt to establish a slaveholding State in Central America for once impelled the different States to common action. Walker was driven out in 1856, and upon his renewing his attempt was captured and shot (1860). There followed for Nicaragua a long period of peace, broken in 1893 by a struggle for the Presidency, which in turn led to war with Honduras, owing to the unwarrantable interference of that State. Under the energetic administration of President Zelaya Nicaragua proceeded to annex the Mosquito Territory in 1894, and entered thereby into strained relations with Great Britain, which demanded compensation for its subjects. In 1895 Nicaragua, Salvador, and Honduras united to form the Greater Republic of Central America, with provisions for the subsequent admission of Guatemala and Costa Rica. A constitution was adopted and went into effect on November 1, 1898; but one month later, owing to the dissatisfaction of Honduras, the union was dissolved.

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NICARAGUA, LAKE. The largest lake of the American continent between Lake Michigan in the north and Lake Titicaca in the south. It lies in the southwestern part of the Republic of Nicaragua, and is separated from the Pacific coast by an isthmus 11 miles wide at its narrowest point (Map: Central America, E 5). The lake is oval in shape, with a length of 110 miles, a maximum width of 45 miles, and an area of over 3000 square miles. Its depth is from 50 to 120 feet; its greatest depth is about 200 feet. It discharges southeastward into the Caribbean Sea through the San Juan River, and receives the water of Lake Managua through the Tipitapa River. The mean elevation of its surface above the sea is now about 106 feet, but seemingly it was considerably greater 70-100 years ago. Ancient beaches show that in past ages it was continuous with Lake Managua, and discharged into the Pacific Ocean through the Gulf of Fonseca. The shores of the lake are lined with densely wooded mountain ranges, and the lake itself is studded with hundreds of islands, the largest of which, Ometepe, has two active volcanoes. For the proposed interoceanic waterway through Lake Nicaragua, see NICARAGUA CANAL.

NICARAGUA CANAL. A proposed ship canal across the territory of Nicaragua, by way of Lake Nicaragua, connecting the Atlantic and Pacific Oceans. The question of interoceanic communication across Central America first began to occupy the attention of the United States shortly after the establishment of the independence of the Spanish American republics. It formed one of the proposed subjects of discussion at the Panama Congress of 1826, Henry Clay, then Secretary of State, instructing the Commissioners from the United States to investigate "the practicability and the probable expense of the undertaking on the routes which offer the greatest facilities." In March, 1835, the Senate instructed the President to open negotiations with the governments of Central America and New Granada with a view to affording protection to any individuals or companies that should undertake to construct a canal connecting the Atlantic and Pacific oceans, and for insuring the free and equal navigation of the canal by all nations. During the administrations of Presidents Jackson and Van Buren commissioners for the purpose were successively appointed, one of whom reported in favor of the Nicaragua route. The interest of the United States in the project was increased by the establishment of a British protectorate over the Mosquito Coast (q.v.) and the acquisition of California and the subsequent discovery of gold there. In 1849 the Government of Nicaragua granted to a company, of which Cornelius Vanderbilt was the chief member, the right to construct a ship canal across the territory of that State. This concession lapsed in 1856 on account of the non-fulfillment of the conditions. In the same year in which the Vanderbilt concession was granted, Mr. Hise, the chargé d'affaires of the United States in Nicaragua, concluded, without authority from his Government, a treaty with Nicaragua, by which the United States received a grant of perpetual and exclusive right of way for the construction of a canal across the Isthmus, and with full jurisdiction over the same, in spite of the British claim to the Mosquito Coast. In return the United States agreed to guarantee the integrity of Nicaragua and forever protect her in the exercise of all her sovereign rights. The treaty did not meet with the approval of President Taylor, and accordingly was not submitted to the Senate, although it was held for a time as a means of influencing the action of Great Britain in the negotiations then in progress for settlement of the controversy in regard to the Mosquito protectorate.

It was now generally believed that the Nicaragua route was the most feasible for the construction of a ship canal, but the claim of Great Britain to the territory around the mouth of the San Juan River, the proposed eastern terminus, was an obstacle to the United States. It was felt to be too serious an undertaking to dislodge her from this position, and it was therefore resolved to negotiate with a view to securing her coöperation in guaranteeing the neutrality of the proposed canal. This was accomplished by the so-called Clayton-Bulwer Treaty (q.v.) of 1850. (For the abrogation of this treaty in 1901, see HAY-PAUNCEFOTE TREATY and PANAMA CANAL.) In the same year Orville Childs, a civil engineer, completed the survey of a route for the proposed ship canal, and made a favorable report on the feasibility of the undertaking. The Vanderbilt Company in the meantime had secured a new concession for the construction of a canal in accordance with the survey made by Colonel Childs; but this was soon revoked by the Government of Nicaragua, chiefly on account of the Walker filibustering expedition, which had for its object the conquest of Central America. The outbreak of the Civil War arrested further progress toward the construction of the canal, but in 1867 the project was again taken up, and in June a treaty was concluded between the governments of the United States and Nicaragua, by which the citizens of the United States acquired the right of free transit over any canal constructed under the authority of the Government of Nicaragua, but the right of the United States or its citizens to construct the canal was not conceded. During the ten years following 1872 almost every possible route across the Isthmus was carefully surveyed by officers and engineers of the United States Navy. In March, 1872, President Grant appointed, in compliance with a resolution of the Senate, a commission of three eminent military and naval engineers to investigate the subject of an Isthmian canal, and these unanimously reported, February 7, 1876, in favor of the Nicaraguan route, by way of the San Juan River from Greytown and Lake Nicaragua, terminating at Brito on the Pacific coast.

In May, 1879, an international congress was held at Paris to determine the location of the interoceanic canal. The merits of the Nicaraguan route were ably advocated by the delegates from the United States, but the Congress decided in favor of the Panama route. (See PANAMA CANAL.) In 1884 a treaty was concluded between the United States and Nicaragua, by which the United States agreed to build a canal to be owned jointly by the two powers, the United States agreeing furthermore to 'protect' the integrity of Nicaragua. When Cleveland became President, the treaty was still unratified, and he withdrew it from further consideration by the Senate. He declined to resubmit it on the ground that the construction and ownership of the canal under such circumstances would be "inconsistent with its dedication to universal and neutral use" and would "entail measures for its realization beyond the scope of our national polity or present means." In the meantime a scheme had been set on foot, chiefly by leading capitalists of New York, to construct by private enterprise a canal through Nicaragua. In April, 1887, under the name of the Nicaragua Canal Association, they secured from the Government of Nicaragua a concession granting the exclusive privilege of constructing and operating the canal. Surveys were at once begun by a corps of competent engineers, and the final location of the route was soon determined upon. In February, 1889, Congress granted the company a charter of incorporation with a capital of $100,000,000, with authority to increase the amount to $200,000,000. In June, 1889, the preliminary work of construction was begun at Greytown, and in the following October the actual work of excavation began. The route finally determined upon was to begin at Greytown on the Atlantic and end at Brito on the Pacific coast, about 170 miles distant. The company erected large storehouses, hospitals, and other buildings at Greytown, established the necessary railroad and telegraph service, and landed large quantities of machinery, tools, lumber, and other materials. Within a period of about one year $2,000,000 had been expended. In 1893 the company ceased operations owing to lack of funds, a fruitless effort having been made to induce Congress to guarantee the principal and interest at 4 per cent. of an issue of $100,000,000 of canal company bonds, to be issued for construction purposes. In 1895 Congress provided for the appointment of three engineers, namely, Colonel Wm. Ludlow, U.S.A.; M. F. Endicott, C.E.; and Alfred Noble, collectively known as the Ludlow Commission, to investigate and report upon the feasibility and cost of completing the work already begun by the company. They reported in favor of the feasibility of the project, estimating the cost at $133,472,893, as against the company's estimate of about half that amount. In view of the small appropriation made by Congress, and the consequent impossibility of making an exhaustive investigation, the commission advised a more thorough investigation with a view to the possible discovery of a more advantageous route.

Congress then provided for a new commission, popularly known as the Walker Commission, to continue the investigation, with a view of making complete plans for the entire work of constructing the canal. The members selected were Rear-Admiral John G. Walker, U.S.N.; Prof. Lewis M. Haupt, C.E.; and Col. P. C. Hains, U.S.A. With a large corps of engineers, geologists, and other experts, the commission visited Nicaragua in December, 1897, and made a full examination of the topographical, geological, and hydrographic conditions of the country, reporting in May, 1899, that in their judgment the cost of constructing the canal from Greytown to Brito, by way of the Lull route east of the lake and by way of the Childs route west of it, would not exceed $118,113,790. Colonel Hains, who concurred in the report, estimated the cost at $134,818,308. In the meantime, interest in the old Panama canal project having been aroused on account of the favorable report of an international commission of experts, it was decided that nothing further should be done toward the construction of a canal by way of the Nicaraguan route until the whole question of canal possibilities had been investigated by a larger commission of experts. Congress accordingly, in March, 1899, provided for a new commission to undertake the task of 'finding the route.' The members appointed by President McKinley were Rear-Admiral Walker, Colonel Hains, and Professor Haupt of the Nicaragua Commission; ex-Senator Pasco of Florida, Alfred Noble C.E., George S. Morrison of New York, Prof. W. H. Burr of Columbia University, Lieut.-Col. O. H. Ernst, U.S.A., and Prof. Emory R. Johnson of Pennsylvania. After an exhaustive investigation of all the proposed routes on the entire Isthmus from Nicaragua to Colombia, the commission reported, November, 1901, unanimously in favor of the Nicaraguan route as "the most practicable and feasible," chiefly on account of the financial difficulties in the way of acquiring the property and franchises of the Panama Canal Company. The Panama Company now removed this difficulty by offering to sell its property and franchises to the United States for $40,000,000, the valuation which the Canal Commission had placed upon the work already done on the Panama route. The commission thereupon in a supplementary report recommended the acceptance of the offer. Already in May, 1900, the House of Representatives had by a vote of 225 to 35 passed a bill for the construction of a canal by way of the Nicaraguan route, which, however, the Senate had refused to accept. In January, 1902, the House repassed this bill by a vote of 307 to 2. Shortly thereafter came the supplementary report of the Canal Commission recommending the purchase of the Panama Company's property and franchises. This led the Senate to hold up the House bill for further consideration of the Panama scheme. Finally it refused to accept the Nicaragua plan, and after three months of debate the two Houses, largely influenced by the volcanic occurrences in the Caribbean region, agreed upon the Panama route, with the understanding that the Nicaraguan route should be reverted to in case a satisfactory title could not be secured to the Panama property and the necessary territory from the Government of Colombia. In such case the President was authorized to begin negotiations with the Government of Nicaragua for the necessary concessions, and to construct the canal at a cost not exceeding $180,000,000.

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NICARIA, nē'kȧ-rē'ä or **ICARIA.** A Turkish island, situated off the western coast of Asiatic Turkey, a short distance west of Samos (Map: Balkan Peninsula, F 6). Area, about 53 square miles. It is mostly mountainous, rising over 3000 feet above the sea. Wood is one of the chief products. The inhabitants, who number about 8000, are chiefly engaged in the production of charcoal and in sponge fishing.

NICASTRO, nė-kä'strȯ. A city in the Province of Catanzaro, Italy, beautifully situated near the sea, 16 miles west-northwest of Catanzaro (Map: Italy, L 9). It is the see of a bishop. It has the ruins of a mediæval castle. The town has a trade in wine and oil. There are hot springs in the vicinity. Population (commune), 1901, 17,524.

NICCOLINI, nĭk'kȯ-lē'nė, GIOVANNI BATTISTA (1782-1861). An Italian poet, born at San Giuliano, near Pisa, October, 1782. He studied at Florence and took his degree in law at the University of Pisa. In 1802 he took a Government clerkship; from 1804 to 1807 he was in the office of the Archivio delle Rifermagioni, and from 1807 until his death he was professor of history and mythology, secretary and librarian in the Accademia di Belle Arti at Florence, and for a while also librarian of the Palatine Library. His critical and historical treatises, many of them produced in connection with his academic labors, constitute the less important part of his work. As a poet he attained to greatest excellence in tragedy, but he also revealed no little force in his lyrics (*Poesie nazionali*, 1859; *Pensieri poetici*, 1860; *Canzoniere nazionale e poesie varie*, 1863; *Canzoniere civile*, 1884; *Versi inediti*, 1888), and in his translations from Æschylus, Euripides, and Ovid. In his original dramas of the earlier period he adhered to the classic Greek model, wherein we find the norm of his *Polissena*, *Ino e Temisto*, *Edipo*, and *Medea.* The *Nabucco*

(1816; published at London 1819) was his first political drama, and it assailed absolute power of all kinds. Another manifesto against absolute power is the *Antonio Foscarini* (performed in 1827), the most popular of his tragedies. The plays of his second period show his tendencies to romanticism. His *Beatrice Cenci* is based on that of Shelley. The *Giovanni da Procida* (1817; performed in 1830) was a protest against the anti-Italian sentiments of the French dramatist Casimir Delavigne, and, like the *Lodovico Sforza* (1834), advocated the unity and independence of Italy. There is no political intention discernible in the *Rosmunda d'Inghilterra* (performed in 1838), but his masterpiece, the *Arnaldo da Brescia* (1843), again proclaims the sovereignty of the people over imperial and ecclesiastical power, and attacks especially the temporal power of the Pope. The fundamental ideas of the *Arnaldo* reappear in *Filippo Strozzi* (1847). His plays, with all their merits, are rather lyric than genuinely dramatic in spirit. Consult the edition of his *Opere* prepared by himself and first published at Florence, 1844; also the *Opere edite e inedite*, an ed. by Gargiolli (Milan, 10 vols., 1863-1880); Vannucci, *Ricordi della vita e delle opere di Giovanni Battista Niccolini* (Florence, 1866).

NICCOLÒ DE' NICCOLI, nêk'kô-lō' dâ nêk'kô-lê (or, more often, Niccoli Niccolò) (1363-1437). An Italian scholar, born in Florence. He was a collector of coins, and particularly of Greek and Latin manuscripts. These he procured from every possible source, and often copied them with his own hand. In his fine house in Florence he entertained the élite of the literary and artistic society of the day, as well as humble students, and was looked upon as the supreme authority in all matters of letters. Even the most famous scholars feared his caustic tongue. After his death, Cosmo de' Medici bought his manuscripts, and made them the foundation of the present Laurentian Library of Florence.

NICCOLÒ OF AREZZO, å-rĕt'sô (also called Niccolò Lamberti, and Niccolò di Piero) (1350-1417). An Italian sculptor and architect, born at Arezzo. His master was probably Moccio of Siena. He was first employed in Florence on minor works in the cathedral. After the plague (1383) he returned to Florence and executed two statues, believed to be those of Saint Gregory and Saint Augustine, for the Campanile. He also did some decorative carving on the northern door of the Duomo, and at Or San Michele. These, like his other carvings, show a marked gain in freedom and elegance over the work of former sculptors. He executed a relief of the Virgin on the façade of the Santa Maria della Misericordia, Arezzo, and the mausoleum of Pope Alexander V. in the Certosa, Bologna; and was employed as architect on the Castle of Sant' Angelo, Rome, and to restore the walls of Borgo San Sepolcro.

NICE, nês. A city in Bithynia. See Nicæa.

NICE. The capital of the Department of Alpes-Maritimes, France, situated on the Mediterranean, at the foot of the Alps, and at the western extremity of the Riviera, 140 miles by rail east-northeast of Marseilles, and 640 miles from Paris (Map: France, O 8). Nice is far-famed as a place of sojourn for health-seekers, some 15,000 of whom visit it yearly. The city and its bay are protected by the mountains on the north. The climate is dry, mild, and invigorating. It is warm in winter and not hot in summer. Mean annual temperature 58.6° F.—January 45.4°, July 73.8°. Frost and snow are rare. The rainy period is in the fall. The fashionable season begins soon after January 1st and lasts till June 1st. The situation of Nice, where the small Paglione empties into the sea, is splendid. There is a circle of forts in the rear, and the city is important strategically to France. On the left bank of the covered-over stream is the little old town, with narrow, crooked streets. In this section a mixture of Provençal and Italian is spoken. Along the sea front here extends a fine boulevard. At its east end rises Castle Hill, on which runs a promenade, whence an immense and admirable view of the coast may be had. Beyond the hill lies the city's small harbor, called Limpia.

On the western bank of the Paglione is the more important foreigners' quarter, where French is the universal language. In this section the avenues are spacious and beautiful, with plane trees and eucalypti, and the city presents the delightful appearance of a southern sea resort. The centre of life in this part is the Square Masséna, on which stands the bronze statue to Masséna, who was born in Nice. Adjacent is the Casino, an attractive modern municipal structure, containing gaming rooms, a theatre, and an entertainment garden. From the Casino the Public Garden, exceptionally attractive with its palm, pepper, myrtle, and laurel trees, reaches to the sea, and terminates in the splendid iron and glass pier promenade. From this point west along the bay for a distance of over two miles is the wide, magnificent Promenade des Anglais, flanked by villas and spacious hotels, and having gardens of orange and lemon trees and acres of flowers. Among the objects of interest in the city are a marble cross, commemorating the meeting here of Francis I. and Charles V. in 1538; the modern centenary obelisk in honor of the union of Nice with France in 1792; a pyramid to the memory of Garibaldi, a native of Nice; also a statue of him, and a bust of President Carnot.

The public library has nearly 100,000 volumes. The Museum of Natural History is noteworthy for its collection of mushrooms. The municipal museum contains mediocre works of modern French artists. Nice has a nunnery, a lyceum, a priests' and a teachers' seminary, a charity hospital, and an important astronomical observatory (on Mont Gros), with one of the largest refractors in the world. The municipal theatre has good opera in the season. The carnival—an elaborate fête of flowers, confetti, and Moccoletti—is an annual occurrence which attracts pleasure-seekers from all countries. To the north of Nice lies Cimiez, with its interesting Roman remains. Nice exports oranges, lemons, flowers (for which it is celebrated), perfumes, olives, oils, and liquors. It also manufactures ivory goods, furniture, silk, dyes, etc. Some marble is quarried near. The city shows a marked increase in commercial importance and in population. Its inhabitants numbered 105,109 in 1901.

Nice was the Nicæa of the ancients, and dates from the fourth century B.C., when it was settled by Phocæans from Marseilles. It suffered in many wars and at the hands of many races. It belonged in the late Middle Ages to Provence, and finally passed to Savoy. The French took it in 1792; it was given back to Sardinia after the fall of Napoleon, and became again a part of France in 1860. It suffered severely from an earthquake in 1877. Consult: Hole, *Nice and Her Neighbors* (London, 1881); Lee, *Nice and Its Climate* (ib., 1854); Moris, *Nice* (Paris, 1899).

NICE, COUNCILS OF. See NICÆA, COUNCILS OF.

NICENE CREED, THE. Frequently called the NICÆNO-CONSTANTINOPOLITAN CREED. The most important ancient formula of the Christian faith, and the only one which approaches ecumenical authority. Since the fifth century it has commonly been believed that this creed was adopted at the Council of Nicæa (325), and reaffirmed at Constantinople (381); but this view is certainly wrong. The creed in question is practically identical with one given by Epiphanius, in his *Ancoratus* (374), which in turn draws its material from Cyril of Jerusalem (*Catechetical Lectures*, 347), and from the symbol actually adopted at Nicæa. This original Nicene formula was drawn up to combat Arianism (q.v.), and was based upon a creed which had long been used in Cæsarea. Its leading characteristic was that, in defining the orthodox doctrine of the Trinity, it asserts the consubstantiality of the Son with the Father, i.e. that both are of the same essence or substance. (See HOMOOUSION.) Our so-called Nicene Creed is longer and more symmetrical in construction than the one actually adopted at Nicæa. In the article on the Holy Spirit, the Eastern Church has always used the form which reads "And [I believe] in the Holy Ghost, . . . who proceedeth from the Father," whereas the Western Church says, "Who proceedeth from the Father and the Son." This difference has proved a prolific source of controversy. (See FILIOQUE.) The Nicene Creed finds a place in the liturgies of the Greek, Roman, and Anglican churches, and its doctrinal teaching has been accepted by most Protestants.

Consult: Hahn, *Bibliotek der Symbole* (3d ed., Breslau, 1897); Schaff, *Creeds of Christendom* (New York, 1877); Hort, *Two Dissertations* (London, 1876); Swainson, *The Nicene and Apostles' Creeds* (ib., 1875); Hefele, *History of the Councils*, vol. i. (Edinburgh, 1871); Bindley, *Ecumenical Documents of the Faith* (London, 1899).

NICEPH'ORUS (Lat., from Gk. Νικηφόρος, *Nikēphoros*) (c.758-c.828). Patriarch of Constantinople. He was born in Constantinople, the son of Theodore, Imperial secretary of Constantius Copronymus. He first held high office at court. In 787 he was present as Imperial commissioner at the Nicene Council, where, in defense of image-worship, he opposed the iconoclasts. This zeal for image-worship he inherited from his father. Soon after his return to the capital he retired to a convent, whence in 806 he was called to be Patriarch of Constantinople. Leo the Armenian, who became Emperor in 813, passed an edict in 814 against the worship of images. But neither menaces nor entreaties could induce Nicephorus to assent to it. He became unpopular at court, and in the ensuing year was deposed, and withdrew to the convent of Saint Theodore, which he himself had founded, and remained there till his death in 826 (or 828). He published several valuable ecclesiastical works, characterized by great beauty of style, and historical productions distinguished for accuracy, discernment, and erudition. The most important are *Breviarium Historicum*, an historical abridgment, and *Chronographia Brevis*, a short chronicle of events from the beginning of the world to the author's time, with the series of kings, emperors, patriarchs, bishops, etc. The best edition of both treatises is by De Boor, *Nicephori Constantinopolitani Opuscula Historica* (Leipzig, 1880). Nicephorus is numbered among the saints in both the Greek and the Roman Catholic churches.

NICEPHORUS I. (died 811). Byzantine Emperor from 802 to 811. He overthrew the Empress Irene, whose minister of finance he had been. He was cruel and tyrannical, and the heavy taxes he imposed made him unpopular. He waged war against Harun al-Rashid, but was unsuccessful, and had to conclude a disgraceful peace in 806. He also tried to check the Bulgarians, and though successful at first, was finally defeated and slain at Marcellae on July 25th, 811. Consult Gibbon, *Decline and Fall of the Roman Empire*, ed. by Bury (London, 1896-1900).

NICEPHORUS II. PHOCAS (c.913-969). Byzantine Emperor from 963 to 969. He was the descendant of an illustrious race, and distinguished himself during the reigns of Constantine VII. and Romanus II. In 961 he recaptured Crete from the Saracens, and after the death of Romanus was proclaimed Emperor and married Theophano, the widow of his predecessor. As Emperor, Nicephorus waged successful war against the Mohammedans, and in 969 captured Antioch, and brought home as a trophy the sword of Mohammed. He was also successful against the Bulgarians. The numerous wars, however, necessitated increased taxes, and Nicephorus speedily became unpopular. He was finally murdered by his wife's lover, John Zimisces, who ascended the throne. It was during this reign that Liudprand (q.v.) came to Constantinople on an embassy from Otho I. Consult: Schlumberger, *Un empereur byzantin au dixième siècle. Nicéphore Phocas* (Paris, 1870); Gibbon, *Decline and Fall of the Roman Empire*, ed. by Bury (London, 1896-1900).

NICEPHORUS III. BOTANIATES (died 1081). Byzantine Emperor from 1078 to 1081. He belonged to the same family as Nicephorus II., and had distinguished himself as general under Constantine X. (XI.), Ducas and Romanus IV. When during the reign of the weak Michael VII. Nicephorus Bryennius was proclaimed Emperor by the European legions, Nicephorus Botaniates immediately had himself nominated as Emperor by the Asiatic troops. The latter was successful, through the aid of the Sultan Solyman, and was crowned on April 3, 1078. His reign was fairly successful, but he quarreled with his general, Alexius, and in consequence he had to abdicate and retire to a monastery in April, 1081, where he died a few months later. Consult Gibbon, *Decline and Fall of the Roman Empire*, ed. by Bury (London, 1896-1900).

NICE'TAS CHONIATES, kō'nĭ-ā'tēz (Lat., from Gk. Νικήτας Χωνιάτης, *Nikētas Chōniatēs*), or ACOMINATUS (c.1145-1215). A Byzantine historian, born at Chonæ, the ancient Colossæ. He held high office under the Byzantine emperors during the last years of the twelfth century. Nicetas was in Constantinople when the city was captured by the Latins (1204) and escaped to Nicæa. His history of the Greek emperors from 1118 to 1206 completes Zonaras, and is an excellent authority. It is best edited by Bekker (Bonn, 1835). A valuable description of the statues in Constantinople destroyed by the Latins may have been originally composed by Nicetas; in its present state it seems to have suffered additions by a later author. It was edited by Wilken (Leipzig, 1830).

NICHE, nĭch (Fr. *niche*, from It. *nicchia*, niche in a wall like the hollow of a shell, from *nicchio*, shell, niche, from Lat. *mitulus*, *mytilus*, *mytulus*, mussel, from Gk. *μύτιλος*, *mytilos*, *μίτυλος*, *mitylos*, mussel, from *μῦς*, *mys*, mouse). A recess formed in a wall, commonly for the purpose of containing a statue or some ornamental figure or piece of furniture. In classical architecture, the niches are generally square recesses with canopies formed by small pediments. In Gothic architecture, the niche is one of the most frequent and characteristic features, the doorways, buttresses, and every part of the buildings being in many instances ornamented with niches and statues in endless variety, the openings being arched and decorated with colonnettes, gables, pinnacles, and intricated detailed ornament. In the Mohammedan mosque the direction of Mecca (called Kiblah), the sacred city, is marked by a niche called *Mihrab*. In early and mediæval churches niches were frequently built to receive pieces of ecclesiastical furniture.

NICHIREN, nĭch′ĭ-rĕn (1222-82). A Japanese religious teacher, and the founder of an influential sect of Buddhists, the Hokkes. He was born in Kominato, the Province of Awa. He was devoted to the priesthood from his birth, for his mother had dreamed that the sun had entered her body. He completed the prescribed studies at an early age, was admitted to the priesthood and became a violent and bitter sectarian. So severe were his attacks upon all other forms of Buddhism that he was banished for a time, and later was condemned to death on the charge of teaching doctrines subversive of the Government. His life was saved by a miracle, but he was again banished. Possessed, as it is said, of miraculous powers, he gained large numbers of followers, and founded the sect which is popularly known by his name. He added nothing to the doctrinal development of Buddhism, being dependent upon Chinese sources for his ideas. But he brought to Buddhism a spirit of intolerance and bitter persecution far other than the spirit of its founder. The sacred book of the sect is the Sanskrit Saddharma Pundarīka, which has been translated into English by Kern in Müller, *Sacred Books of the East*, vol. xxi. (Oxford, 1884).

NICHOL, nĭk′ol, JOHN (1833-94). An English scholar, son of John Pringle Nichol, the astronomer. He was born in Montrose, Scotland, and educated at the University of Glasgow (1848-55), and at Balliol College, Oxford (1855-59). In 1865 he visited the United States, where he became acquainted personally with Emerson and Longfellow. He was made LL.D. by Saint Andrews (1873); professor of English literature at Glasgow (1861-89); he lectured in Scotland and England; advocated broad Church doctrines, and took the side of the North in the American Civil War. He died October 11, 1894. Nichol contributed to the *Westminster*, *North British*, and other reviews; was one of the writers on the *Encyclopædia Britannica;* and published *Fragments of Criticism*, a volume of essays (1860); *Hannibal*, a classical drama (1872); *Byron*, in the "English Men of Letters Series" (1880); *American Literature: An Historical Review* (1882); *Landmarks of English Literature* (1882); *Lord Bacon's Life and Philosophy* (1887-89); and several educational treaties. Consult the *Memoir* by Knight (Glasgow, 1896).

NICHOL, JOHN PRINGLE (1804-59). A Scottish astronomer, born at Huntly Hill, near Brechin, in Forfarshire. He received his education at King's College, Aberdeen, where he highly distinguished himself in mathematics and physics. He engaged in preaching before he was of age, but his fondness for scientific studies led him to give up the ministry. He was for some time editor of the *Fife Herald*, and later headmaster of Cupar Academy, which position he resigned to become rector of Montrose Academy (1827). Having declined the chair of political economy in the Collège de France, Paris, he was appointed, in 1836, regius professor of astronomy in the University of Glasgow. In this capacity he effected the equipment and transference of the Glasgow Observatory to its present site on Dowanhill. His astronomical work was directed chiefly to the physical features of the moon, and to the nebular theory. In one of his works he made the earliest suggestions for the study of sun-spots by photography. He visited the United States in 1848 and lectured publicly on scientific subjects. He was a fellow of the Royal Astronomical Society and a member of the Royal Society. Among his works may be mentioned: *Views of the Architecture of the Heavens* (1838 and nine subsequent editions); *Contemplations on the Solar System* (1844); *Exposition and History of the Planet Neptune* (1848); *The Stellar Universe* (1848); *The Planetary System, Its Order and Physical Structure* (1851); *A Cyclopædia of the Physical Sciences* (1857). Consult Maclehose's *Hundred Glasgow Men*, and Stewart's *University of Glasgow, Old and New*.

NICHOLAS, nĭk′ō-las. The name of five popes. NICHOLAS I., Saint, Pope 858-67. He was of a noble Roman family, and was employed in important affairs by Benedict III., whom he succeeded, being crowned—the first recorded instance of the coronation of a pope—in the presence of the Emperor Louis II. The most important events of his pontificate are those connected with his conflict with Photius, who had been illegally intruded into the See of Constantinople. (See PHOTIUS; GREEK CHURCH.) Throughout his reign he was one of the most uncompromising upholders of the claims of the Roman See to universal jurisdiction. A prolonged contest in practical matters with a Western prelate of great power and individuality, Hincmar, Archbishop of Rheims, was terminated by Hincmar's submission. The matrimonial affairs of the German princes also gave him much trouble; and his firmness in upholding the sanctity of the marriage tie brought him into conflict with the Emperor, who marched upon Rome and held the Pope a prisoner without food for two days in the Castle of Sant' Angelo, until, terrified by a sudden illness and by some fatalities which befell his followers, he drew off his forces and made peace. Nicholas brought the new Slavonic Church, just growing up through the preaching of Cyril and Methodius (q.v.), under the control of the Papacy. Altogether he was one of the most vigorous of the early popes, one who laid the foundations upon which Gregory VII. could build; an impressive figure, who may stand with Charlemagne to close the centuries of formation and preparation, and open the Middle Ages. Consult: Leroy, *Saint Nicholas I.* (Paris, 1898; Eng. trans., London, 1901); Hergenröther, *Photius, Patriarch von Constantinopel* (Regensburg, 1867); Lämmer, *Papst Nikolaus I. und die byzantinische Staatskirche seiner Zeit* (Berlin, 1857); Schrörs, *Hincmar, Erzbischof von Reims* (Freiburg, 1884).

NICHOLAS II., Pope 1059-61, Gerhard by name, a Burgundian by birth. He was a canon of Liège, and in 1046 became Bishop of Florence. When, on the death of Stephen X. in 1058, the so-called Tusculan faction of the Roman nobility chose the Bishop of Velletri Pope under the name of Benedict X., Hildebrand induced an assembly at Siena in December to elect Gerhard. The Empress Agnes espoused his cause, and he entered Rome in January. Hildebrand became archdeacon of the Roman Church in the latter part of the same year (1059), and was the soul of the entire Pontificate of Nicholas. (See GREGORY VII.) Under his influence and that of Peter Damiani stringent measures were enforced against simony and concubinage; the Papal election was also definitely restricted to the college of cardinals, and the whole tendency of Nicholas's administration was to free the Church from the invasion of external influences. He died in Florence, July 19, 1061, and was buried in his former cathedral.

NICHOLAS III., Pope 1277-80, Giovanni Gaetano degli Orsini. He was made cardinal by Innocent IV. in 1244, and employed by several popes in important diplomatic missions. On the death of John XXI., he was elected at Viterbo after a prolonged division in the conclave, which was only terminated by the citizens locking the cardinals up in the town hall. He had already acted as mediator between Charles of Anjou and Rudolf of Hapsburg, and now employed his influence with them to strengthen materially the temporal power of the Church in Italy. He is described as a man of strict morals and considerable learning, though the reproach of nepotism is brought against him.

NICHOLAS IV., Pope 1288-92, Geronimo by name. He entered the Franciscan Order at an early age, and in 1272 was sent to Constantinople to invite the Greeks to the Council of Lyons. Two years later, on the death of Saint Bonaventura, he was elected general of his Order. Nicholas III. made him a cardinal, and Martin IV. Bishop of Palestrina. After nearly a year's interregnum he was chosen to succeed Honorius IV., and was the first Franciscan Pope. In his time Acre, the last stronghold of the Christians in the East, fell into the hands of the Moslems; and he made vigorous attempts to stir up Christendom to renewed efforts against them, also making strenuous endeavors to convert the Tatars.

NICHOLAS V., Pope 1447-55, Tommaso Parentucelli. Born probably at Sarzana, near Pisa, in 1397, he was educated at Bologna and Florence. In 1426 he came to Rome and was employed in the ecclesiastical service. In 1444 he was made Bishop of Bologna and cardinal two years afterwards in recognition of his skill in conducting difficult negotiations in Germany. On succeeding three months later to the Papal throne, he addressed himself first to the settlement of the troubles growing out of the Council of Basel, and prevailed upon the Antipope Felix V. to resign his claims, thus securing universal recognition in 1449 and restoring peace to the Church. In 1452 he crowned Frederick III. as Emperor—the last Imperial coronation to take place in Rome. He sought to stir up Christendom to oppose the advance of the Turks. He reproached the Greeks with their dilatory postponement of the agreements made at the Council of Florence, and upon the Greek Emperor finally accepting his conditions, sent Cardinal Isidore to Constantinople with troops and money. The submission of the Greeks was, however, only feigned; and on May 29, 1453, Constantinople fell into the hands of the Mohammedans. In the revival of classical learning which preceded and followed that event Nicholas was actively concerned. He dispatched agents in all directions, east and west, to purchase or to copy every important Greek and Latin manuscript. The number collected by him was about 5000. He remodeled and may almost be said to have founded the Vatican library. He caused translations to be made of the Greek classics, both sacred and profane. He invited to Rome the most eminent scholars of the world, and extended his special patronage to the Greeks who were driven from Constantinople; in short, he did all in his power to make Rome the centre of the world, both in art and letters.—The name of NICHOLAS V. was also assumed by the Antipope set up by Louis of Bavaria against Pope John XXII. in 1328, the Franciscan Pietro Rainalducci di Corbara, who finally made his submission and died at Rome in 1333.

NICHOLAS I. (1844—), Prince of Montenegro. He was educated in Cetinje, Triest, and Paris, returning to Cetinje when about twenty years old. His uncle, Prince Danilo, was assassinated in August, 1860, and Nicholas was immediately proclaimed Prince. In the same year he married Milona, daughter of Peter Valsetitch, president of the Council of State. Danilo Alexander, his eldest son, was born June 29, 1871. Helena, one of his six daughters, became the wife of the Prince of Naples, now Victor Emmanuel III. of Italy. He has introduced many reforms in education, the civil administrations, and the army. The period of Nicholas's reign has been one of much moment for Montenegro, which obtained from the European Powers recognition of its independence in the treaty of Berlin (1878). He has shown himself on the whole a capable ruler, using for the good of his people the almost absolute power he holds. See MONTENEGRO.

NICHOLAS I., PAVLOVITCH (1796-1855). Emperor of Russia from 1825 to 1855. He was the third son of Paul I., and was born at Saint Petersburg July 6 (old style June 25), 1796. His early education was under the direction of his mother, a princess of Württemberg. His later studies were principally in the fields of economics and military science, but he evinced no especial ability in these branches. He traveled in England and on the Continent in 1816, and also made a tour through the Russian provinces. On July 13, 1817, he married Charlotte, the eldest daughter of Frederick William III. of Prussia. The death of Alexander I., in December, 1825, and the previous renunciation by his elder brother, the Grand Duke Constantine (q.v.), of his claims to the throne (1822), made Nicholas Emperor, but he was obliged to meet at the outset a military conspiracy, which was stamped out with ruthless severity—the celebrated rising of the Decembrists. (See RUSSIA.) Capital punishment, abolished by the Empress Elizabeth, was revived, for the purpose of inflicting it upon the leaders of the insurrection. Nicholas, like other czars, showed at the beginning of his reign some zeal for reform; but the spirit died out, giving place to the old despotism, and he became the embodiment of the reactionary spirit of the Holy Alliance. Nevertheless, his first great measure, the codification of Russian law, commenced in 1827, was continued and completed in 1846. A war with Persia began soon after his accession, and was concluded on February 28, 1828, by the peace of Turkmantchai, which gave Persian Armenia to Russia. Close upon this followed a successful but costly war with Turkey, concluded by the Peace of Adrianople (q.v.) which obtained for Russia another increase of territory, the free navigation of the Danube, the right of free passage between the Black and Mediterranean seas, and the protectorate over Moldavia and Wallachia. The revolutionary agitation of 1830 communicated itself to Russian Poland, where there was a national rising, suppressed after a contest of nine months, which taxed the military resources of the Empire. Nicholas converted the Kingdom of Poland into a Russian province, and began the process of Russification, which has since been in progress. Russia, which had been approaching more closely the standards of Western Europe, gradually lost its newer aspect. The press was placed under a strict censorship, and education was directed, not to the development of the people, but to preparation for the work of the State. The process, begun in Poland, was to be carried out all over the Empire, until all the foreign elements were completely Russianized and unified in people and religion. The independence of the mountaineers of the Caucasus was inconsistent with the Emperor's schemes, and war was waged against them with the greatest energy and perseverance, but at the cost of immense sacrifices both of money and lives. Nicholas sought to check the advance of British influence in Central Asia, and to counteract it tried various means, among which was the expedition for the conquest of Khiva in 1839, which ended in disaster. Between 1844 and 1846 he visited England, Austria, and Italy. When the Revolution of 1848 broke upon Europe, Nicholas refrained from interference until, by aiding in the suppression of the Hungarian national uprising against Austria, he was able to win Austria's gratitude and strike a blow at the Magyars, who interfered with Panslavism. Nicholas was intent on carrying into effect the hereditary Russian designs upon Constantinople, and in 1853 provoked a war with the Sultan; but the opposition of Great Britain and France plunged Nicholas into a much more terrible struggle than he had anticipated. (See CRIMEAN WAR.) In the course of the war he died at Saint Petersburg, March 2, 1855, his death having undoubtedly been hastened by chagrin at the repeated defeats which his arms sustained, and the excessive labor he underwent to repair his losses. He was remarkable for temperance, frugality, and patriotism, but equally so for vanity and ostentation. Consult: Smucker, *Nicholas I.* (Philadelphia, 1860); Balleydier, *Histoire de l'empereur Nicolas* (Paris, 1857); Lacroix, *Histoire de Nicolas I.* (ib., 1864-73); Edwards, *The Romanoffs* (London, 1890).

NICHOLAS II. (1868—). Emperor of Russia from 1894. He was born at Saint Petersburg, May 18 (old style May 6), 1868, the eldest son of Emperor Alexander III. and Maria Feodorovna (Princess Dagmar, daughter of Christian IX. of Denmark). In 1890-91 he traveled extensively in the East, and while in Japan narrowly escaped assassination at the hands of a maniac. He traversed the length and breadth of the Russian Empire and went through Siberia by the old conveyances along the route of the Siberian railway, thus obtaining an adequate appreciation of the importance to Russia of that gigantic undertaking. On the death of his father, Alexander III. (November 1, 1894), he succeeded to the throne. Although regarded prior to his accession as a mild and somewhat indefinite character, his administrative acts exhibited energy and decision. He brought into his service some of the ablest statesmen of Russia. The Empire in the reign of Alexander III. was influenced politically by the reaction from liberal agitation caused by the assassination of the Liberator Czar; the conservative national Russian party had become dominant, and this was not changed through the accession of Nicholas. The process of Russification went on uninterruptedly in Poland and the Baltic Provinces, and even extended to Finland (q.v.), which by all previous czars had been allowed to retain its national existence. The great object of the internal policy of the Government has been to consolidate Russian nationality and to develop the strength and resources of the Empire. Nicholas and his advisers were apparently inclined to believe that in the present state of civilization among the Russian people this can best be done under the autocracy. Under him Russia steadily advanced its interests in the far East, won by its diplomacy open harbors on the Pacific, developed a great railway system on strategic lines through the whole Empire, and accomplished much in the upbuilding of its own industries. Perhaps the most notable act of the Czar was the peace rescript of 1898, looking to a reduction of national armaments, the result of which was the peace conference at The Hague. (See HAGUE PEACE CONFERENCE.) Nicholas married, November 26 (14), 1894, Princess Alexandra Alix, daughter of the Grand Duke of Hesse. Consult: Leudet, *Nicolas II. intime* (Paris, 1899); Prince Ukhtomski, *Voyage en Orient, Grèce, Egypte, Inde, 1890-91, de son altesse impériale le Césarevitch* (French translation by Léger, with preface by A. Leroy-Beaulieu (ib., 1893).

NICHOLAS, Sir EDWARD (1593-1669). A minister of Charles I. of England. He was born at Winterbourne Earls, Wiltshire. He was a member of Parliament in 1620-21, 1623-24, and 1627-28, and in 1641 was made Secretary of State and Privy Councilor. When the Royalist cause was lost, Nicholas went to live in Normandy, but was nominally the secretary of Charles I. until his execution, and tried to serve Charles II. as faithfully, but the jealousy of Queen Henrietta Maria prevented him from holding the position, except in name. He returned to England at the Restoration, but retired in 1662.

NICHOLAS, George (c.1755-99). An American soldier and politician. He was born in Hanover, Va., and graduated at William and Mary College in 1772. He took the patriot side in the Revolution, became captain of the Second Virginia Regiment in October in 1775, major of the Eleventh Virginia Regiment in November in 1776, lieutenant-colonel of the same regiment in September, 1777, and resigned from the service in the following November. In 1781, as a member of the Virginia Assembly, he introduced articles of impeachment, founded on charges of incompetency, against Governor Jefferson, but they were not adopted. In 1788 he did much in the Virginia Convention to secure the ratification of the Federal Constitution. He removed to Kentucky in 1790, took the leading part in framing the State Constitution of 1792, and became the first Attorney-General of the State.

NICHOLAS, Saint (?-326). A highly popular saint of the Roman Catholic Church, reverenced with still greater devotion by the Russian Church. Of his personal history hardly anything is known with certainty. He is said to have been Bishop of Myra in Lycia and to have taken part in the Council of Nicæa. With more probability, however, he is referred to a later date, but he certainly lived prior to the reign of Justinian, in whose time several of the churches of Constantinople were dedicated to Saint Nicholas. The great popularity of Saint Nicholas rests mainly on the traditions, both in the West and in the East, of the many miracles wrought through his intercession. He is regarded in Catholic countries as the special patron of the young, and particularly of scholars; also parish clerks, travelers, sailors, and pawnbrokers. As his protection was implored against robbers, these persons came to be called 'Clerks of Saint Nicholas.' In England his feast was celebrated in ancient times with great solemnity in the public schools and elsewhere; the supposed day of his death, December 6, is still observed with curious popular ceremonies in Germany. The nearness of his feast to that of Christmas Day led to the confounding of the two, so that we are told that Santa Klaus, a Dutch corruption of the name Saint Nicholas, gives the presents of Christmas. In art Saint Nicholas is represented as clad in episcopal robes and carrying three purses, three different stories, illustrating the saint's charity. The supposed relics of Saint Nicholas were conveyed from the East to Bari, in the Kingdom of Naples, May 9, 1087, and in the Russian Church the anniversary of this translation is still observed as a festival.

NICHOLAS, Wilson Cary (c.1757-1820). An American legislator, the son of Judge Robert Carter Nicholas. He was born at Hanover, Va., graduated at William and Mary College in 1774, and at the outbreak of the Revolutionary War enlisted in the Continental Army, serving for the greater part of the war as an officer of Washington's 'Life Guards.' In 1788 he was a member of the Virginia convention that ratified the Federal Constitution, and was himself a supporter of that instrument. In 1799 he became a Republican member of the United States Senate, but resigned in December, 1804, to become collector of customs for Norfolk and Portsmouth. From 1807 to 1811 he was a member of Congress, and from 1814 to 1817 was Governor of Virginia.

NICHOLAS NICKLEBY, nĭk″l-bĭ. A novel by Charles Dickens. It appeared as a serial in 1838 and 1839. The hero began his career as a teacher in Squeers's school, Dotheboys Hall, Yorkshire, of which Dickens gives a terrible picture, showing the evils of cheap schools of that time. After a struggle as secretary, actor, and clerk, Nicholas became a member of the firm of Cheeryble Brothers. The leading characters are Ralph Nickleby, his son, the miserable Smike, the Squeerses, and the Mantalinis.

NICHOLAS OF CLÉMANGES, klā′mäNzh′. See Clémanges.

NICHOLAS OF CUSA. See Cusa.

NICHOLAS OF LY′RA (c.1270-1340). An eminent biblical scholar. He was born at Lyra (Lyre) in Normandy; entered the Franciscan College at Verneuil in 1291, and afterwards studied in Paris; became a doctor of theology, and a successful teacher; held some of the most important posts of his Order, among which was that of Provincial for Burgundy, and was eminent as a lecturer on biblical interpretation. His works were approved by the Reformers and used by them to support their arguments. In his system of interpretation he gave preference to the literal, as being the one on which all the other methods—mystical, allegorical, and spiritual—were based. His chief work, *Postillæ Perpetuæ in Universa Biblia*, has been regarded as marking the beginning of a school of natural exegesis. He also wrote on the coming of the Messiah, in reply to Jewish critics (*Tractatus Fratris Nicholai de Messia Ejusque Adventu Una cum Responsione ad Judæorum Argumenta Quatuordecim contra Veritatem Evangeliorum*, 1309); and a work on the Sacrament (*Tractatus de Idoneo Ministrante et Suscipiente Sancti Altaris Sacramentum*). An edition of his works in five volumes was published at Rome (1471-72), and one in six volumes at Antwerp (1634). Consult: Davidson, *Sacred Hermeneutics* (London, 1843); Graetz, *Geschichte der Juden* (11 vols., Leipzig, 1853-70); and for different editions, Graesse, *Trésor des livres rares et précieux* (Dresden, 1859-69).

NICHOLASVILLE, nĭk′ō-las-vĭl′. A city and the county-seat of Jessamine County, Ky., 83 miles east-southeast of Louisville, on the Cincinnati Southern and other railroads (Map: Kentucky, G 3). It is the seat of the Jessamine Female Institute, opened in 1854, and is an important tobacco market and the centre of extensive horse-breeding interests. The chief industrial plants are a large sawmill and wheel works. Nicholasville was settled in 1799, and was first incorporated in 1835. Population, 1890, 2157; 1900, 2393.

NICHOLL, nĭk′ol, Horace Wadham (1848—). An Anglo-American musician, born at Tipton, near Birmingham, Eng. He was educated under native teachers, the most famous of whom was Samuel Prince, and after holding one or two local organ appointments moved to America and settled in Pittsburg. After 1878 he made his home in New York. His compositions include: *Cloister Scene* (1874); symphonic poem *Tartarus* (1888); *Mass in E Flat;* and many other smaller orchestral and instrumental numbers. His most important work, a cycle of four oratorios, has remained in manuscript, the component works of which are named respectively *Adam, Abraham, Isaac, Jacob.*

NICHOLLS, nĭk'olz, FRANCIS TILLON (1834—). An American politician and soldier, born at Donaldsonville, La. He graduated at West Point in 1855 and took part in the Seminole War, but resigned from the army in 1857 and returned to his native State, where he began the practice of law. At the outbreak of the Civil War he entered the Confederate service as a captain and rose to the rank of brigadier-general. In 1876 he was elected Governor of Louisiana, and was again elected in 1888. During his second administration occurred the suppression of the Louisiana Lottery. The lottery company succeeded in getting a bill granting it a new charter through both branches of the Legislature, but Governor Nicholls vetoed the measure, whereupon the company appealed to the people and met with final defeat. In 1892 he became Chief Justice of the State Supreme Court.

NICHOLLS, RHODA (HOLMES) (?—). An English water-color painter and illustrator, born in Coventry, England. She was a pupil of the Bloomsbury School of Art in London and won the Queen's scholarship. In 1884 she removed to the United States, and afterwards settled in New York City, where she became a prominent member of the New York Water Color Club. Her work is strong, brilliant, and individual, and her figure and flower studies are particularly well known.

NICHOLS, nĭk'olz, EDWARD LEAMINGTON (1854—). An American physicist. He was born at Leamington, England, and was educated at Cornell University, graduating in 1875. After studying at Leipzig, Berlin, and Göttingen, where he took the degree of Ph.D. in 1879, he was appointed fellow in physics at Johns Hopkins. He then spent some time in the Edison laboratory at Menlo Park, N. J., and in 1881 became professor of physics and chemistry in the Central University of Kentucky. In 1883 he was called to the chair of physics and astronomy at the University of Kansas, and in 1887 he was appointed professor of physics at Cornell University. He became editor of the *Physical Review* and prepared many papers on electricity and other branches of experimental physics as well as text-books dealing with these subjects.

NICHOLS, ERNEST FOX (1869—). An American physicist, born at Leavenworth, Kan. He graduated at the Kansas Agricultural College in 1888, and pursued graduate studies at Cornell University and Berlin University. He was professor of physics at Colgate University in 1892-98 and at Dartmouth College from 1898 to 1903, when he was made professor of experimental physics at Columbia University. His work in physics includes the remodeling and improvement of the Crookes radiometer; with H. Robens, the discovery and measurement of heat waves four times as long as any hitherto known; the measurement of the heat radiation from the stars Arcturus and Vega and the planets Jupiter and Saturn; and, with G. F. Hall, the measurement of pressure due to radiation.

NICHOLS, JOHN (1745-1826). The last of the learned printers, born near London, February 2, 1745. He was apprenticed to William Bowyer (q.v.), and was taken into partnership (1766). On the death of his patron (1777) he succeeded to the business. He died November 26, 1826. For nearly fifty years Nichols devoted himself to writing, editing, and publishing valuable books. Among them are *A Supplement to Swift's Works* (1776, 1779); *Biographical and Literary Anecdotes of W. Bowyer* (1782); *The Progresses of Queen Elizabeth* (1778, with additions in 1805 and 1821); and *Literary Anecdotes of the Eighteenth Century* (1812-15). His son, JOHN BOWYER NICHOLS (1779-1863), was also a well-known printer and antiquary.

NICHOLSON, nĭk'ol-son, EDWARD WILLIAMS BYRON (1849—). An English librarian and author, born at Saint Helier, Jersey, and educated at Oxford. He was librarian and superintendent at the London Institution from 1873 until 1882, when he became librarian at the Bodleian Library in Oxford. His publications include Gospel commentaries, *The Christ-Child and Other Poems* (1877); *The Rights of an Animal* (1879); *New Homeric Researches* (1883); *The Pedigree of Jack* (1892); *The Vernacular Inscriptions of the Ancient Kingdom of Alban* (1896); *Golspie* (1897); *The Man with Two Souls and Other Stories* (1898); and *The Language of the Continental Picts* (1900).

NICHOLSON, Sir FRANCIS (1660-1728). A British colonial governor and soldier in America. He was born in England, and in 1678 entered the army as an ensign. In 1684 he became a lieutenant and was sent to America, where in 1687 he was appointed deputy for New York of Sir Edmund Andros. Nicholson's administration of affairs in New York was weak and vacillating. In the spring of 1689, at the time of the Leisler rebellion (see LEISLER, JACOB), he was turned out of office, and returned to England, a new commission from William III. as Governor of the colony arriving soon after his departure. From 1690 to 1694 he was Lieutenant-Governor of Virginia, and administered the affairs of the colony with great ability. Although himself a dissolute rake, he endeavored, with considerable success, to improve the moral and intellectual condition of the people. He gave his attention to bettering the character and condition of the clergy, established for the first time a regular system of schools, and founded William and Mary College, to which he himself donated the sum of £300. In 1694 Lord Howard of Effingham, under whom Nicholson served as deputy, died, and when Andros was appointed to succeed him Nicholson, disappointed, resigned. He was pacified with the appointment to the Governorship of Maryland, where his failure to get along with the colonists was as conspicuous as his success in Virginia had been. In 1698 he returned to Virginia as Governor, but his second term was far less successful than the first. He caused considerable irritation and ill-feeling by his removal of the capital from Jamestown to Williamsburg. He was recalled in 1705. In 1709 and 1711 he made ineffectual attempts to invade Canada by leading an army northward from Albany by way of Lake Champlain. In 1710 he planned and commanded the expedition which resulted in the capture of Port Royal, and in 1713 became Governor of Acadia. In 1719, the proprietary charter of South Carolina having been declared forfeited, Nicholson was appointed royal Governor. He was knighted in the following year, and remained in South Carolina until 1725. In the same year he attained the rank of lieutenant-general. He published an interesting account of the capture of Port Royal, entitled *Journal of an Expedition for the Reduction of Port Royal* (1711), reprinted by the Nova Scotia Historical Society in 1879; and *An Apology or Vindication of Sir Francis Nicholson, Governor of South Carolina* (1724).

NICHOLSON, James (1737-1804). An American naval officer, born at Chestertown, Md. He was present at the capture of Havana in 1762, lived in New York from 1763 to 1771, then returned to Maryland, and in 1775 became captain of the American ship *Defense.* In March, 1776, he captured several British prizes; in June he was put in command of a twenty-eight-gun ship, the *Virginia;* and in October he was made ranking captain of the American navy. His vessel was confined for some time to Chesapeake Bay by a strict blockade, and during this period he and his crew took part as volunteers in the battle of Trenton. In January, 1777, he succeeded Commodore Esek Hopkins as commander-in-chief of the American navy, in which position he remained until the close of the war. Early in 1778, while he was attempting to leave Chesapeake Bay, his vessel ran aground and was captured, but he, with most of his crew, managed to escape. On June 2, 1780, in command of the *Trumbull,* of 38 guns, he fought a drawn battle with the British ship *Wyatt,* and in 1781, off the Delaware capes, after a stubborn resistance, he was captured by the *Iris* and *General Monk.* He was released at the close of the war, and returned to New York City, where he was appointed commissioner of loans.

NICHOLSON, James William Augustus (1821-87). An American naval officer. He was born in Dedham, Mass., entered the United States Navy as a midshipman in 1838, became a lieutenant in 1852, and in 1853-55 served on the *Vandalia* in Commodore M. C. Perry's Japan expedition. During the Civil War he commanded the steamer *Isaac Smith,* of the South Atlantic blockading squadron, in the battle of Hilton Head at Port Royal (November 7, 1861); was promoted to the rank of commander in 1862; was in the action with the Confederate flotilla on the Savannah River in the same year; commanded the monitor *Manhattan,* under Admiral Farragut, in the battle of Mobile Bay, and soon afterwards participated in the bombardment of Fort Morgan. In 1865-66 he commanded the steamer *Mohigan* in the Pacific Squadron; in 1873 was promoted to be commander; and from 1876 to 1880 was commandant of the Brooklyn Navy Yard. He became a rear-admiral in 1881, was placed in command of the European station in the same year; was present at the bombardment of Alexandria, Egypt, by an English fleet in 1882, and by his prompt and energetic measures did much to restore order thereafter. In 1883, having reached the age of sixty-two, he was retired from service.

NICHOLSON, John (1821-57). A British general and administrator in India. He was born in Dublin, December 11, 1821. At eighteen he received a cadetship in the Bengal infantry. In 1841 he fought heroically to defend Ghazni against the Afghans, but was taken prisoner and cruelly treated. His escape was followed by a period of inactivity, during which he was stationed at Meerut, doing duty as adjutant of his regiment. On the breaking out of the Sikh War in 1845, he served in the campaign on the Sutlej, and was present at the battle of Firozshah, though he had no opportunity to distinguish himself. After the war, through the recommendation of Colonel Lawrence, Nicholson, now a lieutenant, was appointed assistant to the Resident at the conquered capital, Lahore, and thus fairly transferred to the political branch of the service, in which most of his future life was passed. But with the outbreak of the Sikh rebellion in 1848 came an interlude of military activity, in which he greatly distinguished himself. At the battles of Chillianwalla and Gujerat he earned the approval of Lord Gough, to whom he was immediately attached.

When the Punjab finally became a British province, Captain Nicholson was appointed deputy commissioner under the Lahore Board, of which Sir Henry Lawrence was president. During a furlough, 1850 to 1851, he studied military affairs in the great European capitals. For five years after his return to India he was engaged in administrative duties among the savage tribes of the Punjab. His success in bringing them under thorough subjection to law and order was very great; and such was the impression of fear and reverence wrought by the force and personality of the man, that he became among these rude populations, under the title of 'Nikkul Seyn,' the object of a curious kind of hero-worship. In the great mutiny of 1857 he did noble service for England in helping save the Punjab. When everything was safe behind him, he marched to reinforce the army of General Wilson, engaged in the siege of Delhi. His presence and counsels gave new life to the operations, and in every way he strove to expedite the delayed assault. When the attack on the city was at last ordered, General Nicholson, as he was now, led the first column. As the troops forced their way into the city, Nicholson exposed himself fearlessly to animate his men. Conspicuous by his great stature, he became the mark of the enemy's bullets and fell, shot through the body. After great suffering he died September 23, 1857. Consult: Kaye, *Lives of Indian Officers* (London, 1867); id., *History of the Sepoy War in India* (ib., 1867); Malleson, *History of the Indian Mutiny* (ib., 1897); Trotter, *Life of John Nicholson, Soldier and Administrator, Based on Private and Hitherto Unpublished Documents* (ib., 1897).

NICHOLSON, Joseph Shield (1850—). An English economist, born in Lincolnshire. He studied at the universities of Edinburgh, Cambridge, and Heidelberg. He was private tutor at Cambridge, 1876-1880, and became professor of political economy at the University of Edinburgh in 1880. His writings represent a compromise between the methods of the historical school of German economics and those of the English deductive school. In his principal work, *Principles of Political Economy* (3 vols., 1893-1901), he closely follows the great work of John Stuart Mill in his selection of material, but employs statistical and historical discussion instead of the abstract reasoning from simple assumption which characterizes Mill's works. His other important works on economic subjects are: *Effects of Machinery on Wages* (1878); *Tenant's Gain Not Landlord's Loss* (1883); *The Silver Question* (1886); *Money and Monetary Problems* (1888); *Historical Progress and Ideal Socialism* (1894); *Strikes and Social Problems* (1896). He is also author of three romances: *Thoth* (1888); *Dream of Dreams* (1889); and *Toxar* (1890).

NICHOLSON, Louisa Margaret. An American singer, better known by her professional name, Louise Nikita (q.v.).

NICHOLSON, William (1872—). An English painter and wood engraver, born at Newark-upon-Trent. He studied with Herkomer and under Bouguereau and Constant in Paris, but these masters had little influence upon him. After his return to London, he and his brother-in-law, James Pryde, began to design posters under the name of the Beggarstaff Brothers. The technical skill shown in these works, their originality and boldness, attracted considerable attention. They are done in black and white with usually a dash of color. His publications include: *An Alphabet* (1898); *An Almanac of Twelve Sports* (with Rudyard Kipling, 1898); *London Types* (with W. E. Henley, 1898); and *Characters of Romance* (1900). In portraiture he is particularly successful. His best cuts are Queen Victoria, Whistler, Bernhardt, Kipling, and Earl Roberts.

NICIAS, nĭsh'ĭ-*as* (Lat., from Gk. *Νικίας*, *Nikias*). A famous Athenian statesman and general during the Peloponnesian War. He was the son of Niceratus, a very wealthy citizen, who had acquired his fortune by working the silver mines at Laurium. Nicias belonged to the aristocratic party, and after the death of Pericles presented himself as the opponent of Cleon, the great popular or demagogic leader. The opposite in character to Alcibiades, he was wary, cautious, obstinate, and irresolute. He was generally successful in his enterprises against the Spartans and their allies. In B.C. 427 he captured the island of Minoa; in the following year he ravaged the island of Melos and the coasts of Locris; and in B.C. 424 he captured the island of Cythera and ravaged the coast of Laconia. After the death of Cleon he brought about a peace between the Spartans and Athenians, B.C. 421, called the Peace of Nicias. Six years afterwards the Athenians, at the instigation of Alcibiades, resolved on a great naval expedition against Sicily. Nicias was appointed one of the commanders, although he had strongly protested against the undertaking. In the autumn of B.C. 415 he laid siege to Syracuse, and was at first successful, but subsequently experienced a series of disasters; his fleet was destroyed, and his troops began a retreat toward the interior of Sicily. They were speedily forced to surrender, and Nicias was put to death, B.C. 413. Consult the *Histories of Greece* by Grote, Curtius, Holm, Beloch, and Eduard Meyer; also Plutarch's "Life of Nicias."

NICKEL (Swed. *nickel*, connected perhaps with Ger. *Nickel*, devil, cf. the etymology of *cobalt*; according to others connected with Icel. *hnikill*, ball, lump). A metallic element discovered by Cronstedt in 1751. It was first mentioned in 1694 by Hiarni, who called it *kopparnickel*, signifying false copper, because, while its ores resembled those of copper, that metal could not be extracted from them. Cronstedt successfully isolated the metal, but it was not until Bergman in 1774 corroborated his investigations that its distinct nature was recognized. Nickel is a constituent of all meteoric irons, and it has been detected spectroscopically in the atmosphere of the sun. On the earth it occurs, usually associated with cobalt, in *niccolite*, *gersdorffite*, *millerite*, *garnierite*, and certain other minerals. The wide distribution of the sulpharsenide ores led to their extensive working in Saxony, Norway, Sweden, Austria, Spain, Russia, Great Britain, and the United States, but since the discovery of garnierite in New Caledonia in 1873, and the development of the nickeliferous pyrrhotite in Sudbury, Ontario, Can., subsequent to 1887, these two localities have become the principal sources of nickel.

Nickel (symbol, Ni; atomic weight, 58.69) is a silver-white lustrous metal that is magnetic at ordinary temperatures, is ductile, hard, and tenacious, has a specific gravity of from 8.97 to 9.26, and a melting-point of about 1450° C. Next to manganese it is the hardest of the metals, and it is capable of taking a fine polish. Fleitman has found that on adding a small quantity of magnesium to fused nickel the latter can be rolled into very thin sheets and welded on to sheet iron or steel so as to permit its use for the manufacture of culinary or other utensils. Nickel thus treated may be drawn into wire and also cast or forged. The chief use of nickel is in the manufacture of alloys, including German silver. There is an important alloy of nickel and steel which is used for armor plate and other heavy forgings. Nickel is also employed as a material for making coins in Switzerland, Belgium, Germany, the United States, and other countries. Nickel combines with oxygen to form two oxides. The monoxide, NiO, is a grayish-green substance found native as bunsenite. It may be made by strongly heating the hydroxide, carbonate, or nitrate. The sesquioxide of nickel, Ni_2O_3, is a black substance obtained by heating the nitrate or carbonate in the air. The most important commercial salt of nickel is ammonium-nickel sulphate, which is obtained by dissolving either metallic nickel or its protoxide in sulphuric acid and adding ammonium sulphate to the concentrated acid solution, which is then evaporated to crystallization. The crystals, which are of a bright green color, may be further purified by recrystallization and find their chief use in nickel plating. The carbonate may also be used for electro-plating. Nickel salts, when hydrated or in solution, have a fine emerald green color, but are yellow when anhydrous. In 1889, 252,663 pounds of nickel, valued at $151,598, were produced from ores mined in the United States. In 1902 there was no nickel mined, the ore smelted being derived entirely from Canada and New Caledonia.

Metallurgy. When nickeliferous ores of lead, cobalt, copper, or silver containing arsenic are smelted, the nickel combines with the arsenic to form speiss; should arsenic not be present, the nickel enters the various intermediate products of the smelting process, such as matte, blister copper, tough pitch copper, and dyes. From all these metallurgical products nickel may be extracted as well as from the ores. The principal ores from which nickel is extracted are the sulphur compounds and the silicates. The chief sulphur compounds are the nickel pyrites of iron and copper, of which one of the most notable deposits is at Sudbury, Canada. The Sudbury ores are the principal source of the world's nickel supply.

The extraction of nickel is performed by (1) the dry method, (2) the wet method, and (3) electro-metallurgically. The dry method is the one chiefly used to extract the metal from the ores, the use of the wet method and electro-metallurgical processes being confined almost entirely to extraction from metallurgical products and the matte and speiss resulting from the dry processes. Most attention will therefore be given to the dry method of extraction as applied to the principal ore of nickel; that is, the combined nickel, iron, and copper pyrites. In smelting these ores in the dry way, after getting rid of the gangue, the metallurgist is chiefly concerned with the separation of the nickel from the sulphur, iron, and, in most cases, from the copper also. When no copper is present the process becomes simple. Considering first ores free from copper, the task is to get rid of the iron and sulphur. The first operation consists in roasting the ore, which converts the metallic sulphides into a mixture of oxides, sulphates, and undecomposed sulphides. The roasted ore is then smelted in a shaft furnace with coal and siliceous matter, which removes the great bulk of the iron as slag, leaving a matte consisting of sulphide of nickel mixed with a small proportion of iron sulphide. Generally, to get a matte rich enough in nickel for the succeeding operations, these roasting and smelting processes are repeated one or more times. The raw nickel matte is next submitted to an oxidizing fusion in hearths, reverberatory furnaces, or converters to remove the remaining iron, leaving nickel sulphide. When copper is present in the ores as well as iron, the iron is removed exactly as before, the result being, however, a matte of nickel sulphide and copper sulphide mixed. This matte may be oxidized by roasting and then smelted to produce a nickel-copper alloy, or to secure nickel alone the matte is smelted with a flux, which removes the copper, or is treated with chemicals, which permit the separation of the copper. This latter method is the chief use made of the wet method of reduction, which, as previously stated, is used mostly for reducing the mattes, speiss, and slags resulting from the smelting process. As in wet methods of extraction generally, the process in the case of nickel consists in dissolving the metals from the matte, etc., by acids, and then in precipitating separately the various metals from this solution. The nickel compounds resulting from the processes mentioned are reduced to metallic nickel by smelting in crucibles with carbon. See Dr. Carl Schnable's *Handbook of Metallurgy* (New York, 1898).

NICOBAR (nĭk′ō-bär′) **ISLANDS.** A group of islands in the Indian Ocean beginning 130 miles northwest of Sumatra and stretching northwestward for 200 miles (Map: French Indo-China, B 6). They form with the Andaman Islands to the north of them the northern extension of the great chain of islands of which Sumatra and Java are the principal members. The group consists of 19 islands, of which 12 are inhabited, the largest being Great and Little Nicobar in the south, Camorta in the centre, and Car Nicobar in the north. The area of Great Nicobar, the largest, is 337, and of the whole group 684 square miles. The southern islands are mountainous and covered with dense forests; those in the north are low, less fertile, but supporting large numbers of cocoa-palms. The climate is hot, humid, and very unhealthful for Europeans. The Nicobarese are classed with the Selungs of the Mergui Archipelago as Indonesians. The inhabitants of the smaller islands and of the coast of Great Nicobar have intermixed with Malays. In all probability they belong originally to one of the primitive stocks of Farther India (proto-Malay?) with Negrito and Malay admixtures. The northern Nicobarese are monogamous and value chastity very highly. In 1901 the inhabitants numbered 6310. They are chiefly supported by their large trade in cocoanuts and copra. Formerly they were engaged in piracy and wrecking, but have been peaceful since the British occupation. The islands are, together with the Andamans, governed by a British chief commissioner. The British Government agent resides at Nancowry Harbor, where there is a fine land-locked harbor between Camorta and Nancowry islands. The Nicobar Islands were settled by Denmark in 1756, but her attempts at colonization were unsuccessful, and she abandoned them in 1848. In 1869 they were annexed by Great Britain.

NICOBAR PIGEON. A large and very beautiful ground-feeding pigeon of the East Indies (*Calœnas Nicobarica*), which is remarkable for the elongated feathers that mantle the neck, and for its very wide distribution over the Polynesian region. Consult Wallace, *Malay Archipelago* (New York, 1869).

NIC′ODE′MUS (Lat., from Gk. Νικόδημος, *Nikodēmos*). A Jew described in the Gospel of John as a Pharisee and member of the Sanhedrin, who came to Jesus secretly and by night at Jerusalem (John iii. 1 sqq.). He put in a plea for a hearing for Jesus when the Pharisees would have condemned Him without allowing Him to plead (John vii. 50); and he bore a part with Joseph of Arimathæa in burying the body of Jesus (John xix. 39). He disappears from the New Testament after the burial. In an apocryphal book, the Gospel of Nicodemus, or Acts of Pilate, the few facts recorded in the Gospels are elaborated and commented on at considerable length, evidently with no basis of historic truth behind them. See APOCRYPHA.

NICOL, nĭk′ol, ERSKINE (1825-1904). A Scotch painter, born at Leith, near Edinburgh. He studied at the Trustees' Academy, Edinburgh, and then went to Dublin, where he taught and painted portraits. In 1859 he was elected associate of the Royal Academy, and in 1863 went to live in London. His works are genre, generally of Irish subjects, and many of them are well known in the United States through engravings. Among the best known are "Paddy's Mark," in the Corcoran Gallery, Washington; "Paying the Rent," in the Vanderbilt Collection, New York.

NIC′OLA, LEWIS (1717-c.1807). An American soldier, born in Dublin, Ireland. He became ensign in the British army in 1740, and afterwards major. He resigned and came to Philadelphia about 1766, and was employed in civil engineering. In 1776 he was made barracks-master of the city and aided in preparing for defense. In December, 1776, he was made town major with State rank, and he held this place until 1782. He presented to Congress a plan for an invalid regiment, which should serve both as a home guard and a training school, was made the colonel in June, 1777, and was brevetted brigadier-general in 1783. He was an original member of the Pennsylvania branch of the Society of the Cincinnati and wrote to Washington for the army officers the famous letter suggesting that the latter become King of the country. He published *A Treatise of Military Exercise Calculated for the Use of Americans* (1776).

NICOLAI, nĭk'ō-lī, CHRISTOPH FRIEDRICH (1733-1811). A well-known German littérateur, born in Berlin. From 1752 he directed a publishing and bookselling establishment, which he made one of the largest in Berlin. He became (1754) a member of a literary circle which included Lessing and Moses Mendelssohn, with the latter of whom he established at Berlin in 1757 the *Bibliothek der schönen Wissenschaften* (conducted from vol. v., 1760, by C. F. Weisse at Leipzig), designed as an independent critical journal. He also collaborated with Mendelssohn and Lessing (whose place was later taken by Thomas Abbt) in the *Briefe die neueste Litteratur betreffend* (1761-67), a literary review presented as letters addressed to a supposititious officer, wounded in the Seven Years' War. Another periodical, the *Allgemeine Deutsche Bibliothek* (106 vols., 1765-91; with a continuation, in all 162 vols., 1805), he made known chiefly for its harshness and insipidity. A rationalist in philosophy, he wrote *Sebaldus Nothanker* (1773), rather a heterodox monograph than the work of fiction it purported to be, and bitterly attacked Kant, Fichte, and the critical school in general. He attempted to cast ridicule upon most of what was significant in the German literature of the time, for example, the work of Goethe and Schiller, who made spirited reply in the *Xenien*, and that of G. A. Bürger, against whose revival of the ballad form he directed his *Feyner kleyner Almanach vol schönerr, echterr, liblicherr Volckslieder* (1777-78; new ed. 1887). Yet in earlier critiques he worked effectively toward the improvement of taste; and his *Anekdoten von Friedrich II.* (1788-92) is of permanent historical value. Consult Göckingk, *Nicolais Leben und litterarischer Nachlass* (Berlin, 1820). See also GERMAN LITERATURE.

NICOLAI, OTTO (1810-49). A German musical composer, born at Königsberg in 1810. His early life was a struggle with poverty and difficulties, and although his first lessons in music were given to him by his father, the lack of sympathy between them, and the oft repeated brutality of the elder, caused the boy to run away from home (1826), and find a patron in Adler of Stargard, by whose aid he was enabled to complete his studies. He studied for three years in Berlin under Klein; and in 1835 went to Rome, where he went through three more years of study under Baini. After traveling for ten or twelve years over Europe, he became in 1847 kapellmeister at Berlin, a post which he soon resigned. He appeared as a composer of dramatic music as early as 1831; but his first work of importance was *Il Templario*, founded on Scott's romance of *Ivanhoe*, which, produced at Turin in 1841, attained a high and permanent reputation. In 1848 he wrote at Berlin *Die lustigen Weiber von Windsor*, on which his renown as a musician is founded, a work charming for its clear design and lively, vigorous tone. Two months after the production of this, his *chef-d'œuvre*, its composer died, in Berlin.

NIC'OLA'ITANS (Gk. Νικολαϊταί, *Nikolaïtai*). Representatives of a form of false teaching and loose moral practice, mentioned only in Revelation ii. 6, 15, and in early Christian literature bearing on these passages. Among the early references is the following by Irenæus (*Against Heresies*, i. 26): "The Nicolaitans are the followers of that Nicolas who was one of the seven first ordained to the diaconate by the Apostles. They lead lives of unrestrained indulgence. The character of these men is very plainly pointed out in the Apocalypse of John, [where they are represented] as teaching that it is a matter of indifference to practice adultery and to eat things sacrificed to idols." They evidently carried to an illogical and immoral extreme the principles of religious freedom from legal requirements taught by Saint Paul. Certain critics have seen in these references of the Apocalypse an allegorical portrayal of Paul's teachings by those to whom they were repugnant. Most scholars, however, find no warrant for this. The Nicolaitans were among the obscure early Gnostic heretics who offended chiefly in violating the decree of the Council at Jerusalem (Acts xv. 29), which forbade participation by Christians in the heathen feasts and in the licentiousness by which these celebrations were commonly attended. That they were personal followers of Nicolas or Nicolaus of Antioch (Acts vi. 5) has not been proved. Their name (in Greek, 'conqueror of the people') closely resembles the name Balaam (in Hebrew, 'destroyer of the people'), whence it has been argued that no such sect really existed, but the close association of the terms in the Apocalypse is a part of its allegorical method. There is no reasonable warrant for the conjecture. The sect was insignificant and disappeared. Other sects called Nicolaitans are met with in the Middle Ages; one flourished in the fifteenth century in Bohemia; these have no connection with the party mentioned in the Apocalypse. Consult the commentaries on Revelation, and McGiffert, *A History of Christianity in the Apostolic Age* (New York, 1897).

NIC'OLAS, Sir NICHOLAS HARRIS (1799-1848). An English antiquary, born at Dartmouth. In 1823 he published his *Index to the Heralds' Visitations in the British Museum.* His labors also resulted in the reform of abuses which had crept into the administration of the record commission, the Society of Antiquaries, and the British Museum. Among his publications are: *Observations on the State of Historical Literature and on the Society of Antiquaries, with Remarks on the Record Commission* (1830); *Synopsis of the Peerage of England* (1825; new ed. revised by William Courthope, 1857); and *History of the Battle of Agincourt* (3d ed. 1833).

NIC'OLA'US (Lat., from Gk. Νικόλαος, *Nikolaos*) **OF DAMASCUS.** A Greek historian of the first century B.C., an intimate friend of Herod the Great and of Augustus. His numerous works include his autobiography, of which a considerable portion remains; a history of the world down to his own times in 144 books, of which fragments have been preserved; and a panegyrical biography of Augustus, of which some extracts, made by command of Constantine Porphyrogenitus, are extant. He also wrote commentaries on various philosophical works, and several tragedies and comedies. A fragment of one of the tragedies has been preserved by Stobæus. For the fragments, consult: Müller, *Fragmenta Historicorum Græcorum* (5 vols., Paris, 1841-70); also, Trieber, *De Nicolai Damasceni Laconicis* (Berlin, 1867); and Steinmetz, *Herod and Nicolaus* (Lüneburg, 1861).

NICOLAY, nī'kô-lā, John George (1832-1901). An American author, born in Essingen, Bavaria, February 22, 1832. He came to the United States in 1838, attended school in Cincinnati, Ohio, and later went to Illinois, where he edited the *Pike County Free Press*, at Pittsfield. Then he became assistant to the Secretary of State of Illinois, and while in this position met Abraham Lincoln. He served as private secretary to Lincoln during the Civil War (1861-65), and after the death of the President became United States Consul at Paris, France (1865-69). He was marshal of the United States Supreme Court (1872-87). Besides contributions to the leading magazines, his writings include books on the Civil War and on Lincoln, *The Outbreak of the Rebellion* (1881), and jointly with John Hay (q.v.) *Abraham Lincoln: A History*. This authoritative work appeared in the *Century Magazine* serially from 1886 to 1890, and was then issued in book form, together with the *Complete Works of Abraham Lincoln*, in 12 volumes (1890-94).

NICOLE, nē'kōl'. In Molière's *Bourgeois gentilhomme*, a bright servant who with Madame Jourdain exposes and ridicules the foibles of her master.

NICOLE, Pierre (1625-95). A distinguished French Jansenist writer. He was born at Chartres, and at an early age attained unusual proficiency in classical studies, at first under the teaching of his father, a counselor in the Parlement of Paris. From 1642 to 1644 he studied philosophy in Paris, where he took his master's degree. Inclined to take holy orders, he made a theological course at the Sorbonne in 1645-46. He was already under the influence of the Jansenist leaders, especially Antoine Arnauld, and after taking his bachelor's degree in theology went to Port Royal in 1649. Five years later he returned to Paris and devoted his talents to promoting the cause of Jansenism. In 1679 his outspoken opposition to the ruling doctrines made it advisable for him to accompany Arnauld to the Low Countries, where he lived at Brussels, Louvain, and elsewhere until he got permission to return to Chartres, and in 1683 to Paris, where he died. He wrote a large number of controversial treatises, all characterized by purity of style and subtlety of discrimination. To him is due the principal part of the celebrated Port Royal logic—*La logique, ou l'art de penser* (Paris, 1662; Eng. trans. ed. T. S. Baynes, 10th ed., London, 1898). His *Essais de morale* (6 vols., 1671 seq.) is his most important work; it was continued in a new edition with life by C. P. Goujet (14 vols., Paris, 1767-82).

NICOLINI, nē'kô-lē'nē, Ernesto (properly Ernest Nicolas) (1834-98). A French singer, born at Saint-Malo. He studied at the Conservatory, and made his début in the *Mousquetaires de la reine* at the Opéra Comique in Paris in 1857. Afterwards, he traveled extensively, and did not reappear in Paris until 1870. While in Saint Petersburg on another tour he renewed an acquaintance with Mme. Adelina Patti, whom he married after her divorce from the Marquis de Caux in 1886.

NIC'OLL, James Craig (1847—). An American painter, born in New York. He studied under M. F. H. de Haas and Kruseman van Elten, and in 1885 was elected a National Academician. His marines include: "On the Rocks Near Portland" (1882), "Twilight," "Sunlight on the Sea," "Fog and Sunshine," and "On the Gulf of Saint Lawrence."

NICOLL, William Robertson (1851—). A British author and journalist, born at Lumsden, Aberdeenshire, Scotland, October 10, 1851. He was educated at the university and the Free Church College at Aberdeen; was a minister at Dufftown (1874-77), and at Kelso (1877-85). In 1884 he became the editor of the *Expositor;* in 1886 of the *British Weekly*, which he founded; and in 1891 of the *Bookman*, which he also founded. He has written: *The Incarnate Saviour* (1881); *The Lamb of God* (1886); *The Key of the Grave* (1893); *Literary Anecdotes of the Nineteenth Century* (1895); and, jointly with C. K. Shorter, a new *Life of the Brontës* (1895); besides editing a number of theological works.

NICOLLET, nē'kô'lā', Jean Nicolas (1786-1843). A French astronomer and explorer, born at Cluses in Savoy. When about twenty-one years old he went to Paris and became a naturalized Frenchman. In 1817 he secured a position in connection with the observatory, and in 1822 was promoted to be assistant astronomer in the Bureau of Longitudes. He discovered at the same time as Pond the comet of 1821, and in 1822-23 was engaged with Colonel Brousseau in measuring an arc of latitude in the south of France. Obliged to leave the country in 1831 because of unfortunate speculations, he went to the United States, where the Government gave him some assistance in making a geographical and geological exploration of the territory beyond the Mississippi. The results of these researches are embodied in a series of memoirs which appeared in the *Connaissance des Temps* and Silliman's *Journal*. Among his other publications are: *Des assurances sur la vie* (1818); *Cours de mathématiques* (1830); and a *Report and Map of the Hydrographical Basin of the Upper Mississippi River* (1843). Consult Sibley, "Memoir of Jean N. Nicollet," in the *Collections of the Minnesota Historical Society*, vol. i. (Saint Paul, 1872).

NICOLLS, nĭk'olz, Mathias (c.1630-87). An English colonial official, born at Plymouth. He was admitted to the bar, and in 1664 was appointed by Charles II. secretary of the commission headed by Col. Richard Nicolls (q.v.), which was to regulate New England and capture New Netherland. He became the first Secretary of New York after the English occupation (September 8, 1664), and was appointed a member of the Governor's Council. He drew up, under the supervision of Governor Nicolls, a code from the English, the Roman-Dutch, and the local laws of New England, which was promulgated at Hempstead in October, 1664, and was later known as the 'Duke's Laws.' In the Court of Assizes provided in this code, he was the presiding justice, and in 1665 was appointed judge of the Admiralty Court. He also served as captain of the militia and led some expeditions against the Indians. Though deposed as secretary when the Dutch recaptured the province in 1673, he was reappointed by Andros in 1674, and was elected mayor of the city as well. In 1680 he resigned all his offices and went to England. Upon his return he was appointed one of the two judges of the Court of Oyer and Terminer in 1683. During that year and the next he was Speaker of the First Assemblies of the Province. He bought and entered much land in Queens County, and died on his estate, Plandome.

NICOLLS, RICHARD (1624-72). A British soldier and colonial Governor. During the Civil War he commanded a troop of horse on the Royalist side. He followed the Stuarts into exile and served with the Duke of York under Marshal Turenne. After the Restoration, he was groom of the bedchamber for the Duke of York. In 1664 Charles II. appointed a commission, consisting of Colonel Richard Nicolls, Sir Robert Carr, Sir George Cartwright, and Samuel Maverick, to investigate complaints against the New England colonies, and reduce the Dutch in New Netherland, which had been granted to the Duke of York. Colonel Nicolls's presence was to be necessary for a quorum, and he was commissioned as Deputy Governor of the territory to be captured. After touching at Boston, he appeared before New Amsterdam, August 25, 1664, and on September 8th Governor Stuyvesant was forced to surrender. Governor Nicolls assumed authority over New York and New Jersey. He made no radical changes, was firm, yet conciliatory, and soon won the respect and confidence of the people and the good-will of the Indians. In March, 1665, he published the 'Duke's Laws,' which had been drawn up under his supervision (see NICOLLS, MATHIAS), and which served for a time as a constitution. On June 12, 1665, he established the English form of municipal government for the city of New York. The French and Indian troubles of 1666 were settled with credit, but he complained that he had spent much money from his private purse to maintain the establishment. He asked several times to be relieved, and in 1667 his petition was granted, but he remained until Governor Lovelace arrived, in August, 1668. His time had been so fully occupied with affairs in New York that he largely left the management of New England to the other commissioners. When war broke out between the English and the Dutch, he served on shipboard and was killed at Solebay.

NICOL PRISM. A prism formed from a crystal of calcite devised by Nicol in 1828 to polarize light. The Nicol prism, which has undergone various modifications, is a most convenient source for obtaining polarized light, and is largely employed in many forms of polariscope. The accompanying diagrams will show its construction. In Fig. 1 A G B F D E C is a rhomb of calcite, a material which is doubly refracting (see LIGHT, paragraph on *Polarization*), while Fig. 2 shows diagrammatically a section of a Nicol prism in the plane A B C D. In the natural crystal the angle B A D is 71°, but in the prism this is made 68°, and the two halves of the crystal forming the prism are cemented together with Canada balsam along the line B D, which makes an angle of 90° with B A. The plane of the balsam is perpendicular to the end of the face of the prism. Under these conditions the ray of light falling upon the prism at H is broken by double refraction into two rays—the extraordinary, which travels to J and passes out of the prism and is available for experimentation, and the ordinary, which strikes the balsam at an angle of incidence so great that it is totally reflected at I and lost on the side of the prism. The plane of the polarization of the extraordinary ray is perpendicular to the plane of the diagram, while that of the ordinary ray is parallel to it. See POLARISCOPE; LIGHT.

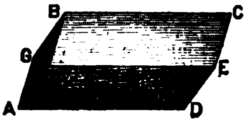


FIG. 1. RHOMB OF CALCITE.

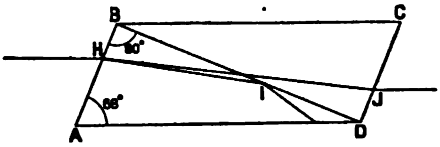


FIG. 2. NICOL PRISM.

NICOMACHUS, nī-kŏm'ȧ-kŭs (Lat., from Gk. Νικόμαχος, *Nikomachos*). A celebrated painter of the fourth century B.C., a son and scholar of Aristides. The references to him praise his mastery in technique, and rapid but effective execution. The notices, however, throw but little light upon his style. His works are known only from a particular list in Pliny (*Hist. Nat.*, xxxv., 108, cf. 145). Among them were: "The Rape of Proserpine," in the temple of Minerva, on the Capitol; "Victory Conducting a Four-Horse Chariot on High," also in the Capitol; "Apollo and Diana," "Cybele on a Lion," "Bacchantes Approached by Satyrs," and "Scylla."

NICOMACHUS (c. 100 A.D.). A Neo-Pythagorean philosopher and mathematician, born at Gerasa, probably in Judæa. He wrote an arithmetic in two books, of which the best edition is that of Hoche (Leipzig, 1866). In this he fully treated the theory of figurate numbers, and it is interesting as containing the first known multiplication table. Commentaries on this work were written by Iamblichus (q.v.), Philoponus, Soterichus, and others, and it was translated into Latin by Boëthius and Apuleius. He also wrote a *Harmonices Manuale* (published in 1652; French trans. 1880), of which the first book is still extant; the so-called second book, consisting of two fragments which probably did not belong to the original, was published in Jans's *Musici Græci* (Leipzig, 1895).

NIC'OME'DIA (Lat., from Gk. Νικομήδεια, *Nikomēdeia*). The capital of ancient Bithynia, situated at the northeastern angle of the Gulf of Astacus, in the Propontis, now called the Bay of Ismid; founded in B.C. 264 by Nicomedes I. after the destruction of Astacus (on the opposite side of the bay) by Lysimachus. Nicomedes made it the capital of the kingdom, and it soon became one of the most magnificent and flourishing cities in the East. Some of the later Roman Emperors, as Diocletian and Constantine the Great, selected it for their temporary residence. It suffered greatly both from earthquakes and the attacks of the Goths. Constantine died at a royal villa in the immediate vicinity. Hannibal committed suicide in a castle close by. It was the birthplace of the historian Arrian. The small town of Ismid or Isnikmid now occupies its site, and contains many relics of ancient Nicomedia.

NICOP'OLIS (Lat., from Gk. *Νικόπολις*, *Nikopolis*). A town in Epirus, where Paul, in writing to Titus, stated that he designed to pass the winter (Titus iii. 12). It was founded in the year B.C. 31 by the Emperor Augustus, who named it the 'City of Victory,' in commemoration of the victory won by him at Actium. He decided to make a great city of Nicopolis, gathered a large population into it, and instituted games which drew throngs there every fourth year. The question of Paul's visit to Nicopolis is bound up with the authenticity of the pastoral Epistles (i.e. the two letters to Timothy and the one to Titus, qq.v.). Those who hold these to be authentic believe that Paul reached Nicopolis from Rome, preached there, and was there arrested for the second time and sent to Rome, where he was tried a second time and condemned. The original site of Nicopolis is now deserted. Remains of it are still to be found. Another city, Prevesa (Map: Balkan Peninsula, C 5), situated about five miles distant from the original location of Nicopolis, is the historical successor of the older city.

NICOPOLIS. A town of Bulgaria. See NIKOPOLI.

NICOSIA, nē̇'kō̇-sē'ȧ (more common than the forms LEFKOSIA and LEVKOSIA, of which it is a corruption). The capital and largest city of the island of Cyprus (Map: Turkey in Asia, E 5). It is the seat of the British High Commissioner and of an archbishop of the Greek Church. It is situated in a barren plain, a little northeast of the centre of the island, on the river Pedias, which is dry most of the year. The water supply of the city comes by aqueduct from the hills not far away. From a distance the high walls built by the Venetians and the beautiful Gothic cathedral, now a mosque, render Nicosia attractive; but the streets are narrow and labyrinthine, and most of the buildings insignificant. The manufactures are silks, leather, and woolen stuffs. Population, in 1891, 12,515; in 1901, 14,752. The city first appears in history in the time of Constantine, who fortified it with walls that lasted until the Venetians replaced them. It became the capital under the Lusignan kings, to the first of whom, Guy de Lusignan, the island was given in 1193 by Richard Cœur de Lion. Consult *Levkosia, the Capital of Cyprus* (London, 1881).

NICOSIA, nē̇'kō̇-zē'ȧ. A city in the Province of Catania, Sicily, situated in a mountainous region, on the Salso, 25 miles northeast of Caltanissetta (Map: Italy, J 10). The town is mediæval in appearance and customs. It is the see of a bishop, and has a Gothic cathedral, several ancient churches, and quaint houses. It carries on some trade in corn, wine, oil, and cattle. Near it are beds of alum, a rich mine of rock salt, and springs of petroleum. Population (commune), in 1901, 16,004.

NICOT, nē̇'kō̇', JEAN, Sieur de Villemain (1530-1600). A French diplomat, born at Nîmes. He was appointed by Francis II. Ambassador to Portugal in 1560. During his residence at Lisbon he obtained from a Flemish trader some seeds of the tobacco plant, which he took back with him to France, where the plant was named *Nicotiana* in his honor. He published a *Historia Francorum* (1566), and a *Trésor de la langue française* (1606), one of the earliest French dictionaries.

NICOTERA, nė-kō'tā-rȧ, GIOVANNI (1828-94). An Italian statesman, born at San Biase (Calabria). He took an active part in the Revolution of 1848-49, fought in Calabria and Rome, and was afterwards taken prisoner at Sanza and condemned to death. Through the influence of England this sentence was commuted to imprisonment for life. In 1860 he was set at liberty again, and joined Garibaldi. He was concerned in all of the political movements of the succeeding years, and was at all times a supporter of Victor Emmanuel. After the establishment of the Kingdom of Italy, he was Minister of the Interior under Depretis (1876-77), and again during the Premiership of Rudini (1891-92).

NICOTIANA. See TOBACCO.

NIC'OTINE (Fr. *nicotine*, Sp. *nicotiana*, from Fr. *nicotiane*, tobacco, named in honor of Jean *Nicot*), $C_{10}H_{14}N_2$. One of the vegetable alkaloids that contain no oxygen; it constitutes the active principle of the tobacco plant, in the leaves, roots, and seeds of which it occurs in combination with malic and citric acids. The smoke of burning tobacco-leaves contains but a mere trace, if any, of nicotine; which does not prove, however, that tobacco smoke is harmless, for its other ingredients are probably more or less injurious to health. Nicotine is a colorless, intensely poisonous liquid, of specific gravity 1.027 at 66° F.; it boils at 466° F. (241° C.), evolves a very irritating odor of tobacco, especially on the application of heat, is very inflammable, and burns with a smoky flame. It is moderately soluble in water, but dissolves readily in alcohol and ether. If exposed to the air, it absorbs oxygen and becomes brown and ultimately solid. The quantity of nicotine contained in tobacco varies from 2 to 8 per cent.; the coarser kinds containing the larger quantity, while the best Havana cigars seldom contain more than 2 per cent., and often less. Turkish tobacco scarcely contains any nicotine at all.

The principal physiological effects of even minute doses of nicotine are as follows: intense gastro-intestinal irritation, among the symptoms of which are nausea and vomiting, accompanied by great muscular weakness, a rapid, feeble pulse, coldness of extremities, and extreme general collapse: the motor nerves and the respiration are rapidly paralyzed, and death may ensue within three minutes after taking a dose of the poison. See also ALKALOIDS.

NICOYA, nė-kō'yȧ, GULF OF. An inlet of the Pacific Ocean, on the west coast of Costa Rica, formed by a peninsula ending in Cape Blanco

(Map: Central America, E 6). It is about 60 miles long and 20 to 30 miles wide, and is lined on both sides with high and picturesque mountains. On its eastern shore lies Punta Arenas, the only port of entry on the Pacific coast of Costa Rica.

NICTHEROY, nĕk'tâ-roi'. A town of Brazil, in the State of Rio de Janeiro. It is situated on the east side of the entrance to the bay, opposite the city of Rio de Janeiro (Map: Brazil, J 8). The town is not attractive, but it is surrounded by delightful suburbs, where the residences of the wealthy classes are situated. Prior to 1894 Nictheroy was the capital of Rio de Janeiro. The population was estimated in 1898 at 26,000.

NIC'UM, JOHN (1851—). An American clergyman and author, born at Winnenden, Württemberg. He studied at Muhlenberg College, Allentown, Pa., and at the Philadelphia Theological Seminary. In 1876 he became pastor at Frockville, Pa., but two years later removed to Philadelphia, where he remained two years, and then went to Syracuse, N. Y. In 1887 he took charge of the Saint John's Evangelical Lutheran Church in Rochester. His books include *History of the New York Ministerium* (1884), and *Confessional History of the Lutheran Church in the United States* (1891).

NIDIFICATION (from Lat. *nidificare*, to make a nest, from *nidus*, nest + *facere*, to make). Strictly, the act and process of nest-building. In the present article, however, the word will be broadly interpreted, so as to include the entire series of acts, instincts, and adaptations connected with the provision of a temporary breeding-home, nidus, or 'nest' for their eggs, embryos, or young, and the care of offspring, by the parents of animals generally.

A nest differs from an animal's ordinary residence in that it is not made primarily for the animal's own use, but for that of expected young. In some instances it is mainly a convenient lying-in place for the mother; in others, merely a means for the safety and comfort of eggs or helpless embryos; but often it combines these purposes and adds to them that of a nursery. The last phase is illustrated by certain social insects, some birds, a few mammals, and in human society. In the lowest ranks of invertebrate life, and to some extent among animals of comparatively high organization, the eggs, or 'spawn,' are simply voided into the water or earth and left to survive or perish, unregarded by the parent. Some animals, however, produce comparatively few eggs, protected against many dangers by being placed within one or more envelopes or 'capsules.' (See EGG.) Another widespread method is that of retaining the embryo in the maternal body until it is able to shift for itself. This is seen in many invertebrates and in some fishes. These animals are therefore known as ovoviviparous.

MATERNAL CARE OF EGGS. An advance upon this is made by a large class of creatures which carry their eggs about with them until they hatch, and in some cases even continue to care for the young, although they make no nest. Examples of this are to be found in all classes of animals, from mollusks and crustaceans up to a few of the lowest birds; and some of the brooding habits and physical adaptations thus manifested are surprising. Thus the female argonaut (q.v.) has developed an elaborate boat-like shell in which her eggs and embryos rest secure; the violet-snail (q.v.) (Janthina) drags hers beneath a raft; and other instances are citable. Spiders' eggs are covered with silk, forming a bag or ball of various shapes and colors. (See SPIDER.) Crustaceans almost universally keep their eggs with them. Some insects inclose their eggs in packets and take care of them, much as do the crabs, but most insects simply deposit their eggs so that the resulting larvæ shall be within reach of suitable food, and do not know what becomes of them. It is not until the highest grades of Hymenoptera are reached—the wasps, bees, and ants—that anything which may be called a 'nest' is made in preparation for the eggs or young, or any parental care is exerted. (See ANT; BEE; WASP; INSECT, paragraph *Social Insects.*) The equal of this is hardly to be found among vertebrates until man is reached—and even then only among men in a somewhat advanced stage of culture.

FISHES AND REPTILES. Among fishes a certain amount of instinct is adapted to the best interests of the young. Thus many kinds migrate long distances to seek the water or food proper for the young, but, a suitable general surrounding having been obtained, little or no further care is taken. Only a few species build nests. Certain kinds make very crude nests, such as the hollow scooped out in the sand on some warm, clean, sunny bottom by the male sunfish, or the more elaborate structures of sticklebacks and gobies (qq.v.). Amphibians and reptiles rarely make anything which may be called a nest, but some care for their eggs in very curious ways elsewhere described.

BIRDS. The nest-making of birds is most familiar and perfect, yet it is only among the higher forms that it is manifested to any great extent. In no respect is there greater diversity among birds than in the structure of the nest. As a rule, its character is closely associated with the intelligence of the bird, modified more or less by the necessities of the situation and the structure of the bird's bill and feet. The nests of ostriches and other Ratitæ are mere accumulations of sand or earth, or cavities scraped in the ground. The nests of the lowest water-birds consist of burrows in the ground, or the eggs are laid on the bare earth or rock. Good examples are the guillemots (q.v.). The king-penguin treats its eggs in the same way. Among those a little higher in the scale, nests of sea-weed and coarse grass loosely put together make a home for the young. Most of the ducks and geese build nests of grass, and often include feathers from their own bodies, a habit carried to the extreme in the eider-duck (q.v.). Few of the wading birds build nests, the herons coming nearest to it with a platform of sticks. The grouse and quail, turkey and pheasant, all scrape together nests of leaves and grass on the ground. The allied mound-birds are remarkable for collecting great heaps of decaying vegetable matter, in which the eggs are laid, the heat caused by the decay ripening them. Doves and pigeons usually build a very frail nest of twigs, but a few species are ground breeders. Eagles, hawks, and vultures construct coarse, heavy nests of sticks and twigs on large trees or cliffs, while owls often resort to hollows in trees, or to the deserted burrow of some mammal, especially the prairie dog. Parrots, woodpeckers, kingfishers, mouse-birds, todies, and some others lay their eggs in holes in trees, or in earthen banks, with little or no bedding. Humming-birds (q.v.) build the most delicate and beautiful nests known; and swifts extraordinary ones, consisting largely of mucilaginous saliva. (See CHIMNEY-SWIFT; SALANGANE.) Many song-birds build on the ground, where the nest is more or less cleverly concealed, but the great majority build in trees or bushes. The most remarkable nests built by any birds are those of the American orioles or hangnests, and more especially of the weaver-birds (q.v.) of Africa and the East Indies.

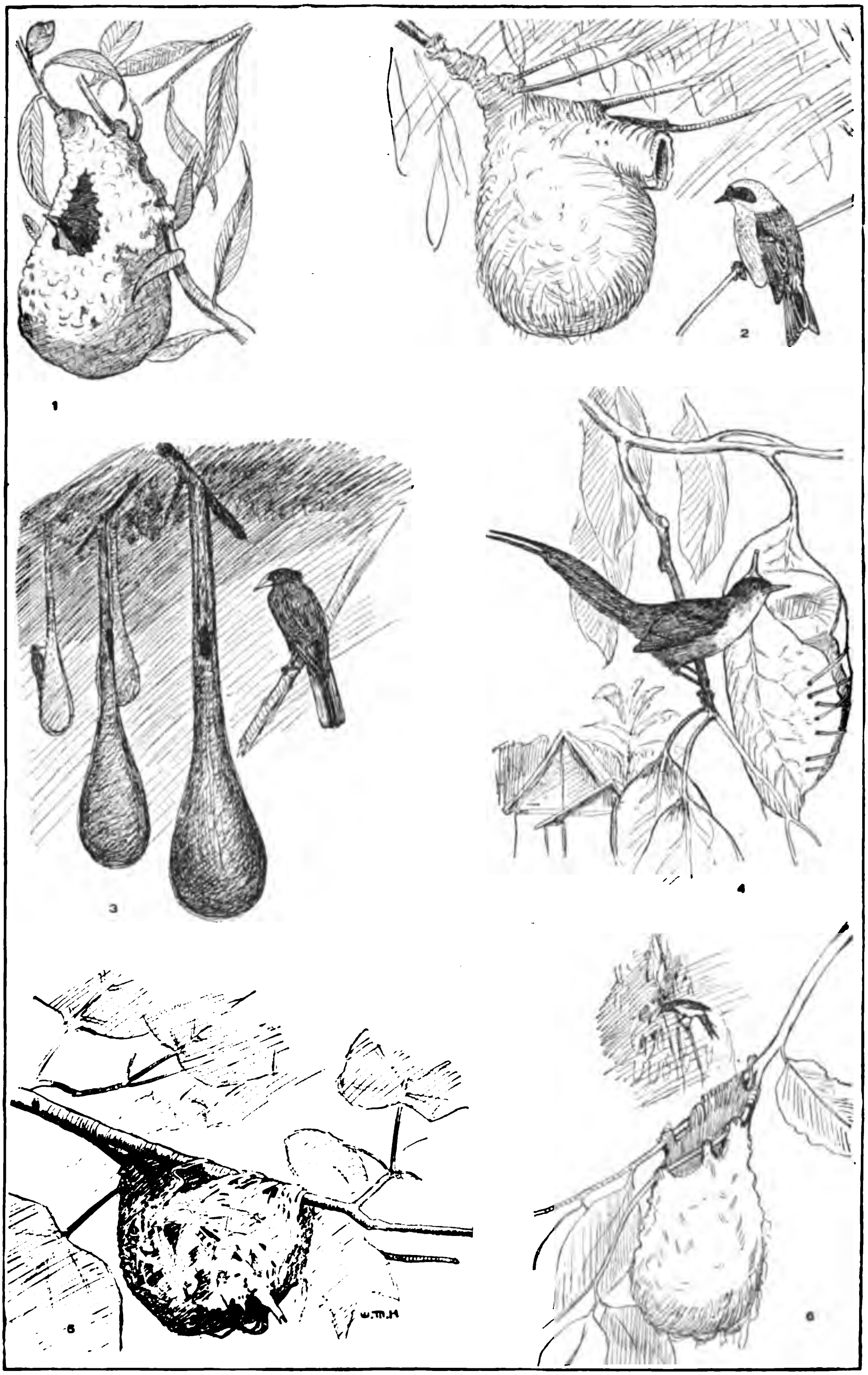
The perfection of many nests for the purposes to which they are put, and the ingenuity, skill, and apparently æsthetic sentiment displayed by many birds, long ago led to some study and much speculation. An excellent book was made upon the subject early in the nineteenth century—Rennie's *Architecture of Birds* (London, 1831). He divided his subjects into such classes as ground-nesters, squatters, and miners; builders of mounds, of umbrellas, of domes; masons; carpenters; platform-makers; basket-makers; weavers; tailors; felters; and cementers. This was purely artificial, but did well enough so long as nests and eggs were treated as things separate from the bird itself. About forty years later Wallace included in his book *Contributions to Natural Selection* (London, 1870) an essay on "A Theory of Birds' Nests," in which he discussed the subject from an evolutionary point of view, showing the analogy between the method of birds and primitive men in meeting their diverse requirements of shelter out of the materials most available. Wallace places birds' nests in two great classes—a functional, not a structural, classification. The first class includes those in which the eggs, young, and brooding parents are not exposed. To this group belong nests that are built in natural covers, such as holes in trees or in banks and cliffs, as well as nests covered by the bird, such as the suspended nest of the American orioles. To the second class belong the nests of the ordinary type, cup-shaped and open above, so that the eggs, young, and brooding females are exposed. This contrast in method of nidification, as he believed, correlated with the color of the female. As he says: "When both sexes are of strikingly gay and conspicuous colors the nest is of the first class, or such as to conceal the sitting birds; while, whenever the male is gay and conspicuous, and the nest is open so as to expose the sitting bird to view, the female bird is of dull or obscure colors." The comments and criticisms upon this theory by the Duke of Argyle, by Prof. A. Murray, and by J. A. Allen (*Bulletin Nuttall Ornith. Club*, vol. iii., Cambridge, 1878), and by others more recently, show that it is not so universal in its application or fully explanatory as its author considered it. The hypothesis was restated, with improvements, by Wallace, in *Darwinism* (New York reprint, 1889).

The more recent philosophic view, well summarized by Chapman (*Bird Life*, New York, 1898), is that, apart from and above the various considerations already mentioned, the necessity for protection of the eggs and young from physical accidents, loss of heat, and seizure by enemies is the real motive; and the superior excellence as cradles of the nests of birds of the higher orders is explained by the fact that these orders are 'altricial'—that is, their young are born in a helpless condition, must be cared for by the parents for a considerable time, and hence both old and young need much better and safer quarters than do the 'precocial' birds, whose young (e.g. chickens) run about at birth and have no need of a nursery.

Wallace also treated of the belief formerly prevalent that birds work by instinct and never make any improvement during their lifetime in nest-building. He asserted that the chief mental faculties so exhibited by birds are the same in kind as those manifested by mankind in the formation of their dwellings; that is, essentially, imitation, and a slow and partial adaptation to new conditions. In answer to the objection that it is not so much the material as the form and structure of nests that varies, Wallace replied that such diversities may be explained in a great measure by the general habits of the species, the nature of their tools, the materials they can most easily obtain, and differences of habitat and needs that may have occurred within the period of existing species, due to changes in climate, the earth's surface, food, and so forth. Birds learn something, doubtless, in regard to the size, structure, and material of the nest of their own species before they leave it. Wallace quotes a number of cases of birds reared in the nests of other birds that sang only the song of the foster parent, learned while in the nest. Then, too, young birds do not always mate with birds of their own age, and the young bird learns nest-building from its more experienced mate. It is not unusual to see one bird of a pair, say an English sparrow, redisposing the material that the other bird has just put in place. Several observers have stated that young birds build less perfect nests than old birds, and Wallace quotes one instance in which some young chaffinches were taken to New Zealand and there set free. They built a nest in the new home which showed "very little of that neatness of fabrication for which this bird is noted in England." It is an oft-repeated observation that the nests of the Baltimore oriole, when built near the habitations of man, differ in shape and structure from those in the wilds where twine and threads are not at hand, and where there is more necessity of concealment from hawks and snakes. The swallows and swifts of all parts of the world are quick to change their nesting places from hollow trees and rocky cliffs or caverns to the porches, barns, and chimneys of men's habitations, and changes in the style of their architecture follow. The nests of house wrens and purple martins vary with the situations chosen. The orchard oriole may build a shallow nest in stout branches or deep ones in swaying willows. Many similar instances of change in form and material might be adduced. "Children and savages imitate before they originate; birds, as well as all other animals, do the same." so when the environment remains constant, the form and constructive material of birds' nests vary little.

BROODING OF BIRDS. The eggs of birds are hatched by the steady application of warmth for a sufficient time to mature the embryo to the stage when it breaks from the shell. This

PENSILE NESTS OF BIRDS



1. AUSTRALIAN FLOWER-PECKER (Dicæum hirundinaceum).
2. EUROPEAN PENDULINE TITMOUSE (Ægithalus pendulinus).
3. BRAZILIAN CRESTED CACIQUE (Ostinops citrius).
4. INDIAN TAILOR BIRD (Orthotomus sutorius).
5. RED-EYED VIREO (Vireo olivaceus).
6. BALTIMORE ORIOLE (Icterus galbula).

necessary warmth (about 105° F.) is secured by the bird covering the eggs with its body, 'sitting' upon or 'incubating' them almost continuously for a length of time which in a general way is proportioned to the bird's size. No very extended and accurate observations on this point have been recorded; the best are those by Evans in *The Ibis* (London) for 1891 and 1892. Broadly speaking, most of the small song-birds hatch their young in from 13 to 15 days, but the very smallest may take less time—the humming-bird, it is said, only 10 days. In canaries, it is from 15 to 18 days; in the common fowl, it is 21 days; in the duck, it is from 28 to 30 days; in the guinea-fowl, it is 28 or 29 days; in the turkey, 30 days; and in the swan, from 40 to 45 days. The emeu is said to sit 50 days. Small altricial birds usually begin sitting after the first egg is laid; but game-birds and water-fowl rarely begin to sit until the whole clutch is in the nest, so that the whole brood shall hatch simultaneously.

It is in most birds the function of the female to perform the duties of incubation, during which she is to a greater or less extent defended, fed, and cheered by her mate. Twice or oftener each day she leaves the nest for rest and to get food, and the male takes her place for an hour or two. It sometimes happens that if she is killed, the male concludes the process of incubation and cares for the young. In some groups he does the entire duty of sitting. This seems to be universally true of the ostrich and other ratite birds, and is the practice of the godwits, phalaropes, and certain other shore-birds. Both sexes join in the care of the young at first, but in most cases their education is gradually left entirely to the mother.

NESTS OF MAMMALS. Among the mammals, a 'nest' in the present sense of the word is not common. The female, when about to bring forth young, is either already in a den or lair which has been a family residence during the winter or is permanently so, or else requires no more accommodation than a retired corner in the midst of a thicket or beneath a sheltering rock. Squirrels, wood-rats, and mice (qq.v.), however, often construct in bushes and trees, or among tall grass or low brush, globular nests of leafy twigs or of grass in which the young are born. The 'lodges' of the beaver, muskrat, coypu, and the like, elsewhere described, are family houses in which the protection of the young is probably the prime desideratum. Hardly different, and by no means so elaborate, are the platforms or 'nests' of the anthropoid apes, and especially of the orangs (see ORANG-UTAN), where the young are born, but in which they do not long remain. There is, however, little to choose between these structures, or their advantage to the young, and those of many nomadic savages, such as the aboriginal Bushmen of South Africa, the northern Australians, or the Indians of the Utah Basin and deserts of Arizona and Chihuahua.

Consult standard works on zoölogy, especially *Cambridge Natural History*, vols. iii.-x. (London, 1898-1902); and Newton, article "Nidification," in *Dictionary of Birds* (London and New York, 1893-96). See also works cited under EGG.

NIEBUHR, nē'bo͞or, BARTHOLD GEORG (1776-1831). A German historian, critic, and philologist, born August 27, 1776, at Copenhagen, where his father, Carsten Niebuhr, then resided. He showed singular aptitude for learning in his earliest youth, and his powers of acquiring knowledge kept pace with his advancing years. After preliminary education, under the superintendence of his father, he studied law and philosophy at Kiel, and then went to Edinburgh, where he devoted himself more especially to the natural sciences. On his return to Denmark he became private secretary to the Finance Minister, Schimmelmann, and from that period held several appointments under the Danish Government, being made director of the Government bank in 1804. He entered the Prussian civil service in 1806, and during the three succeeding years he shared in the vicissitudes which befell the Government of his chief, Count Hardenberg. The opening of the University of Berlin in 1810 opened a new era in the life of Niebuhr. He resigned his Government position and gave at the university a course of lectures on Roman history, which, by making known the results of the new critical methods which he had applied to the elucidation of obscure historical evidence, established his position as a leader in the scientific study of history, and effected an important change in historical method. In 1813 he reëntered the Government service. Appointed in 1816 Prussian Ambassador at the Papal Court, Niebuhr was enabled to verify many of his conjectures and test his methods by the actual sources of ancient Roman history. On his return from Rome in 1823, Niebuhr took up his residence at Bonn, where he delivered classical and archæological lectures and expositions. The Revolution of 1830 again stirred his interest in public affairs. He died January 2, 1831. Niebuhr's scholarship was broad, vigorous, and independent. He was an accomplished linguist and a philosophical and scientific thinker. He was a path-breaker in the modern method of historical criticism, and while all his conclusions are not accepted to-day, he showed the way by which they might be tested in the light of more complete knowledge. He was the founder of the *Rheinisches Museum* at Bonn. Among his important works are: *Römische Geschichte* (3 vols., Berlin, 1811-32; new ed. 1873; the first two volumes translated by Hare and Thirlwall, and the third by Smith and Schmitz); *Griechische Heroengeschichte* (1842; 11th ed. 1896), written for his son Marcus; *Geschichte des Zeitalters der Revolution* (1845). The *Kleine historische und philologische Schriften* (1828-43) contains his introductory lectures on Roman history, and many of the essays which had appeared in the transactions of the Berlin Academy. Besides these, and numerous other essays on philological, historical, and archæological questions, Niebuhr coöperated with Bekker and other learned annotators in reëditing the *Scriptores Historiæ Byzantinæ;* he also discovered hitherto unprinted fragments of classical authors, as, for instance, Cicero's *Orations*, and portions of Gaius; published the *Inscriptiones Nubienses* (Rome, 1821); and was a constant contributor to the literary journals of Germany. His *Lectures on Ancient History* is familiar in English translation. Consult: Winkworth, *Life and Letters of Niebuhr* (London, 1852); Lieber, "Reminiscences of an Intercourse with Niebuhr," in *Miscellaneous Writings* (Philadelphia, 1884); and for his biography, Classen (Gotha, 1876) and Eyssenhardt (ib., 1886).

NIEBUHR, Carsten (1733-1815). A German traveler, father of the preceding, born at Lüdingworth in Hanover, where his father was a small farmer. He entered the University of Göttingen, and in 1760 became a lieutenant of engineers in the Danish army. The next year he sailed with the expedition sent out by Frederick V. of Denmark to explore Egypt, Arabia, and Syria. His companions, the best known of whom was the naturalist Forskål (q.v.), all died of hardship or disease, but Niebuhr continued alone and only after six years of wandering did he return to Europe. The results of his observations appeared in *Beschreibung von Arabien* (1772); *Reisebeschreibung von Arabien und andern umliegenden Ländern* (1774-78); and *Reisen durch Syrien und Palästina* (1837). He also brought out the results of Forskål's work under the titles *Descriptiones Animalium* (1775), *Flora Ægyptiaco-Arabica* (1776), and *Icones Rerum Naturalium* (1775-76); and contributed a number of papers to the German periodical *Deutsches Museum.* The accurate observation and the unswerving truthfulness of their author place these works among the most reliable books on the lands which they describe. In 1778 Niebuhr entered the civil service and removed from Copenhagen to Meldorf, in Holstein, where he died. Consult *Carsten Niebuhrs Leben* (1816), by his son, Barthold Georg Niebuhr, an English version of which, by Mrs. Sarah Taylor Austin, was published in the *Lives of Eminent Persons* (London, 1833).

NIECKS, nēks, **Frederick** (1845—). A British musician, critic, and writer, of German birth and parentage. He was born in Düsseldorf, and studied under native teachers. When twenty-three years of age he moved to England, and became organist at Dumfries, and played viola in A. C. Mackenzie's string quartet. He subsequently became critic for the *Monthly Musical Record* and Novello's *Musical Times.* He was appointed professor of music in Edinburgh University, and was considered one of the highest musical authorities in Great Britain. His works include: *Dictionary of Musical Terms* (1884); *Frederick Chopin as a Man and Musician* (1888).

NIEDERMEYER, nē′dẽr-mī′ẽr, **Louis** (1802-61). A Franco-Swiss composer, born at Nyon, Switzerland. He studied under Moscheles and other eminent masters at Vienna and Rome. His first opera was produced at Naples, but of several composed by him, *Stradella* (1837) was the only one which had success. He also set to music a number of songs by Victor Hugo, Lamartine, and Manzoni. Dissatisfied with the meagre success of his secular work, he turned to church music and achieved real success. The Ecole Niedermeyer, founded by him, subsequently came under Government subvention, and equally favorable results attended his journal *La Maîtrise*, which became a very influential musical factor. He died in Paris, and a bust of him has been placed in the foyer of the Grand Opéra.

NIEDERWALD, nē′dẽr-vält. The finely wooded western spur of the Taunus, in the Prussian District of Wiesbaden, near the Rhine. Its height is 1115 feet. On it, opposite Bingen, stands the national monument commemorating the war of 1870-71 with France. The pedestal, 82 feet in height, is richly decorated with reliefs and allegorical figures. On it stands a bronze figure of Germania, 34 feet high, holding the Imperial crown, typifying the formation of the Empire. The monument is the work of Schilling of Dresden. It was unveiled on September 28, 1883, when an anarchistic plan for dynamite explosion was frustrated by the damp weather. The two ringleaders of the attempt were executed in 1885. Two railways lead to the monument from Rüdesheim and Assmannshausen, famous for their wines.

NIEDNER, nĕt′nẽr, **Christian Wilhelm** (1797-1865). A German ecclesiastical historian. He was born at Oberwinkel, near Waldenburg; studied theology at Leipzig; and was professor there (1829-49) and afterwards at Berlin (1859-65). His *Geschichte der christlichen Kirohe* (2d ed. 1886) shows a remarkably minute acquaintance with materials, but is composed in a peculiarly abstract and difficult style. For the last twenty years of his life, Niedner was an editor of the *Zeitschrift für die historische Theologie.*

NIEHAUS, nē′hous, **Charles Henry** (1855—). An American sculptor, born in Cincinnati, Ohio. He studied at the McMicken School of Design there, and in Munich, where his "Fleeting Time" won the first medal ever awarded to an American. He returned to America in 1881, and two years afterwards made statues of Garfield for Cincinnati, and of William Allen for the Capitol in Washington. Both these works are massive and dignified, and are fine portraits. From 1881 until 1843 he was in Rome, and upon his return to America he settled in New York City. His other works include: the Lee monument at Richmond (1886); "The Scraper" (1893); the statues of Hooker and Davenport, in the Connecticut State Capitol; and the bronze doors for Trinity Church, New York City, given in memory of John Jacob Astor. The six reliefs of religious and historical subjects which decorate these doors are fine examples of delicate and skilled workmanship. The colossal statues of Gibbon and Moses, for the Congressional Library in Washington, are also works notable for strength and simplicity. He was awarded first prize in the competition for the memorial to Samuel Hahneman, in Washington, D. C. Other works that should be mentioned are the pediment of the Appellate Court building, New York City, and two large groups representing Mineral Wealth at the Pan-American Exposition of 1901.

NIEL, nē′ĕl′, **Adolphe** (1802-69). A French marshal. He was born at Muret, Haute-Garonne, and educated at the Ecole Polytechnique and at the military academy of Metz. He became lieutenant of engineers in 1827, captain in 1835, and served in Algeria in 1836-37, gaining the rank of *chef-de-bataillon* by his courage. He commanded the engineers in the army of Oudinot, which put an end to the Roman Republic in 1849, and became brigadier-general and director of the engineer department in the Ministry of War. As general of division he conducted the operations which destroyed the Russian fortress of Bomarsund in August, 1854. At the head of the engineers in the Crimea, he directed the siege operations around Sebastopol. During the Italian War of 1859 his services at Magenta and Solferino made him marshal. In 1867 he became Minister of War.

NIEL′LO (It., blackish). A black substance capable of being ground fine and also of being melted by a moderate heat. The ingredients are essentially silver and sulphur, but other metals are melted with the silver before the sulphur is added. It is used as enamel is used, to fill up incised lines and patterns, the metal background being nearly always silver. Thus the top and sides of a silver box may be engraved with elaborate ornaments in scrolls, conventional flowers, and the like; the separate parts are heated, the powdered niello is spread over the whole surface, and as it melts, fills every incision, even the finest lines and points. The metal is then cleaned and polished, so that the smooth surface shows a black pattern on a plain silver ground. In some modern work the black pattern is slightly in relief; this suggests the application of the ground and nearly fused niello by hand to the actual lines of the pattern.

The art of working in niello dates from antiquity. It was in common use under the Byzantine Empire, and this tradition has been inherited by the modern Russians, together with so many other forms of decorative art. It was also practiced in Western Europe throughout the Middle Ages, though it was less popular than enamel. A great deal of altar plate and similar decorative objects belonging to the Christian ritual were adorned by niello. The metal-workers of India have always employed the art with high success. Consult: Ottley, *History of Engraving* (London, 1816); Duchesne, *Essai sur les nielles gravures des orfèvres florentins du XVème siècle* (Paris, 1826); Waterton, "On Niello," in *Archæological Journal*, vol. xix. (London, 1862); Passavant, *Le peintre-graveur* (Leipzig, 1860-64); Labarte, *Arts of the Middle Ages* (2d ed., Paris, 1872-75); Davenport, "Niello Work," in *Journal of the Society of Arts*, vol. xlviii. (London, 1901).

NIEM, nē′ĕm, or **NIEHEIM**, nē′hīm, Dietrich of (1340?-1418). A German chronicler, born in the town of Nieheim, in the mediæval Bishopric of Paderborn. He received office under the Papal Curia at Avignon, and went with it to Rome in 1376. In 1395 he was made Bishop of Verden (Hanover) by Boniface IX. He appears to have been forced from this dignity by disputes, and in 1403 is met with as *abbreviator* in the Papal Chancellery. During the subsequent discussions which harassed the Church, he insisted on internal reforms. He wrote in this connection his three books, *De Schismate* (completed in 1410; printed in 1532, and subsequently), a vivid history of the events of the years 1376-1410. This with others of his works, such as the *Historia de Vita Joannis XXIII.* (1682), and the *Nemus Unionis* (incorporated with the Basel 1566 edition of the *De Schismate*), forms an important source for historical investigation. Consult the *Life* by Sauerland (Göttingen, 1875).

NIEMANN, nē′män, Albert (1831—). A German dramatic singer, born at Erxleben. He was at first a singer in the chorus at Dessau. After a thorough training under Schneider and Nusch, his voice (tenor) attracted the attention of the King of Hanover, who took him into his service. Wagner selected him to sing in *Tannhäuser* on its first production in Paris in 1861. He sang in the United States, and was remarkable for his ability in the dual rôle of vocalist and actor. He retired from the stage in 1889.

NIEMBSCH VON STREHLENAU, nĕmsh fŏn strā′le-nou, Nikolaus. See Lenau, Nikolaus.

NIEMCEWICZ, nyĕm-tsā′vĭch, Julian Ursyn (1757-1841). A Polish author and statesman, born at Skoki, Lithuania. After graduating from a military school he entered the army at twenty as an adjutant and became major in 1788, when he was sent as Deputy to the Polish Diet. With a colleague he published the *People's Paper*, and was the framer of the so-called 'Constitution of the 3d of May,' making monarchy hereditary in Poland (1791). He was Kosciuszko's adviser and aide, and was severely wounded at Maciejowice and taken prisoner with his chief (1794). While in the fortress of Saints Peter and Paul in Saint Petersburg, he translated Pope's *Rape of the Lock* and Gray's *Elegy*. Released by Paul after two years, he came with Kosciuszko to the United States, where he married Mrs. Livingston Kean of New York. On the report of Napoleon's entrance into Poland, he left America for his fatherland in 1807. The King of Saxony appointed him secretary of the Senate in the new Duchy of Warsaw, as well as inspector of schools and member of the Supreme Council of Public Instruction. When Poland came under Russia's control, he was retained in office by Alexander I., but he did not lose faith in the restoration of Poland, and took a most active part in the events of 1830, after which he went into exile. He died in Paris. His *Historical Ballads* (1816-19) which aroused the national consciousness of the Poles, have retained much of their hold on the public, and his *Meditations at Ursynow* are his best lyric poems. *The Envoy's Return*, among his dramatic works, and his novel of manners, *Johann of Tenczyn*, enjoyed a great vogue. The *History of Sigismund III.'s Reign* (latest ed. 3 vols., Breslau, 1836) and a *Collection of Memoirs on Ancient Poland* are valuable for the material collected. A collection of his works was published in Leipzig (1838-40), but it is incomplete. Consult a biography in Polish, by A. Czartoryski (Berlin, 1860).

NIEMEN, nē′men, *Pol. pron.* nyĕm′ĕn. A river of Russia and Prussia (Map: Russia, B 3). It rises near the city of Minsk, and flows westward to Grodno, where it becomes navigable. Thence it flows northward, forming the boundary between West Russia and Poland; turning again westward at Kovno, it enters East Prussia, where it takes the name of Memel, and empties into the Kurisches Haff through a large compound delta beginning near the city of Tilsit. Its total length is 490 miles. It is of considerable commercial importance, being the outlet for large quantities of timber and grain from Russia. Its navigation is extended through several canal systems. Its banks are mostly low and often marshy, and in the delta they are protected from inundations by large dikes.

NIEMEYER, nē′mī-er, August Hermann (1754-1828). A German educator and theologian. He was born at Halle, and after finishing his studies was appointed professor of theology in the university (1779). In 1807 Niemeyer was carried to France a prisoner of war. A year afterwards, on his return, he became rector of the University of Halle, and its chancellor. As a theologian, he held to a moderate rationalism;

but even his theological works were tinged with the views of an educator, and in the latter character he did his most important work. Among Niemeyer's works, the chief are: *Charakteristik der Bibel* (1775-82); *Handbuch für christliche Religionslehrer* (1805-07); and *Leitfaden der Pädagogik und Didaktik* (1802).

NIEMEYER, Felix von (1820-71). A German physician. He was born at Magdeburg, where he practiced medicine after studying at Halle, Prague, and Vienna. At the time of the cholera epidemic of 1848-49 he published *Die symptomatische Behandlung der Cholera mit besonderer Rücksicht auf die Bedeutung des Darmleidens.* In 1853 he became head of the medical department of the city hospital at Magdeburg, and two years afterwards was appointed professor at Greifswald, whence in 1860 he went to Tübingen. Niemeyer's great work, *Lehrbuch der speziellen Pathologie und Therapie* (1858 sqq.; 11th ed. 1884), met with immediate success and proved one of the most important medical works of the century.

NIEPCE, nē'ĕps', Joseph Nicéphore (1765-1833). A French scientist, born at Châlon-sur-Saône. He entered the Revolutionary army in 1789, but two years later was compelled to resign because of ill health, and in 1795 became civil administrator of the District of Nice. In 1801 he returned to his native town and thenceforth devoted himself to the study of chemistry and mechanics. During the following years he made a number of inventions, and in 1813 turned his attention to the production of pictures upon metal plates by means of light. In 1824 he discovered a process by which he could fix the images of the camera obscura. Two years later he entered into relations with Daguerre, and in 1829 the two formed a partnership to "coöperate in perfecting the discovery invented by M. Niepce and perfected by M. Daguerre." Article V. of their agreement says that Niepce gave "his invention" and Daguerre "a new contrivance of the dark chamber, his talents, and his education;" so that if the title "inventor of photography" can be applied to any one man it seems that it should go to Niepce. He died at Gràs, near his birthplace, poor and comparatively unknown. He wrote *Notice sur l'héliographie* (1829). Consult: Ernouf, *Les inventeurs du gaz et de la photographie* (Paris, 1877); and Fouqué, *La vérité sur l'invention de la photographie: Nicéphore Niepce* (ib., 1867).

NIEPCE DE SAINT VICTOR, de săN vĕk'-tôr', Claude Marie François (1805-70). A French photographer, born at Saint-Cyr, near Châlon-sur-Saône. He served in the army, and was appointed in 1854 second commandant of the Louvre. The discoveries in photography made by his uncle, Nicéphore Niepce, jointly with Daguerre, had attracted his attention to that art, and he succeeded in bringing out himself a number of interesting inventions. He was the first to use albumen for photographic purposes, and was one of the first to try photography on glass and to produce steel-engravings by a photographic process. He also succeeded in obtaining colored images, which he named *heliochromes:* the colors, however, were fugitive. In 1855 he published the various memoirs in which he had at different times communicated his discoveries to the Academy of Sciences, under the title of *Recherches photographiques*, which was followed in 1856 by *Traité pratique de gravure sur acier et sur verre.*

NIESE, nē'ze, Benedictus (1849—). A German classical philologist and historian. He was born at Burg, on the island of Fehmarn, in Schleswig-Holstein, and in 1877 he became professor in the University of Marburg. His publications include: *Flavii Josephi Opera I.-VII.* (Berlin, 1885-95); *Grundriss der römischen Geschichte* (2d ed., Munich, 1897); *Geschichte der griechischen und makedonischen Staaten* (Gotha, 1893-99); *Flavii Josephi Antiquitatum Epitoma* (Berlin, 1896); *Kritik der beiden Makkabäerbücher* (ib., 1900).

NIETZSCHE, nēt'she, Friedrich (1844-1900). A German philosophic writer, one of the most daring thinkers and charming stylists of the nineteenth century. He was born at Röcken, near Leipzig, son of a Protestant pastor of the village, who died when the precocious boy was five years old. He was brought up by his mother at Naumburg on the Saale; studied at the noted State school at Pforta, and then devoted himself to the study of the classics in the universities of Bonn and Leipzig. At twenty-five, on the recommendation of Ritschl, he became professor extraordinarius of classical philology at Basel, and shortly afterwards was promoted to be professor ordinarius there—a post which he was forced to resign in 1879 because of an affection of his eyes. Meanwhile Nietzsche had made the acquaintance of Wagner and become an ardent advocate of Schopenhauer's theories of art. During this period, which was brief and immature, the only work of importance he wrote was *Geburt der Tragödie aus dem Geiste der Musik* (1872), in which he maintained that both Dionysiac (orgiastic) and Apollonic (temperate) motifs contributed to the origination of Attic tragedy. The book might be termed a defense of Wagner's programme. But shortly thereafter came a breach between Nietzsche and Wagner, said to be due to Wagner's compromises with success. With the loss of faith in Wagner, he lost faith in God and in Christianity, in traditional morality, and in current human ideals, and ended by deifying passion and despising reason. He went so far as to say that the untruth of a view is not a valid objection to it if only it be useful, and that the falsest views are often the most useful. Satisfaction of instincts became his ideal; we must, he maintained, at all hazards realize the will to dominate (*der Wille zur Macht*). The moral man who lives for others is a weakling, a degenerate. The lordly egoist who exploits other men and rises on stepping stones of their dead selves to higher things is the proper human ideal, the over-man (*Uebermensch*). The evolution of Nietzsche's thought, which culminated in this idealization of the inhumane victor in the struggle for existence, can be traced in his *Menschliches, Allzumenschliches, ein Buch für freie Geister* (1876-80); *Morgenröthe, Gedanken über moralische Vorurtheile* (1881); *Also sprach Zarathustra* (1883-84); *Jenseits von Gut und Böse* (1886); *Zur Genealogie der Moral* (1887); *Der Fall Wagner* (1888); and *Götzendämmerung* (1889). Among his other works should be mentioned *Der Wille zur Macht: Versuch einer Umwertung aller Werte* (1896). Of this book the first part is entitled *Der Antichrist,* where the author traces the history of the world, showing the part played by tawny brutes and tawny heroes in the great struggle for power, and representing might as right, a right overthrown by the slavish and false concepts of the Jewish Nazarene. After Nietzsche left Basel he lived for several years in Turin; in 1889 it became evident that his brain was affected, partly due to hereditary causes and partly to the abuse of soporifics. He retired to his mother's home near Weimar, where he was cared for by his sister until his death. As can be seen from the above sketch of the course of his philosophical development, Nietzsche accepted the struggle for existence as an ultimate fact which man ought not to attempt to ameliorate. It is only the slavish spirit which attempts to modify the inevitable natural process of the elimination of the unfit. This attempt to stem the tide of natural evolution results in the servile morality (*Sklavenmoral*) characteristic of the present day. Nature's morality is the morality of the ruthlessly strong hero (*Herrenmoral*). This view is the inevitable outcome of an uncritical acceptance of the merely physical 'is' as the moral 'ought.' Its philosophical significance lies in its exhibiting in undisguised form the logical consequences, for a Darwinian, of the principle that whatever is, is right. His popularity is due partly to this hyper-Darwinianism, but more largely, since such a doctrine is against the predominant spirit of humanity of the present age, to his fascinating literary style. He is a great prose poet, and if we may judge from a volume of early verse, *Gedichte und Sprüche* (1897), in tone a revolt against the lyric tradition of Heine, he might have been a great lyrist. Richard Strauss (q.v.) has founded one of his most famous tone-poems upon *Also sprach Zarathustra*. A complete edition of his works was begun at Leipzig in 1895; an English version under the editorship of Tille is incomplete. Consult the biography by his sister, Frau Förster-Nietzsche (Leipzig, 1895, sqq.), and appreciation in Riehl, *Friedrich Nietzsche, der Künstler und der Denker* (Stuttgart, 3d ed., 1901); also Seth, *Man's Place in the Cosmos* (2d ed., Edinburgh, 1902); Wallace, *Lectures and Essays in Natural Theology and Ethics* (Oxford, 1898); Dolson, *The Philosophy of Friedrich Nietzsche* (New York, 1901), with an excellent bibliography; Brandes, *Friedrich Nietzsche* (Frankfort, 1888); Kronenberg, *Nietzsche und seine Herrenmoral* (Munich, 1901); Eisler, *Nietzsches Erkenntnistheorie und Metaphysik* (Leipzig, 1902).

NIEUWENHUIS, nē'ven-hois, DOMELA (1846—). A Dutch Socialist, son of Domela Nieuwenhuis (1808-69), who was a prominent Lutheran theologian. The son, born at Amsterdam, studied theology, was for nine years preacher at the Lutheran Church in The Hague, and then became a leader of the Social Democrats and practically the founder of the party in Holland. In 1887 he entered the States-General, but he failed of reëlection in 1888. His views became more and more extreme, and he broke from the State Socialists to form with Cornelissen a free Socialist faction. Nieuwenhuis was prominent in the Socialist Congresses of Brussels (1891) and of Zurich (1893) as an opponent of Liebknecht and his motion against war and compulsory military service. In 1897, when *Recht voor allen* became the property of the centralization Socialists, Nieuwenhuis started a new journal, *De vrye Socialist*.

NIEVO, nê-ā'vô, IPPOLITO (1832-61). An Italian novelist and poet, born at Padua. He studied in his native town, took part in the revolutionary disturbances of the time, and finally joined Garibaldi. His *Confessioni di un ottuagenario* (1867) holds a high place among the historical novels of the century. He also wrote *Il conte pecorajo* (1857), *Angelo di bontà* (1858), and *Poesie* (1883).

NIÈVRE, nyâ'vr'. A central department of France, nearly conterminous with the former Province of Nivernais. It is named from the river Nièvre, an affluent of the Loire. It has the Loire and the Allier as its western boundary (Map: France, K 4). Its area is 2658 square miles. The eastern half is occupied by the forest-covered Morvan Mountains, and the soil is generally rocky and sandy. Forest and mineral products, the latter including coal, iron, marble, and mill-stones, form the chief wealth of the department, but stock-raising and viticulture are also important. The chief manufactures are glass and porcelain, and there are large iron and steel works. Population, in 1891, 343,581; in 1901, 323,783. The capital is Nevers (q.v.).

NIFLHEIM, nĭf''l-hīm (Icel., cloud-home). One of the nine separate abodes or homes of which the old Scandinavians conceived the world as consisting in the beginning of time. It is the kingdom of cold and darkness, and is separated from Muspelheim, the kingdom of light and heat, by a huge chasm (Ginnungagap, yawning gap).

NIFO, nē'fô, AGOSTINO, or AUGUSTINUS NIPHUS (c.1473-c.1538). An Italian scholar, born in the Province of Calabria. At an early age he settled at Sezza, and afterwards studied and taught philosophy at Padua, Salerno, Naples, Rome, and Pisa. Nifo at first belonged to the school of Averroës (q.v.). His commentaries, several times reprinted, were collected with his *Opuscula Moralia et Politica* in 14 volumes (Paris, 1654). Afterwards, Nifo modified his beliefs to suit orthodox doctrine, and published the writings of his master (1495-97), with notes and objections. He was charged by Leo X. to answer Pompanazzi's *De Immortalitate Animi*, and for this service he received the title of Count Palatine. His philosophical treatises, *De Immortalitate Animi* (1518 and 1524), *De Intellectu Libri VI.* (1503, 1527, 1592), and *De Infinitate Primi Motoris Quæstio* (1504), are the most important of his productions.

NIGEL, nĭg'el, known as NIGEL WIREKER (fl. c. 1190). A satirist who flourished toward the close of the twelfth century. He was a monk in Christ Church priory, Canterbury, and was personally acquainted with Thomas à Becket. His famous work is *Speculum Stultorum* (A Mirror of Fools), a satire in Latin elegiac verse on the clergy and society in general. The hero is Burnellus, or Brunellus, an ass, who wants a longer tail. The poem was immensely popular for centuries. Under the title, "Daun Burnel the Asse," it is quoted by Chaucer in the "Nun's Priest's Tale." Nigel also wrote several short Latin poems and a prose treatise, *Contra Curiales et Officiales Clericos*. Consult: Wright, *The Anglo-Latin Satirical Poets* (London, 1874);

and Ward, *Catalogue of Romances* (London, 1883-93).

NIGEL'LA (Neo-Lat., fem. of Lat. *nigellus*, blackish, diminutive of *niger*, black). A genus of annual plants of the natural order Ranunculaceæ, indigenous to the Mediterranean region and the warmer temperate parts of Asia, having five colored spreading sepals, five or ten small two-lipped petals, with tubular claws; carpels more or less connected, many-seeded; leaves divided into threadlike segments, and flowers solitary at the top of the stem or branches. *Nigella damascena*, occasionally seen in gardens, is known by the names fennel flower, devil-in-a-bush, and devil-in-a-mist. The somewhat peppery aromatic seeds have been used as a substitute for spices. Those of *Nigella sativa*, nutmeg flower, a species common in grain fields in the south of Europe, are supposed to be the black cummin of the ancients, and perhaps the cummin of the Bible. The seeds of a species of Nigella are much used by the Afghans for flavoring curries.

NIGER, nī'jẽr, or JOL'IBA. The third largest river of Africa (Map: Africa, D 3). It has no single native name. It is generally known, however, as the Joliba in the upper course, the Issa and Mayo in the middle, and the Kwara (Quorra) in the lower course. The Niger rises on the inner frontiers of Sierra Leone and Liberia, and flows first northeastward to Timbuktu; thence eastward along the escarpment of the Sahara Plateau; finally it turns to the southeast, which direction it maintains, with a few deviations, to its mouth. It enters the Gulf of Guinea through a vast delta extending 100 miles inland, and occupying an area of 14,000 square miles. The delta consists almost wholly of low and malarious mangrove swamps, and its size is increasing rapidly, owing to the constant inland breezes which prevent the sediment from being carried to sea. Only one of the numerous arms of the delta, the Nun, is accessible to seagoing vessels. The length of the Niger is about 2600 miles, and the incline of its bed through its whole course is very gentle, with few rapids, in which respect the Niger differs conspicuously from other African rivers. It is, however, navigable only in sections, being obstructed at several places. At Bamaku, 250 miles from its source, it is already 500 yards wide, and from here it is navigable for small steamers to Timbuktu, above which place it spreads out into a large inland delta converging in the marshy Lake Debo. Below Timbuktu it runs through a rocky gorge, where it is narrowed to a width of 300 feet, and obstructed by rapids. The greater part of its middle course lies in a desert region, where it receives scarcely any tributaries, and where vegetation flourishes only immediately along its banks. As it flows southward, however, the country becomes more and more fertile and populous. The head of permanent steam navigation is at Rabba, 460 miles from the mouth of the river, which below that point is a broad and tranquil stream 50 feet deep in the dry season, and over 100 feet deep during floods. Some distance below Rabba the Niger receives its largest tributary, the Benue (q.v.)

The chief towns or settlements on the river are, in descending order, Bamaku, Sego-Sikaro, Sansanding, Gundam, Timbuktu, Gogo, Birni, Say, Busah, Rabba, Lakoja, and places situated in the delta.

The name Niger (*Nigris*) is mentioned by ancient writers, but did not probably refer to this river. The stream was first made known to Arabian geographers in the Middle Ages by travelers across the Sahara, but it was then believed to communicate with the Nile. It had not been seen by Europeans until Mungo Park explored its upper course in 1796. The lower course was first explored by Clapperton, Denham, and Lander in 1825-32. Consult: Baikie, *Reports on the Geographical Position of the Countries in the Neighborhood of the Niger* (London, 1863); Rohlfs, *Quer durch Afrika* (Leipzig, 1874); Thomson, *Mungo Park and the Niger* (London, 1890); Möckler-Ferryman, *Up the Niger* (ib., 1892); Trotter, *The Niger Sources and the Borders of the New Sierra Leone Protectorate* (ib., 1898); Hourst, *The Exploration of the Niger*, trans. (ib., 1898); Vandeleur, *Campaigning on the Upper Nile and Niger* (ib., 1898).

NIGE'RIA, or NIGER TERRITORIES. A British colonial possession in Africa, organized in 1900. It occupies the territory between the Military Territories of French Sudan, Lake Chad, the German possession of Kamerun, the Gulf of Guinea, the British colony of Lagos, and the French possession of Dahomey (Map: Africa, E 4). It is divided into Northern and Southern Nigeria. Northern Nigeria comprises a large portion of the Fulah or Sokoto Empire, with its subordinate States of Nupe, Ilorin, Muri, Gandu, Kano, Katsena, Banchi, a portion of Adamawa, Bakundi, Donga, Takum, and Zaria, besides a part of the Kingdom of Bornu, and of the pagan confederation of Borgu. Southern Nigeria consists of what was formerly known as the Niger Coast Protectorate, supplemented by the Protectorate of Lagos and considerable acquisitions along the Cross River in the southeast. No trustworthy figures for the area of the region and for the population are available. Current estimates of the area range from 400,000 to 500,000 square miles; of the population, from 25,000,000 to 40,000,000.

The physical features of the region are as yet slightly known. The country along the gulf is, as far as 40 miles inland, swampy, and intersected by the numerous arms of the Niger and a multitude of other streams interlacing each other and lined with mangrove trees. The climate of that district is characterized by humidity and unhealthfulness. The portion north of the coast region, as far as the confluence of the Benue with the Niger, is an undulating forest country, while that north of the Niger is mostly hilly and partly covered with thin forests. The extreme north partakes of the character of the Sahara. The climate of the interior appears to be more healthful.

Agriculture is pursued mostly along the Benue River and in the plains of the interior. Cotton and many cereals are raised to some extent, but the chief articles of food among the natives are bananas and yams. The oil tree is found in abundance and the forest region is full of rubber trees and valuable woods. In its present state of development the country produces chiefly palm oil and kernels for export. Some ivory, indigo, and rubber are also brought to the southern ports from the interior. The principal means of communication are the Niger, the

Benue, and a number of smaller rivers. The principal seaports are Akassa, Old and New Calabar, and New Benin. The imports and exports for 1900-01 amounted to $5,842,490 and $5,679,135 respectively.

At the head of the administration of Nigeria are two high commissioners, assisted by residents. There are a supreme court, at Asaba, and a number of resident courts. The revenue is derived principally from customs duties, which are collected at the ports of Lagos and Southern Nigeria, and distributed among these two governments and that of Northern Nigeria. In 1900-01 the revenue and expenditure amounted to $1,855,392 and $1,481,176 respectively. The control of the British Government thus far extends only to a small proportion of the territory along the coast. The prerogatives of the Sultan of Sokoto are still recognized in a large measure.

The inhabitants of the coast region are pure negroes in a very low state of civilization. The inhabitants of the interior are also of negro descent, intermixed with some of the races of Northern Africa. They show some traces of Moorish influence. The religion is Mohammedanism tinged with fetishism. The most advanced and intelligent of the population are the Hausas. (See HAUSA STATES.)

British settlements and trading stations were established along the Gulf of Guinea in the region of the Niger at a very early period, but these were only private enterprises without any political powers or aims. It was only with the establishment of the United African Company, reorganized into the National African Company by Sir George Goldie in 1882, that the movement looking toward the future acquisition of Nigeria by Great Britain was started. After having concluded political treaties with the native rulers the company obtained a royal charter in 1886, and its name was changed to the Royal Niger Company. The boundaries were fixed by treaties with Germany in 1885, 1886, and 1893, and with France in 1889, 1890, and 1898.

In 1884 and 1887 the territory of Nigeria was declared a British protectorate, and the seaboard region was organized into the Oil Rivers Protectorate, and was put under the authority of a royal commissioner in 1891, the company having no jurisdiction in that part of the country. The name of the Oil River Protectorate was soon changed to Niger Coast Protectorate, and its territory was augmented by the addition of the Kingdom of Benin in 1897, and further extensions along the Cross River in the southeast. On January 1, 1900, the company surrendered its charter and the whole territory passed under the British control.

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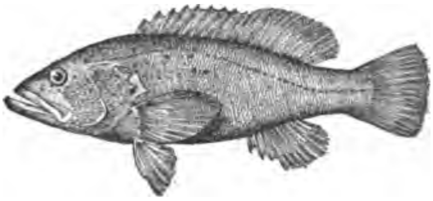
NIGGER CHUB, or NIGGER DICK. A chub (*Exoglossum maxillingua*) of the lakes and rivers of the Middle States, distinguishable from all other cyprinids by its three-lobed under jaw. It is about six inches long, dusky greenish on the back, with a black bar behind the gill-cover. Compare CUTLIPS (a name also locally given to the present fish).

NIGGER-FISH. One of the many names given to the sea-bass of the genus Bodianus, allied to the groupers. They are small, bright-colored spotted fishes that live in warm seas. A common species about Bermuda, Florida, and southward is *Bodianus fulvus*, also called 'yellow fish' and 'butter-fish,' a dark variety of which is especially designated by 'nigger-fish.' The Spanish name for the group is guatívere. They are brought to market.



NIGGER-FISH (*Bodianus fulvus*).

NIGGER-TOES. See BRAZIL-NUTS.

NIGHT-APE. A nyctipithecine monkey. See DOUROUCOULI.

NIGHT-BLINDNESS. A form of amblyopia, or a limited ability to see in a faint light, due to defective power of retinal adaptation; nyctalopia. See SIGHT, DEFECTS OF.

NIGHTHAWK. The North American nightjar (*Chordeiles Virginianus*), numerous and well known in all temperate parts of the continent in summer, whence in winter it migrates to the tropics. It is about 10 inches long and 23 inches in expanse of wing. The gape is destitute of bristles. The tail is slightly forked. The general color is brown, much mottled, and marked with white. There is a white mark on the throat, in shape like the letter V, and a broad white bar, which extends across the first five primary wing-feathers, is plainly visible when the bird is near by and flying. The middle toe is provided with a comb-like process used by the bird to free itself of vermin. The nighthawk is seen pursuing its insect prey in the air, chiefly after sunset and before dawn, and attracts attention by its sharp, tearing cry. It also produces in its flight a remarkable hollow booming sound, "like blowing into the bung-hole of a barrel," in the moments of its perpendicular descent through the air, which has gained for it such rustic names as 'bullbat' and 'piramidig;' also 'mosquito hawk.' Its movements in the air are extremely beautiful and rapid. When fat and plump, as it usually is on its southward migration, it is said to be good eating, and some are shot for that purpose. A closely allied species occurs in Texas and Mexico, and another in the West Indies. The latter is very generally known as the 'gie-me-a-bit,' from its very characteristic note. Nighthawks lay their eggs on the bare ground or on a flat rock or roof of a building. They are usually two in number, and are dull white, closely marked with fine specks of grayish brown. At rest these birds roost by squatting lengthwise on a large horizontal tree-branch, and at once become nearly invisible. Compare WHIPPOORWILL. See Plates of NIGHTJAR, GUACHARO, ETC.; and of EGGS OF SONG-BIRDS.

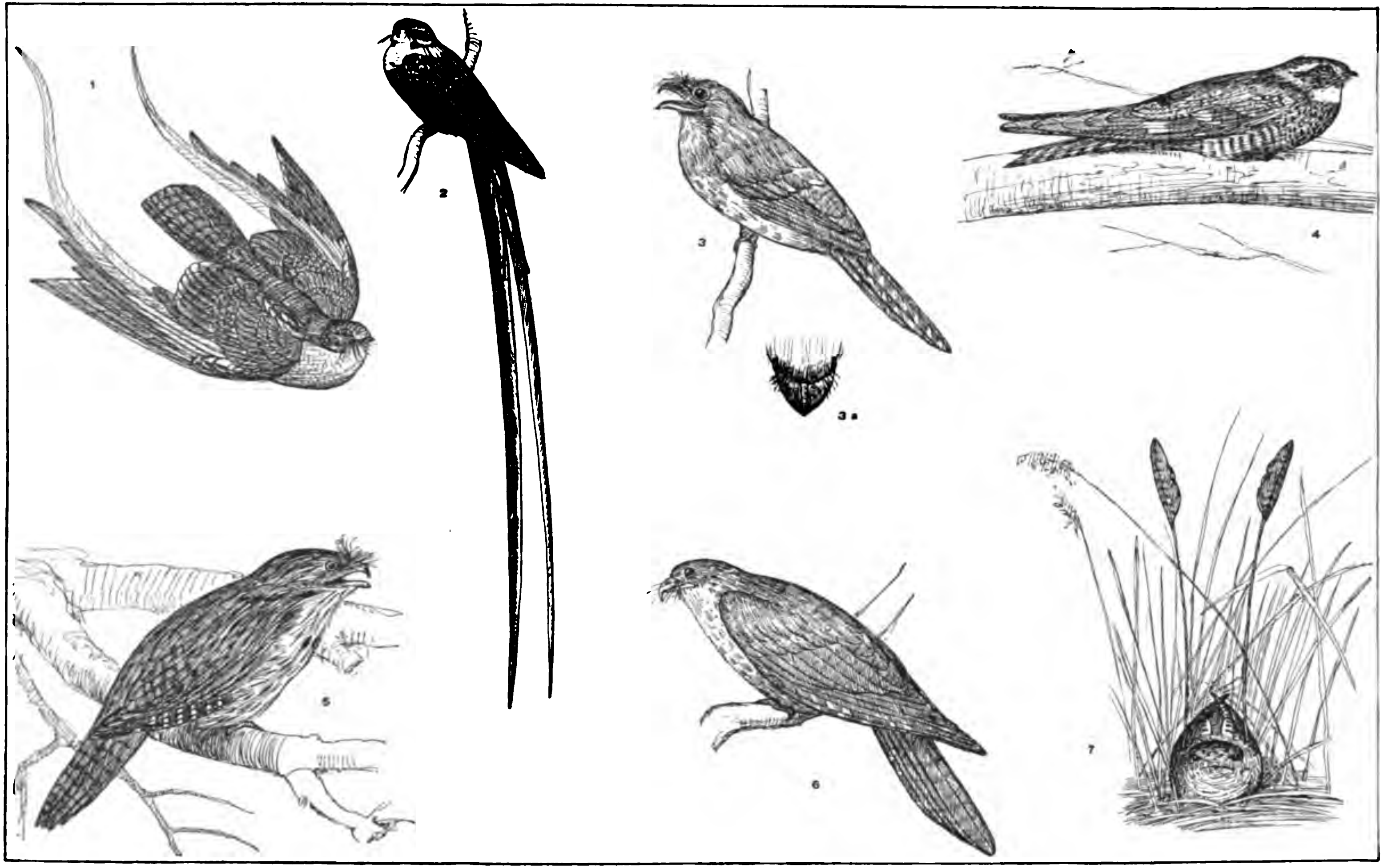
NIGHT-HERON. A heron of the genus Nycticorax, intermediate in form between bitterns and herons, but with shorter and thicker bill than either, and legs shorter than in herons. The common night-heron or 'qua-bird' (*Nycticorax nycticorax*) is found throughout all warm temperate regions. The American bird, a subspecies to which the name *nævius* is given, is abundant in America and is partly a bird of passage. Its length is fully two feet. Its plumage is soft, the general color ash-gray, passing into black on the neck and head, and into white on the breast and belly; the back of the head is adorned with three very long white feathers, which hang down on the neck. The young are very different—grayish-brown marked with white above, and white streaked with blackish underneath. The nests are built in trees and usually many together, forming a heronry; eggs 4-6, dull blue. (See Plate of EGGS OF WATER AND GAME BIRDS.) The night-heron feeds chiefly by twilight or at night, and is never seen standing motionless like other herons, but walks about in search of prey by the sides of ditches and ponds, as its food consists chiefly of fishes, frogs, and other aquatic animals. Its cry is very loud and hoarse. Another species (*Nycticorax violaceus*) is found in the Southern United States. Its crown is white washed with buff, and it is therefore called the 'yellow-crowned night-heron.' It is more solitary than the common species, appearing singly or in pairs, and is also less nocturnal. Other species of night-heron are found in Africa and Australia.

NIGHTINGALE (AS. *nihtegale*, OHG. *nahtagala*, Ger. *Nachtigall*, from AS. *niht*, night + *galan*, to sing). A justly celebrated migratory song-bird of Western and Central Europe, which is a warbler, closely related to the robin redbreast, and as large as a thrush—the *Daulias luscinia* of modern ornithologists. It is rich brown in color, the rump and tail reddish, the lower parts grayish white. The sexes are alike. It is plentiful in some parts of the south and east of England, but does not extend to the western counties, and never appears in Ireland. It frequents thickets and hedges, and low damp meadows near streams. It arrives in England about the middle of April, the males ten to fourteen days before the females. It is at this season, and before pairing has taken place, that bird-catchers generally procure nightingales for cage-birds, as they then become easily reconciled to confinement, while if taken after pairing, they fret and pine till they die. The nightingale makes its nest generally on the ground, but sometimes on a low fork of a bush. The nest is loosely constructed of dead leaves, rushes, and stalks of grass, with a lining of fibrous roots. The eggs are four or five in number, of a uniform olive-brown. The song of the male ceases to be heard as soon as incubation is over, and Newton remarks that it is not safe for novelists to represent it as singing before April 15th or after June 15th. In captivity, however, it is often continuous throughout the year, especially in roomy aviaries. The nightingale usually begins its song in the evening and sings with brief intervals throughout the night. The variety, loudness, and richness of its notes are equally extraordinary; and its long quivering strains are full of plaintiveness as well as of passionate ecstasy. The nightingale has been a favorite from the most ancient times, and is often mentioned in the poetry of India and Persia, as well as of Greece and Rome, but the bird referred to by these Eastern writers is in most cases a larger species (*Daulias philomela*), the 'philomel,' 'sprosser,' or 'thrush-nightingale,' which is never seen west of the Rhine; or else a third species (*Daulias Hafizi*) of Persia and Turkestan. The bird also has a place in classic mythology in the story of Procne and Philomela. Consult: Newton, *Dictionary of Birds* (London and New York, 1893-96); Burroughs, *Winter Sunshine* (Boston, 1876). See Colored Plate of SONG-BIRDS with THRUSH.

NIGHTINGALE, FLORENCE (1820—). An English philanthropist, born at Florence, Italy, the daughter of William Edward Nightingale, of Embley Park, Hampshire. Her attention was early directed to the condition of hospitals; she traveled extensively on the Continent to study such institutions, and entered upon a course of training in nursing with the Sisters of Saint Vincent de Paul in Paris and at the Kaiserswerth institution on the Rhine. When the Crimean War broke out in 1854, she organized a nursing department at Scutari, and by her untiring energy and extraordinary ability in alleviating the suffering of the sick and wounded acquired a world-wide reputation. At the close of the war she gave a testimonial fund of £50,000 to the founding of the Nightingale Home at Saint Thomas Hospital for the training of nurses. During the American Civil War and during the Franco-Prussian War she was often consulted on questions concerning camp hospitals. Among her publications are: *Notes on Hospitals* (1859); *Notes on Nursing* (1860); *Notes on the Sanitary State of the Army in India* (1863); and *Life or Death in India* (1874). Consult Edge, *A Woman's Example and a Nation's Work* (London, 1864).

NIGHTJAR. A general term, derived from their nocturnal habits and jarring utterances on the wing, for the large family Caprimulgidæ (i.e. 'goat-suckers'), which is nearly cosmopolitan in extent. Nightjars are birds varying in size from eight to fifteen inches in length; all have light soft plumage, in finely mottled shades of gray, brown, and white; and they bear many resemblances to owls in structure as well as in their nocturnal and crepuscular habits. In some particulars they resemble the swifts, and, like them, capture all their food upon the wing; and, as moths form a conspicuous part of this, the tribe has been called 'moth-hunters.' In pursuit of this prey they are often seen in the dusk about pastures with the cows or (in Southern Europe) with the goats; and their habit of dodging about the cattle after insects, together with their capacious mouths, led to strange superstitions which are entirely without foundation. The wings are long and powerful, and in the males of some species are furnished with long ornamental feathers (see STANDARD-WING); while in others some tail-feathers are lengthened. The legs and feet are small and weak, and the middle toe is usually remarkably long, and serrated on

NIGHTJARS, GUACHARO, ETC.



1. STANDARD-WINGED NIGHTJAR (Cosmetornis vexillarius).
2. BRAZILIAN FORK-TAILED NIGHTJAR (Hydropsalis furcifera).
3. MALACCAN FROGMOUTH (Batrachostomus stellatus).
3a. BEAK OF FROGMOUTH from above.
4. AMERICAN NIGHTHAWK (Chordeiles Virginianus).
5. MOREPORK (Podargus Cuvieri).
6. OIL-BIRD, or GUACHARO (Steatornis Caripensis).
7. PENNANT-WINGED NIGHTJAR (Macrodipteryx macrodipterus).

its inner edge, so as to form a kind of comb attached to the toe. Although the bill is very short and weak, the gape is extremely wide, as if the head itself were divided, and the mouth is surrounded by bristles, assisting the bird in securing its agile prey. All avoid activity in daylight, when they rest quiet on the ground, a log, stone, or large horizontal tree-branch, in some shady place, and almost always lengthwise of the perch—a habit due not only to the feeble grasping power of the feet, but to the greater invisibility thus obtained. In many instances the birds have a further protective habit of stiffening themselves in certain positions where they resemble a knot, or a broken and projecting stick, and so escape notice. (See MOREPORK.) They make no nests, or only very poor ones, which are placed on the ground. The oblong eggs are usually two, and are whitish or inconspicuously marked. (See Colored Plate of EGGS OF SONG-BIRDS.) The voice is a screaming, jarring, or booming note, produced in flight; while many species have an oft-repeated cry, usually translatable into syllables, as 'whip-poor-Will' or 'chuck-Will's-widow.' About 100 species are known, included in about fourteen genera. Of these, four or five genera with six species occur in the United States. The best known are the whippoorwill, chuck-Will's-widow, poorwill, and nighthawk (qq.v.). The best-known species of the Old World is the common nightjar, 'churn-owl,' or 'fern-owl' (*Caprimulgus Europæus*), familiar throughout Central Europe, the Mediterranean region, and Western Asia. The potoos (q.v.) of Jamaica and South America represent a distinct subfamily (Nyctibiinæ), and an aberrant form is the guacharo (q.v.).

Consult standard authorities, especially Newton, *Dictionary of Birds* (London and New York, 1893-96). See Plate of NIGHTJARS, ETC.

NIGHTMARE (*night* + *mare*, AS. *mara*, OHG. *marô*, *mar*, dialectic Ger. *Mahr*, *Mar*, incubus; connected with Polish *mora*, Bohem. *mura*, incubus, Russ. *kiki-mora*, ghost). A sensation of distress, suffocation, or oppression which occurs during sleep, and is attended by hideous dreams, or indefinite feelings of terror, with a sense of utter helplessness and inability to move or cry out. Nightmare is associated with disturbances of the circulation and respiration, and is most commonly caused by the taking of heavy meals or indigestible food shortly before going to bed. It occurs in persons of a nervous temperament, or in those subjected to severe mental strain or overwork. The physical symptoms of nightmare include groaning, flushing of the face, neck and chest, cold perspiration, or a general trembling of the body. The breathing is disturbed and sometimes stertorous. The pulse is irregular, but otherwise normal.

The night terrors of children may be regarded as a form of nightmare. The child sees some object which inspires him with fear, and springs up, screaming and protesting. He recognizes no one and has no remembrance of the circumstance in the morning. Other allied psychical conditions are observed in certain forms of incipient delirium, such as occurs in fevers, or as the result of alcoholic excesses. See DELIRIUM.

NIGHTMARE ABBEY. A novel by Thomas Love Peacock (1818). The hero is a caricature of Shelley.

NIGHTSHADE (AS. *nihtscada*, OHG. *nahtscato*, Ger. *Nachtschatten*, nightshade, from AS. *niht*, OHG. *naht*, Ger. *Nacht*, night + AS. *scada*, OHG. *scato*, Ger. *Schatten*, shade). The common name of certain plants of the natural order Solanaceæ, possessing the narcotic properties frequently developed in that order. Among them are some species of Solanum, particularly the common nightshade or black nightshade (*Solanum nigrum*), an annual or biennial slightly narcotic weed in waste places throughout the world. It has erect angular stems, ovate leaves, drooping lateral umbels of white flowers, and globose black berries. The leaves in a fresh state are said to be injurious to animals, but seem to lose almost all narcotic property by boiling. The berries, although generally dreaded or suspected, may also, it is said, be eaten, at least in moderate quantity, without danger. They contain, however, the alkaloid solanin, found also in the shoots of the potato. *Solanum dulcamara* is popularly known as bittersweet (q.v.). See BELLADONNA, and Colored Plate of POISONOUS PLANTS.

BLACK NIGHTSHADE.

NIGHTSHADE FAMILY. A natural order of plants. See SOLANACEÆ.

NIGHT WALKER, THE, OR THE LITTLE THIEF. A comedy by Fletcher. It was written probably not later than 1618, was altered by Shirley in 1633, and performed in 1634.

NIGHT WATCH, THE. A large picture by Rembrandt in the Ryks Museum at Amsterdam (1642), representing a company of arquebusiers under Capt. Frans Banning Coch coming out of their guild house. The faces are portraits. The painting is Rembrandt's largest and most renowned work.

NIGID'IUS FIG'ULUS, PUBLIUS (c.100-44 B.C.). A Latin grammarian and Pythagorean philosopher. He was pronounced by Aulus Gellius the most learned of the Romans next to Varro, and was so celebrated as an astrologer that in later times it was believed he had predicted the future greatness of Octavianus on learning of the latter's birth. He was a partisan of Pompey in the Civil War, and in consequence was compelled by Cæsar to live abroad, and died in exile. The surviving fragments of his works, which treated grammar, religion, and the natural sciences, are printed in the *Variæ Lectiones* (1618, iii. 16) of Rutgersius. Consult: Breysig, *De Nigidii Figuli Fragmentis* (Berlin, 1854); Klein, *De Vita Nigidii* (Bonn, 1861); Röhrig, *De Nigidio Figulo* (Coburg, 1887); and Swoboda, *P. Nigidii Figuli Operum Reliquiæ* (Vienna, 1889).

NIGRA, nĕ'grȧ, COSTANTINO, Count (1827—). An Italian diplomatist, born at Castellamonte, near Ivrea. He interrupted his studies at Turin to take part in the war against Austria (1848-49), and then entered the diplomatic service and became secretary to Cavour. After the Peace of Villafranca (1859) he was sent to France as Minister Plenipotentiary. He took an active part in the negotiation of the Treaty of Zurich in 1859, and the cession of Savoy and Nice to France, and was made Ambassador to Paris (1861). After the fall of the Empire he became Ambassador at Saint Petersburg (1876-82), London (1882-85), and Vienna (1885), and in 1890 was elected Senator.

NIGRITIA, nê-grĭsh'ê-ȧ. Another name for the Sudan.

NIHILISM (from Lat. *nihil*, *nil*, nothing, from *ne*, not + *hilum*, trifle, little thing). A term applied to the tenets of the revolutionary wing of the Russian Liberal Party. The term was first used in a novel by Ivan Turgenieff, *Fathers and Sons*. Originally it was a school of philosophic and ethical individualism which held aloof from political agitation. In the common mind Nihilism is associated with assassination and revolution, since Russian Nihilists seek to overthrow the present Government by force. The movement which resulted in the formation of the Nihilistic Party began early in the nineteenth century. As early as 1818 those who aspired for greater freedom in Russia formed an association to further the common welfare. On December 26 (old style, 14), 1825, occurred the celebrated rising of the Decembrists among the officers and soldiers of the army, which aimed at the emancipation of the serfs and the introduction of constitutional government. The revolt was easily quelled, and six leaders were executed; 125 others were imprisoned or exiled. Toward the middle of the century liberal ideas received an impetus from the study of socialistic writers of other countries. On April 23, 1849, some thirty-three men were arrested who belonged to an association formed by Petrashevsky, an official of the Foreign Office. These were sentenced to death, but the sentences were commuted to imprisonment and banishment. There were no further disturbances during the reign of Nicholas I.

In 1857 Alexander Hertzen founded in London his journal, the *Kolokol* (Tocsin), which had enormous influence upon the Russian youth. About this time there arose in Russia itself a literary movement, under the leadership of Tchernishevsky, which criticised existing society and sought to arouse the people. Tchernishevsky's paper was suppressed in 1862, but later he wrote a novel, *What is to be Done?* which had great influence in popularizing revolutionary ideas. Shapoff, writing from the historical point of view, urged the introduction of self-government and local autonomy. Organizations sprang up in the universities, and new regulations introduced by the Government increased the opposition of the students. The secret associations of Saint Petersburg united in 1863 under the name 'Land and Freedom.'

During the decade from 1860 to 1870 true Nihilism was first developed. Its fundamental principle was absolute individualism, the negation of duties imposed by family, State, and religion. An active materialistic propaganda was maintained. It stood for the rights of women and children, demanding equality of treatment for women, and in this respect it won a decided victory. But this individualism was confronted with misery among the common people which was not removed by the emancipation of the serfs. Economic conditions forced a change of policy and the development of political agitation. In 1868 Bakunin (q.v.) started a paper at Geneva, and became the leader of the anarchists, who gained control of the movement. Bakunin advocated the total abolition of the State and the substitution of small communes. The mir, or village commune (q.v.), had only to be freed from the State to make an ideal basis. The Russian students, forbidden in 1873 to study at Zurich, returned home to take active part in the propaganda. Associations sprang up throughout the land. Many of the aristocrats took part in this movement. The attention of the Government was of course attracted, and in 1873 and 1874 some 1500 persons were arrested. Most of these were released after a few months' imprisonment; the rest were confined for three or four years, and in 1877 193 were banished to Siberia. During this same period, and indeed at all times, there existed a more moderate party; but it did not satisfy the demands of the young men and women, particularly of the universities, which have been a hotbed of political agitation. About 1875 the 'Narodniki' became a prominent and widespread organization. It was under the leadership of the society at Saint Petersburg. The Government now became active, and during 1876 and 1877 the prisons were filled with propagandists. The trials of 1877 and 1878 mark the end of the first period of revolution. The number of persons involved in these trials was about 3800.

The attempts to organize the people into revolt now ended. The cruelty of the Government led to reprisals, and the Nihilism which began peacefully in the seventies took on another nature. At first spies of the Government were murdered. February 5, 1878, Vera Zassulitch, a young woman of twenty-eight, shot at General Trepoff, who had caused a prisoner to be whipped for refusing to take off his hat to him. She was tried before a jury of educated men, eight of whom held Government positions, and, to the general surprise, she was acquitted. The Government was enraged at this, and the verdict was annulled. August 4, 1878, General Mezentseff was killed in the streets of Saint Petersburg. On February 21, 1879, the Governor of Kharkov, Prince Krapotkin, was assassinated, and other attempts were made to assassinate hated officials. April 14, 1879, an attempt to assassinate the Emperor, Alexander II., was made by Solovieff, who was captured and hanged. Two later attempts were likewise failures, but the next (March 13, 1881) was successful. (See ALEXANDER II.) It was hoped that the terror inspired by the death of the Emperor would lead to the introduction of a constitutional system. When this hope failed, constructive measures were sought. In 1880 two reform parties were prominent; one of them had as its mouthpiece the *Tcherny Perediel*, which found its chief support in the workingmen, and proposed to educate and organize society in order that social revolution might be effected. The second and more important party was the Narodnaia Volia (Will of the People), which sought to overthrow despotism by the communistic instincts of the peasants. It set forth a programme with the following demands: (1) A representative assembly having supreme control in all State matters; (2) provincial self-government with elective officers; (3) village communes, which were to be economically and executively independent; (4) freedom of conscience, press, speech, association, and political agitation; (5) manhood suffrage; (6) militia instead of a standing army; (7) nationalization of land; (8) measures to socialize factories, etc. The Narodnaia practically dissolved in 1884. With its downfall there came a period of quiet in the social movement, although in the cities there still exists a reform movement among the workingmen. See Communism; Socialism.

Consult: Turgenieff, *La Russie et les Russes* (Paris, 1847); Hertzen, *La conspiration russe de 1825* (London, 1858); Thun, *Geschichte des russischen Nihilismus* (Basel, 1883); Stepniak, *Underground Russia* (London, 1883); id., *Russia Under the Tsars* (ib., 1885); Tikhomirov, *Russia, Political and Social* (ib., 1887); Oldenburg, *Der russische Nihilismus* (Leipzig, 1888); Stegmann, *Handbuch des Socialismus*, article "Russland" (Zurich, 1897); Karlowitsch, *Die Entwickelung des russischen Nihilismus* (3d ed., Berlin, 1880), a convenient short history of the movement; Kennan, *Siberia and the Exile System* (New York, 1891); Krapotkin, *Memoirs of a Revolutionist* (Boston, 1899).

NIHONGI, nē′hôn-gē′ (Jap., Chronicles of Japan). An ancient Japanese historical book. In A.D. 712 the *Kojiki* (Records of Ancient Matters), the first book written in Japan, appeared. It was followed in 720 by the *Nihongi*, which gives the substance of the *Kojiki* in Chinese form. Not only are Chinese phrases and sentences employed, but it is fashioned throughout on the model of Chinese histories. It transforms, for example, the two gods from whom sprang the Japanese race into the 'positive' and 'negative' principles of the Chinese philosophy, and it puts into the mouths of mythical Japanese monarchs speeches filled with quotations from the Chinese classics. It omits a few legends, explains away the grossness of a few others, and gives variant versions of still others. It adds also 72 years of history. In Japan it has far excelled the *Kojiki* in popularity, but to the serious student it is of much less value, though it is still a secondary source for the history of ancient Japan.

NIIGATA, nē′ē-gä′tȧ. A seaport on the west coast of Hondo, Japan, and capital of a prefecture, at the mouth of the Shinano River, in latitude 37° 55′ N. and longitude 139° 3′ E. (Map: Japan, F 5). By the treaty of 1858 Niigata was opened to foreign commerce on January 1, 1869, but the existence of a heavy bar at the mouth of the river has prevented its commercial development. The Province of Echigo, in which Niigata lies, abounds in mineral wealth, petroleum, coal, and metals, and the soil yields rice, silk, tea, and the lacquer tree, and inferior lacquer ware is manufactured at Niigata on a large scale. The town is clean, and well provided with schools, banks, newspapers, and post offices. The climate is very hot in the summer and extremely cold in the winter. Population, in 1898, 53,336.

NIJAR, nē′Här. A town of Southeastern Spain, in the Province of Almería, situated in an artificially irrigated plain, 15 miles northeast of Almería (Map: Spain, D 4). There are mines of lead, iron, manganese, and phosphorite, and the town manufactures woolen blankets and fine ironstone pottery. Population, in 1900, 12,558.

NIJKERK, nī′kĕrk. A town in the Province of Gelderland, Holland, 28 miles southeast of Amsterdam (Map: Netherlands, D 2). It has a good harbor connected with the Zuider Zee by a wide canal two miles long. The chief industries are matting and flax-spinning; a brisk trade is carried on in grain, wood, and cattle. Population, in 1899, 8124.

NIJMEGEN, nī′mâ-Gen. A city of the Netherlands. See Nimeguen.

NIJNI-NOVGOROD, nyĕzh′nyḗ nôv′gô-rŏd. A city in Russia. See Nizhni-Novgorod.

NIKA (nē′kȧ) **RIOT.** An insurrection against the Emperor Justinian at Constantinople in 532. It was occasioned by the oppressive taxation and the fights between the Blue and the Green factions of the Circus. Justinian favored the Blues at first, but soon both Blues and Greens joined in a popular uprising. Justinian yielded to their demands for reform, and this encouraged the mob, who set fire to the city. Saint Sophia and many public buildings were burned. The mob forced Hypatius to assume the Imperial insignia, and Justinian wished to flee, but was dissuaded by Theodora. Finally Belisarius (q.v.) attacked the rioters in the hippodrome, and put down the rebellion by the slaughter of as many as thirty thousand. See Justinian.

NI′KE (Gk. *νική*, victory). The Greek goddess of victory, corresponding to the Roman Victoria. She was the daughter of Styx and Pallas, and sister of Zelos (zeal), Cratos (power), and Bia (force). Having assisted Zeus in his combat with the Titans, she was taken to live with him on Olympus. She is usually represented with wings and bearing a wreath and palm branch, and is often found in sculpture in connection with other divinities, especially with Athena, who is also called Nike.

NIKE AP′TEROS (Gk. *Νίκη Ἄπτερος*, Wingless Victory), or Athene Nike, Temple of. A beautiful small temple of simple Doric architecture standing on a bastion flanking the entrance to the Athenian Acropolis. The temple was erected as part of the scheme of beautification of the city undertaken by Pericles, and was built by Callicrates, the architect of the Long Walls. It was torn down by the Turks in the latter part of the seventeenth century, and the material was used in the construction of a bastion. Lord Elgin took some of the slabs of its frieze to London. In 1835, when the bastion was destroyed, the stones of the building were recovered, and the temple was rebuilt on the original foundation, missing portions being supplied by terra-cotta casts. The temple, 18 by 27 feet, consists merely of a small cella, with four

Ionic columns, 13½ feet high, in the front and rear. The sculptures of its frieze represented an assembly of divinities, combats between Greeks and Persians, and a combat between Greeks and Greeks. The balustrade surrounding the precinct of the temple was adorned with reliefs of sacrifices in honor of Athena, to whom the temple was consecrated under the name of Nike Apteros, in order to distinguish her from the usual winged representations of Nike.

NIK'ISCH, Arthur (1855—). An Hungarian musical conductor, born at Lébény Szent-Miklós. He was educated under Dessoff and Hellmesberger at the Vienna Conservatory, and on the conclusion of his course entered the Court orchestra as a violinist. His first engagement as a conductor was at the Leipzig Theater. Here he became noted for conducting without score, while his ability and technical skill won him a leading place. From 1889 to 1893 he was conductor of the Boston Symphony Orchestra, succeeding Wilhelm Gericke, and being in turn succeeded by Emil Paur. He returned to Pesth, where he was appointed the director of the Royal Opera House and conductor of the city Philharmonic Society concerts. His most important musical engagement and the scene of his greatest success was as the successor of Reinecke (1895) in the conductorship of the Gewandhaus concerts of Leipzig.

NIKITA, nê-kē'tȧ, Louise (1872—). The professional name of Louisa Margaret Nicholson, an American singer, born in Philadelphia. She studied in Paris under Maurice Strakosch, and sang there and in Germany with considerable success. Her operatic début was in 1889 as Zerlina in *Don Giovanni*, and in 1894 she became prima donna at the Paris Opera. Her best-known rôles are in *Fille du régiment*, *Manon*, *Traviata*, *Lakmé*, and *Pagliacci*.

NIKITIN, nyê-kē'tyên, Ivan Savitch (1824-61). A Russian lyric poet, born at Voronezh. He began to write for the press in 1850; attracted attention by his patriotic poem *Russia* in 1853; and in 1856 had a volume of poems published under the patronage of Count Tolstoi. His greatest popularity was won by his poem *Kulak*, or 'The Money-Lender' (1858), a remarkable picture of peasant life. Besides his lyrics, Nikitin wrote two novels. A collected edition of his works was published at Moscow (6th ed. 1892).

NIK'KO (Jap., Sun's Brightness). A town and tourist resort in the Prefecture of Tochigi, Japan, about 80 miles northwest of Tokio, famous for its natural beauties, as well as for the mortuary shrines of Iyéyasu, the founder of the Tokugawa family, and of Iyémitsu, his grandson (Map: Japan, F 5). As a holy place its reputation dates from the eighth century, but the gorgeous mortuary shrines were not built until 1617, since which time they have been embellished by the lavish gifts of vassals, the wonders of Hidari Jingoro's wood carving, magnificent gifts of works of art in bronze, granite, and other stones, with offerings from the Dutch, Loo-Chooans, Koreans, etc. The name Nikko is also applied to the surrounding region.

NIKLA URSS, nē'klȧ ụrs (Rum., Nicholas the Bear). A popular name for a Rumanian patriot, Juon Hora (q.v.).

NIKOLAYEV, nyĕ'kô-lä'yĕv. An important naval and commercial river port in the Government of Kherson, South Russia, situated on the river Bug, 42 miles northwest of Kherson (Map: Russia, D 5). The river at Nikolayev is of sufficient width and depth for the largest vessels. The town has two gymnasia, a naval school, an observatory, a theatre, and a number of parks. Nikolayev is among the largest commercial ports of Russia. It is especially important in the export of grain, the imports being comparatively insignificant. The harbor is strongly fortified, and the navy yard with its wharves and various shops covers a large area. The industrial establishments, except those connected with the navy yard, are few and consist of tobacco factories, tallow-melting establishments, etc. The city forms a separate administrative district under a military Governor, who is also commander-in-chief of the Black Sea fleet. There are many consular representatives at Nikolayev.

Population, in 1897, 92,060, of whom about 75 per cent. were Greek Orthodox, and about 17 per cent. Jews. Nikolayev was founded by Potemkin in 1784. Until 1860 it was only a naval port, which played a prominent part in the building up of the Russian navy.

NIKOLAYEVSK, nyĕ'kô-lä'yĕfsk. A town in the Government of Samara, Russia, situated on the Great Irgiz, a tributary of the Volga, 110 miles south-southwest of Samara (Map: Russia, G 4). It carries on a brisk trade in agricultural products and animals, and produces brick, leather, and tallow. In the district of Nikolayevsk are a number of prosperous German colonies. The town was founded by the Raskolniks (dissenters) in 1782. Population, in 1897, 12,500, chiefly Raskolniks, and including about 1900 Tatars.

NIKOLSBURG, nē'kôls-bōōrk. A town of Moravia, Austria, situated about 30 miles south of Brünn (Map: Austria, E 2). On a rock near the centre of the town stands the castle of the princes of Dietrichstein, to whom the town has belonged since 1575. There are a number of churches, a higher gymnasium, a library, and a natural history museum—the two last in the castle. In the vicinity of the town is produced good wine. Nikolsburg is noted for the peace concluded there between Ferdinand II. and Bethlen Gábor in 1622, and the armistices between Prussia and Austria and Prussia and Bavaria in 1866. Population, in 1900, 8091.

NI'KON (1605-81). A patriarch of the Russian Church. He was born near Nizhni-Novgorod, became a priest and monk, and in 1646 was appointed, by the Czar Alexis Mikhailovitch, Archimandrite of the Novospasky Monastery at Moscow. In 1648 he became Metropolitan of Novgorod, and in 1652 was elevated to the patriarchate. In 1658, having lost the favor of the Czar, he retired to the Monastery of the Resurrection of Christ, which he had himself built, and in 1666 was deposed by a council called to consider his case, and banished as a common monk to a monastery at Bielozersk. Czar Feodor Alexeyevitch granted him permission to return to the Monastery of the Resurrection of Christ, but he died on the journey thither. Nikon was an ardent upholder of monasticism, and was noted for his benevolent life and character, showing much kindness to the poor and unfortunate. He tried to uplift the people, promoted education, and attempted to introduce many reforms into the Church, the most important of which was the effort to revise the Church books and correct them according to the old Eastern liturgies. This effort met with opposition from some who were opposed to change, and led to a division in the Church. See RASKOLNIKS. Consult Palmer, *The Patriarch and the Tsar* (London, 1871-76).

NIKOP'OLI, or **NICOP'OLIS**. An ancient and fortified town in the north of Bulgaria, situated on the right bank of the Danube, about 24 miles north-northeast of Plevna (Map: Balkan Peninsula, E 3). It is commanded by a citadel and has an old castle and a Byzantine church. The surrounding country produces good wine, and there is some trade between Nikopoli and Wallachia. Nikopoli is noted for the defeat here in 1396 of a large Christian army under Sigismund of Hungary by the Turks under Bajazet I. The fortress was occupied by the Russians in 1810, and the fortifications were partly demolished. In 1829 a Turkish fleet was defeated by the Russians near Nikopoli, and in 1877 the town was nearly destroyed by the Russian army. The Nikopolis ad Istrum, founded by Trajan, with which Nikopoli is sometimes identified, is now believed to have been situated a few miles down the river.

NILE (Lat. *Nilus*, from Gk. Νεῖλος, *Neilos*, Nile; possibly connected with Heb. *nahal*, stream, Egyptian *H'pĭ*), THE. The largest river of Africa, and the longest in the world excepting the Missouri-Mississippi, its length from the Victoria Nyanza to the Mediterranean being about 3670 miles. Authorities have definitely ascertained that the fountainhead of the Nile is a little stream situated just north of latitude 3° S., in longitude 29° 30′ E., near the northern extremity of the mountains bordering the northeast coast of Lake Tanganyika. This stream, rising among the mountains at a height of 6114 feet above the sea, gives birth to the Ruvuvu River, which is the mother branch of the Kagera or Alexandra Nile, emptying into Victoria Nyanza on its west coast. The area of the Nile's basin has been estimated at from 1,082,000 to 1,780,000 square miles. The general course of the river is from south to north, and though it has some largely developed sinuosities, its delta is almost directly north of the Albert Nyanza, which the Nile enters and from which it emerges, the delta and lake being separated by a distance of about 2000 miles.

The Nile has some special features that may be mentioned before describing it. While the river and its tributaries bring down from the tropics an enormous quantity of water, little of it reaches the sea, except at high flood, as nearly all the water that does not evaporate in the long journey northward is spread over the fields of Egypt, where it serves the double purpose of supplying moisture and fertilizing sediment. Its upper and its lower courses are navigable. Its middle course is not navigable except at very high flood, and then only with difficulty. The six cataracts of the Middle Nile extend along 1100 miles, with long stretches of smooth water between them; but this entire section of the river may be regarded as unavailable for very important navigation. These Nubian cataracts afford abundant water power, but it has never been utilized. Like all large rivers flowing north and south, the Nile tends to impinge more strongly upon its right bank, owing to the revolution of the earth from west to east. The boundary of the Nile basin is more clearly outlined in the south than in the north. The river differs from all other great African rivers in that it passes through various climatic zones and departs very little from its main direction.

The Nile may be divided into four sections—the Upper, Middle, and Lower Nile, and the Delta, each having its distinctive aspects. The Upper Nile extends from the lakes to the confluence of the Blue and White Niles at Khartum. It is distinguished as being the region of tributaries, all of them being included excepting the Atbara, which is not perennial. It is also the region of heavy tropical rains. Three great reservoirs receive the numerous affluents in the equatorial regions. The Nile issues from the largest of these reservoirs, the Victoria Nyanza, which is nearly equal to Scotland in area, and lies 3900 feet above the sea. The river, issuing from the middle of the north shore of the lake, plunges 13 feet over Ripon Falls, and is 1200 feet wide where its waters start on their journey north. This is the Victoria or Somerset Nile. It flows to the northwest, passes through the small Gita and Kioga lakes, down the Karuma rapids, thunders over Murchison Falls (120 feet high, 270 miles from the outlet), and then pursues a peaceful course for about 30 miles till it empties into the northeast corner of Albert Nyanza, only to emerge at the northern apex of the lake as the Bahr-el-Jebel, a deep and majestic stream, bound on its long journey to the Mediterranean. South of Albert Nyanza is Lake Albert Edward, sending its waters, collected chiefly from the great mountain mass of Rowenzori, through the Semliki River to Albert Nyanza, which is 1600 feet below the level of the Victoria Nyanza. The headwaters of the Upper Nile are thus collected in the Albert Nyanza. From the Albert Nyanza the river descends with slow current and scarcely any slope to Dufilé, where it passes between two mountain walls. Soon after leaving the mountains the slope becomes greater, the river foams over the Fola Rapids, leaves the plateau of Central Africa, enters the grass lands, and below Bor its banks are lost in the wide-spreading swamps on either side, and the channel splits into several branches, the Bahr-el-Jebel, the Bahr-el-Seraf, and others, which meet again in Lake No or farther down the river. In Lake No, the Bahr-el-Jebel meets the large tributary from the west, the Bahr-el-Ghazal (Gazelle River), and they leave the lake as the Bahr-el-Abiad or White Nile, which owes its name to the fact that in the sluggish current through the swamp region and in Lake No the sediment settles, leaving the river light in color, and this is accentuated farther down by the white waters of the Sobat tributary.

This area of swamps and branches is the vast region of the sudd (barrier), where all the channels are often completely choked by dense masses of vegetation. The current brings down fresh masses of weed and the sectional area of the river channel is quickly reduced. The velocity of the current is consequently increased, and the succeeding portions are sucked under the original block, thus adding to its thickness. By degrees, under the severe action of the water, the whole becomes compressed into a dense and solid mass, which covers the river surface from bank to bank, and underneath which the stream rushes as through a sluice gate. These blocks at times attain a thickness of 15 feet below the water and 4 or 5 feet above it. The surface in places is so solid that hippopotami and even elephants can cross it without danger. Navigation of the river is thus rendered impossible. In 1899-1900, after the reconquest of the Sudan, the Government attempted with much success to open navigation in the main channel by cutting down into the sudd, tearing the sections away by steamboats, and setting the masses thus separated afloat. This region is very unhealthful and the inhabitants are few. It is believed that the swamp and sudd region embraces an area of about 12,000 square miles. All the streams are reunited 62 miles below Lake No and receive on the right bank the Sobat River, coming from the southern extension of the Abyssinian highlands, a navigable river for 212 miles from its mouth. Below the Sobat, the White Nile takes a definite northern course and flows, a mighty, though sluggish stream, to Khartum, where the White and the Blue Niles mingle their waters.

The Blue Nile is a very different river. It rises in the Alpine heights of Abyssinia, descends to the White Nile between its high banks with a very rapid current, and in the flood time it is reddened by the quantities of alluvia with which it is surcharged. The White Nile gives to Egypt the larger quantity of water; the Blue Nile spreads over the fields the fertile sediment that enriches them. Thus each had its distinctive function in creating Egypt out of the desert sands. Khartum, at the junction of these rivers, is at the heart of the great hydrographic system, and is naturally the metropolis of the Eastern Sudan. The Blue Nile, from its great reservoir, Lake Tsana, 5840 feet above the sea, has a winding course of 839 miles down the plateau and over the plain to Khartum. Much land in its valley is suitable for agricultural development. The river needs scientific regulation so that it may best serve the interests of Egypt. Under the agreement with King Menelek of Abyssinia (1902) for the delimitation of the boundary between his country and the Sudan, the Egyptian Government has authority to regulate the flow of water in the upper river. The Cape to Cairo Railroad will follow the Blue Nile for a considerable distance above Khartum, to avoid the swamp region of the White Nile.

From a little below Khartum to the Mediterranean the river flows through one of the most arid deserts in the world, without receiving a single tributary excepting the Atbara, 180 miles below Khartum, which drains the northern highlands of Abyssinia, but is nearly dry in summer. Throughout this long course, the valley of the Nile is merely a cleft in the desert plateau, the alluvial plain along the river being bounded by barren cliffs, which here and there rise to 1000 feet. The volume of the river is greatly depleted by evaporation in this part of its course. The second section of the river, the Middle Nile, extends from Khartum to Assuan, a distance of 1124 miles. It is a region of cataracts, there being 351 miles of rapids, with a total fall of 656 feet, and 773 miles of navigation, with a fall of 312 feet. The cataracts, in their order as the river is descended, may be briefly described: The Sixth Cataract, beginning 52 miles below Khartum, is a little over one mile long, and the drop in the river is 20 feet. The Fifth Cataract begins 28 miles north of Berber, is 100 miles long, has three principal rapids, and the descent is over 200 feet. Abu Hamed is a little below the foot of this cataract. The Fourth Cataract is between Abu Hamed and Dongola, and drops 160 feet in 68 miles. The very fertile region of Dongola is between the Fourth and the Third cataracts. The Third Cataract, with two rapids, is 45 miles long and the fall in the river bed is 36 feet. The Second Cataract is 73 miles farther down the river, is 124 miles long, with four rapids, and it falls 216 feet. The town of Wadi-Halfa lies at its foot. The First Cataract is 214 miles farther down the Nile, is three miles long, drops 16 feet, and Assuan lies at its foot. The fact that below Assuan lies the great region of irrigation, fertility, and dense population, and that this portion of the Nile is hemmed in by high hills, marked Assuan as the best place to build a great dam across the river to keep back at flood time much of the water which hitherto had gone to waste, so that it might be utilized in the dry season and give Egypt perennial irrigation.

The third section of the river is the Lower Nile, extending from Assuan to the head of the Delta, an open waterway, navigable by large vessels, with Cairo near its foot. The current is slow during the low river in summer—less than two feet a second. The velocity in flood is from 3¼ to 6½ feet per second. Along the lower part of this section a divergent channel known as the Bahr-Yusuf (Joseph's Canal) extends parallel to the Nile on the west side, finally discharging its waters in the depressed area of the Fayum (q.v.). The fourth section of the river is the Delta or 'Garden of Egypt.' It is pierced in all directions by irrigation canals and navigable channels. When the Nile is in flood, its tendency is to increase the height of its banks by deposits of loam and sand. These banks are artificially strengthened and the river thus kept to a definite course. The river reaches the sea through the Rosetta and Damietta mouths, and the canals that cover the Delta like a network carry their surplus waters into a chain of salt lakes that extends behind the sandy shore. As a drainage outlet, a navigable highway, and a source of power the Nile is surpassed by many other rivers. Its unique distinction is that it has turned Egypt from a desert into one of the richest agricultural lands, supporting a population of about 600 to the square mile. There are periods of exceptional flood and low water; but the extraordinary regularity with which, as a rule, the river rises and falls contributes to the security of farming.

The heavy rains in the basin of the White Nile during April drive the waters of that marshy region down upon Egypt, where they appear at Cairo about June 15th. A fortnight later the real flood begins, for the May rains in Abyssinia fill the Blue Nile with the richest muddy water. The rise is sometimes as rapid as three feet a day, the flood being heightened by the large volume brought down by the Atbara. The maximum flood reaches Assuan about September 1st, and it would be at Cairo a few days later were it not that the water is diverted to the land and the whole Nile Valley is a great lake. For this

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reason the maximum flood at Cairo appears only about October 1st. The rains cease in Abyssinia about the middle of September, the floods of the Blue Nile and the Atbara disappear, and then the great lakes and marshes of Central Africa are the main supply of the river until the following June. This routine of the waters is marked by marvelous regularity. The time between an early and a late flood is not more than three weeks. The height of the flood at Assuan is usually about 25 feet above the minimum supply. If the water rises 29 feet above the minimum, the crops of Egypt are in danger. If it rises only 20 feet above the minimum, large areas cannot be flooded. The mean flood discharge at Cairo is about 280,000 cubic feet per second (about equal to the average flow of the Niagara River), the maximum about 400,000 feet. The general slope of the valley on each side is away from the river. Along each edge of the river is an earthen embankment too high to be topped by the floods. Along the valley is a series of embankments, one end of which is at the river edge and the other on the sides of the hills that wall in the valley. The whole country is thus divided into a series of oblongs surrounded by artificial embankments on three sides and by the slope of the desert hills on the fourth. There are 120 of these oblongs, varying in extent from 60,000 to about 3000 acres. It is easy to cut short, deep canals in the banks which fill as the flood rises and carry the mud-charged water into these basins of irrigation. There the water remains for a month or more, three to four feet deep, depositing its mud. At the end of the flood the water is passed off through sluices from one basin to another and ultimately back into the river. In November seed is sown, and so saturated is the soil that the grain sprouts and thrives and the harvest is gathered in April or May without a drop of rain or any fresh irrigation. After the crop is reaped the fields remain dry and cracked in the fierce summer heat until the next flood comes on. A little below Cairo is a great dam or barrage across the river, by means of which all available water in the Nile before it begins to rise in June is diverted into canals that carry it to the cotton fields of the Delta. This barrage makes it possible to irrigate Delta crops in the dry season, so that to a large extent two crops a year are raised there. The water in the Delta would not be sufficient if a strict system of control were not maintained by which each cultivator is supplied in turn every fifteen or twenty days.

The great need has long been to store the waters during flood time (when a large part of them run to waste) so that they might be turned over the fields during the months of low Nile, thus giving to Egypt the benefits of irrigation at all seasons, and making it possible to raise two or three crops annually where only one or two were grown. Near Assuan, the gateway to Lower Egypt, the work on the great and much desired reservoir was begun. It was completed and formally opened in December, 1902. The work consists chiefly of an enormous wall or dam of masonry nearly 2 miles long and averaging 60 feet in height. The wall is pierced by 180 openings, each containing sluices through which the low Nile may pass and the retained flood waters may escape as they are needed for irrigation. A roadway runs along the top of the wall. It is estimated by Sir William Garstin that the volume of water impounded by the dam will reach the enormous total of 37,612,179,000 cubic feet. He estimates also that in the distribution of this reserve supply 70,000 acres in Upper Egypt, between Assuan and Assiut, will receive perennial irrigation; also 458,000 acres now irrigated as basins in Middle Egypt between Assiut and Cairo; that, further, 52,000 acres in the Fayum now untilled may be reclaimed; and that in Lower Egypt or the Delta the additional water will insure the cotton crop against drought, and reclaim an area of 120,000 acres now uncultivated. In the Province of Ghizeh likewise an area of 106,000 acres of basin cultivation will be converted into perennially irrigated land. Since the dam at Assuan closes the Nile to navigation, a canal 6540 feet in length with four locks is being constructed around it. Mail steamers and any stern-wheeler now on the Nile may pass through the canal, and sailing vessels may pass Assuan all the year round, though heretofore they have been able to get through the cataract only during high Nile. Below Assuan a barrage has also been constructed at Assiut for the purpose of raising the level of the river in summer, so that water may be delivered at that point at a higher level, increasing the discharge into the Ibrahimia Canal, which carries the supplies to the basins as far north as Minieh and Beni-Suef. These great works will add enormously to the productivity of Egypt, will increase the value of all the farm lands, and will augment the revenues of the Government. See EGYPT and EGYPTIAN SUDAN.

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(ib., 1899); Willcocks, *The Nile Reservoir Dam at Assuan and After* (ib., 1901).

NILE GROUP. A large marble group, one of the most important Alexandrine works of art, representing the river god reclining and leaning on a Sphinx. About and over his body sixteen children are climbing and playing, emblematic of the sixteen cubits to which the Nile rises before overflowing the surrounding country. The god holds in his left hand a cornucopia with flowers and fruits, in his right a bunch of grain, types of the fructifying power of the inundation. The group was found near the Church of Santa Maria sopra Minerva, Rome, in the time of Leo X., and is now in the Vatican.

NILES, nīlz. A city in Berrien County, Mich., 92 miles east of Chicago, Ill.; on the Saint Joseph River, and on the Cleveland, Cincinnati, Chicago and Saint Louis and the Michigan Central railroads (Map: Michigan, G 7). It derives excellent power from the river and has extensive manufactures of all grades of paper, furniture, windmills, steel tanks, flour, etc. There is also a large fan and lithographing establishment. The surrounding country is chiefly agricultural, and the river scenery is unusually fine. The government, as provided by general charter of 1896, is vested in a mayor, annually elected, and a unicameral council. The waterworks and electric light plant are owned and operated by the municipality. Population, in 1890, 4197; in 1900, 4287. On or near the site of Niles stood Fort Saint Joseph, the capture of which by the Spaniards in 1781 was the basis of Spain's claim (in 1782-83) to a large tract of Western territory. The foundations of the old fort are still visible. Early records show that a French mission was here established as early as 1697, and a complete census of a settlement in 1767 is extant. Niles was settled permanently in 1828, ten years later was incorporated as a village, and in 1859 it received a city charter.

NILES. A city in Trumbull County, Ohio, 58 miles southeast of Cleveland; on the Mahoning River, and on the Erie, the Pennsylvania, and the Baltimore and Ohio railroads (Map: Ohio, J 3). It is primarily a manufacturing centre, these interests being represented by tin mills, automatic press works, sheet mills, boiler works, and manufactories of electric and steam cars, incandescent lamps, chinaware, iron roofing, metal lath, office supplies, foundry and blast furnace products, mine and mill supplies, and galvanized iron. Niles, first incorporated in 1864, is governed, under a charter of 1895, by a mayor, elected every two years, and a unicameral council. The city owns and operates the water-works and electric light plant. Population, in 1890, 4289; in 1900, 7468.

NILES, HEZEKIAH (1777-1839). An American journalist and publisher. He was born in East Bradford, Chester County, Pa., where he was educated in the village schools. He learned the printers' trade, and in 1800 established himself in the printing and publishing business in Wilmington, Del. Failing in business, he removed to Baltimore, Md., where he became associated with George Bourne in the editing of *The Evening Post*. In 1811 he began the publication of a weekly, largely devoted to politics and the discussion of public affairs, which he called *Niles's Register*. This journal he continued until his death, removing the publication office in 1837 to Washington and renaming the paper *Niles's National Register*. In 1838 the office was moved back to Baltimore, and there the publication of the paper was continued after Niles's death until 1849 by his son, W. O. Niles, and others. The files of the paper from 1811 to 1849 constitute an invaluable source for the study of American political history during that period.

NILES, JOHN MILTON (1787-1856). An American journalist, politician, and Cabinet officer. He was born in Windsor, Conn., received a common school education, and studied law by himself. In 1817 he settled at Hartford, Conn., and established the *Times*, which, under the editorial control of Niles, whose connection with it lasted for thirty years, became one of the most influential newspapers in New England. It was one of the earliest papers in the section to give its support to Andrew Jackson for the Presidency, and after his election Niles received the appointment to the Hartford postmastership as a reward. In 1835 he was appointed United States Senator to fill a vacancy, serving until 1839. In 1840 he was appointed Postmaster-General in Van Buren's Cabinet, remaining in office until Harrison's inauguration. From 1843 to 1849 he was a member of the United States Senate. He published: *The Independent Whig* (1816); *Gazetteer of Connecticut and Rhode Island* (1817); *Life of Commodore Oliver Hazard Perry* (1820); *A History of the Revolution in Mexico and South America, with a View of Texas* (1829); and *The Civil Officer* (1840).

NILES, NATHANIEL (1741-1828). An American politician and theologian, born in South Kingston, R. I. He graduated at Princeton in 1766, later studied medicine and law, taught school in New York City, then studied theology, and preached in various Congregational churches in New England. While living at Norwich, Conn., he invented a process by which bar iron could be made into wire by the use of water power, and also established a wool-card manufactory. About the close of the Revolution he settled in Orange County, Vt., and founded West Fairlee. He was frequently a member of the Vermont Legislature, and in 1784 was Speaker; was later a judge of the State Supreme Court; was a Representative in Congress from 1791 to 1795; was six times a Presidential elector, and also helped, as a 'censor,' to revise the State Constitution. Shortly after the battle of Bunker Hill he composed a song, "The American Hero," which proved popular, and he later contributed essays to the *Theological Magazine*, and published a considerable number of books on theological and other subjects.

NILGAI, nil-gī′ (Pers., Hind. *nilgau, nilgar, lilgar*, blue ox, from *nil*, Skt. *nilá*, blue + *gau*, Skt. *gau*, ox, cow). An East Indian antelope (*Boselaphus tragocamelus*) with a somewhat ox-like head and body, but with long, slender limbs, and of great activity and fleetness. It is one of the largest of antelopes, and stands about 4½ feet high at the shoulder. The horns of the male are about as long as the ears, smooth, black, pointed, slightly curved forward. The female has no horns. The neck is deep and compressed, not rounded, as in most of the antelopes. The general color is brownish gray. A slight mane runs along the neck and the elevated forward part of the back, and the breast is adorned with a long hanging tuft of hair. The nilgai inhabits the bushy parts of India, where it has long been regarded as one of the noblest kinds of game. It is capable of domestication, but is said to manifest an irritable and capricious temper with advancing age. Consult Blanford, *Fauna of British India: Mammals* (London, 1889), and works on sport in India. See Plate of ANTELOPES.

NILGIRI (nĕl-gē̍'rē) **HILLS**, or **NEILGHERRY HILLS**. An almost isolated plateau or mountain group in Southern India, Presidency of Madras (Map: India, C 6). It is situated about 40 miles from the west coast, 200 miles north of Cape Comorin, and rises in general to heights of between 3000 and 6000 feet above the surrounding plains, the highest point being Mount Dodabetta, with an altitude of 8760 feet. Granite ridges connect it with the neighboring Ghat Mountains, and it is itself composed of granite covered with a rich layer of soil. The slopes are covered with dense, hot, and unhealthful forest jungles, but the uplands consist of beautiful grassy plains with a temperate-zone flora and a delightful climate, which has made the Nilgiri Hills one of the principal sanatoriums in India for European invalids, who are chiefly concentrated in the town of Utakamand. The native inhabitants are Dravidian herdsmen.

NILOM'ETER (Gk. Νειλομέτριον, *Neilometrion*, from Νεῖλος, *Neilos*, Nile + *μέτρον*, *metron*, measure). A construction for measuring the height of the Nile. Two such constructions have survived from antiquity. The first is situated on the island of Roda, south of Cairo. This *mikyâs*, as it is called in Arabic, is a square well, 16 feet in diameter, with an octagonal graduated pillar of marble in the centre, marking 17 cubits of 21.386 inches. The official guarding it announces that the water has risen high enough to cut the dams and to begin the irrigation when the river has risen to 15⅔ cubits. Taxation was formerly regulated in accordance with the height of the inundation. This construction is due to the Caliph Suleiman, A.D. 715-717, but has been restored repeatedly since the ninth century. The other nilometer is situated on the island of Elephantine (q.v.), near the First Cataract. It consists of a well with a staircase of stone, and is very correctly described by Strabo. It was restored to official use in 1870.

NILSSON, nĭl'son, CHRISTINE (1843—). A Swedish soprano. She was born near Wexiö, and although her parents were in humble circumstances, she became proficient on the violin, learned the flute, and attended fairs and other places of public resort, at which she sang, accompanying herself on the violin. While performing in this manner at a fair in Ljungby in 1857, her voice attracted the attention of F. G. Tornerhjem, who sent her to Stockholm, where she received instruction from Franz Berwald. She made her début at Stockholm in 1860, and then went to Paris to continue her musical education, under Masset and Wartel. In 1864 she appeared at the Théâtre Lyrique of Paris, as Violetta in *La Traviata*, with such success that she was engaged for three years. She made her first appearance in London in 1867, where she immediately became a favorite. In 1868 she sang the part of Ophelia in the opera *Hamlet*, by Ambroise Thomas, at the Grand Opéra in Paris. During the same year she sang in England at the Handel festival at the Crystal Palace. In 1870 she came to America, appearing in concerts and operas, and achieved popularity wherever she was heard. She was married in 1872 to Auguste Rouzaud, a merchant of Paris. After leaving Saint Petersburg, where she had been very successful, she returned to America with the Strakosch Italian opera troupe. She also sang Elsa in Wagner's *Lohengrin*. The death of her husband in 1882, after she had retired from the operatic stage, caused her to return to it, but her marriage to Count Miranda in 1887 brought about her permanent retirement in 1888. What her voice lacked in volume was compensated for in smoothness, sweetness, and evenness of tone.

NILSSON, nĭl'son, SVEN (1787-1883). A Swedish zoölogist and archæologist, born near Landskrona. At twenty-five he became assistant professor of natural history at Lund. He was appointed director of the Zoölogical Museum of that city in 1819, and returned there after four years in a like post at Stockholm. He resigned in 1856. Nilsson wrote, on Scandinavian fauna and antiquities: *Ornithologia Suecica* (1817-21); *Prodromus Ichthyologiæ* (1832); *Observationes Ichthyologicæ* (1835); *Skandinavisk fauna* (1820-53); and *Skandinaviska Nordens urinvånare* (1838-43; in German translation by Mestorf, 1863-68).

NIMBLE FLY. A fly of the family Dexiidæ, a group allied to the parasitic family Tachinidæ, so called from its rapid movements. Their legs are unusually long, and in their early stages they are parasitic in various insects, especially in beetles and also in snails. About fifty species inhabit North America.

NIMBUS. See CLOUD.

NIMBUS (Lat., cloud). In art, especially in sacred art, the name given to the disk or halo which enriches the head of the sacred personage who is represented. Its use is occasional in non-Christian religious art, especially the Hindu, and it was not unknown to classic and Oriental art. The nimbus, strictly so called, was first systematically used in Christian art, appearing first in the fifth century. Later, in Christian art, it became almost a necessary appendage of all representations of God or of the saints. It is of two kinds—either circumscribed by a well-defined outline, or radiating in vanishing lines. It took various forms. The square or oblong shape indicated a saintly person, such as a pope, still living, and was used mainly between the fifth and ninth centuries. The square form was symbolic of the material and earthly. The common form was the circular, symbolic of the spiritual and perfect. The earliest figure to receive the nimbus was that of Christ, and this nimbus almost immediately took a peculiar form, which was ordinarily given to Him up to the sixth century, and this was the monogram ☧ or ⳨ in the shape of a cross, called the Constantinian monogram (see LABARUM), formed of the first two letters of the Greek word for Christ, circumscribed in the circle and appearing above and on either side of His head. This became, after the sixth century, the ordinary cruciform nimbus which was the rule up to the Renaissance, when the nimbus went out of fashion for all figures except occasionally in the form of a poised circlet or band. The interior of the nimbus, of whatever form, is gilt, either plain or in rays, excepting occasionally that of the Virgin, made of blue or some other color or starred. Up to the Renaissance the nimbus forms a circle against the background, but Renaissance artists tilted it or poised it naturalistically. God the Father was not represented until the late Middle Ages, and to Him was given a circular nimbus, but the Renaissance often gave it a triangular radiating shape. The dove of the Holy Ghost also had a circular nimbus. So had all duly canonized saints, for it was a symbol of the blessedness of eternal life in heaven. In later art the nimbus became lighter and more aërial, melting, as it were, into the picture; and in Raphael's saints it occasionally fades into the very faintest indication of a golden tinge around the head. Mosaic paintings, frescoes, illuminated manuscripts, and altar-pieces are the principal classes of monuments illustrating the use of the nimbus. See ICONOGRAPHY.

NIMEGUEN, nĭm′*e*-gĕn (Dutch *Nijmegen*). A city in the Province of Gelderland, Holland, on the Waal, four miles from the German frontier (Map: Netherlands, D 3). It is situated on several hills, has the form of an amphitheatre, and is, for the most part, poorly built, with steep and narrow streets. The town is strongly fortified and garrisoned. Among the noteworthy edifices are the Church of Saint Stephen, a handsome Gothic structure dating from the thirteenth century, and the town hall, with a museum of Roman antiquities. In the beautiful Valkhof Park are ruins of an ancient Imperial palace. Nimeguen is a large market for cattle and agricultural products, especially grain and wine. It is noted for its Weissbier and its eau de cologne, and has manufactures of flour, cigars, tin, and other metal ware, leather, and furniture. Population, in 1895, 37,008; in 1900, 42,756, chiefly Catholics.

Nimeguen was founded by the Romans, who made it a permanent camp, in order to keep in subjection the Teutonic tribes northeast of the Rhine. In the Middle Ages it was a member of the Hanseatic League. It was taken by the Spaniards in 1585, but was recovered six years later. The Peace of Nimeguen in 1678-79 brought to a close the war between France and the Dutch and their allies, initiated by Louis XIV.'s invasion of the Netherlands in 1672. Peace between France and Holland was concluded on August 11, 1678; between France and Spain on September 17, 1678; between France and the Emperor on February 5, 1679; and between Holland and Sweden, the ally of France, on October 12, 1679. France secured possession of Franche-Comté and a portion of Flanders. The Peace of Nimeguen was the culminating point in Louis XIV.'s career and made France the leading power of Europe.

NÎMES, nêm. The capital of the Department of Gard, France, in Lower Languedoc, situated on a fertile plain at the southern base of a range of outlying hills of the Cévennes. 174 miles south-southwest of Lyons (Map: France, L 8). The climate of Nîmes is not particularly agreeable, owing to its winds and dust storms, and to its heat in summer. It is a unique city in that it contains very ancient constructions side by side with modern and handsome buildings, streets, etc. It has splendid monuments of Roman times, and its antiquities are of almost every description. The fine Esplanade, approached by the spacious Avenue Feuchères, and flanked by the immense Roman amphitheatre, and adorned by a magnificent fountain decorated with statues by Pradier, forms a centre of striking interest. Here also are found the modern Palace of Justice, and a statue to Soleillet, the French explorer. The amphitheatre—Les Arènes—is an ellipse 438 feet long, and while smaller than the famous ones of Italy, is in a better state of preservation. Its construction is interesting. It was built at the beginning of our era and was capable of seating 24,000. Its restoration was begun in 1858.

The most striking structure in Nîmes is the far-famed Maison-Carrée, an imposing Roman temple, well preserved. It is 76 feet long and 40 feet wide, and is embellished with 30 Corinthian columns. The whole edifice is in excellent taste and possesses rich features. It is now thought to have been built early in our era. It evidently belonged in the ancient forum. After having served various degraded uses during the centuries, it was artistically restored in the eighteenth century. It contains a collection of Roman relics, some exhibiting a fine style of workmanship. Its Venus of Nîmes, however, is mediocre. The Romanesque Church of Saint Paul has splendid mural paintings by the two Flandrins. Nîmes has a Reformed Grand Temple of a very simple architectural style. The uninteresting cathedral was built of materials from ancient ruins. The Jardin de la Fontaine is a lovely garden, with a canal, cascades and basins, and a statue of Antoninus Pius, who was born in Nîmes. Among the Roman remains are the Tour Magne, 90 feet high, affording a fine view; a little Temple of Diana; and the Porte d'Auguste. The Hôtel-Dieu has an attractive façade. The Central Prison, with a capacity for 1400 persons, was an ancient citadel.

The Ecole des Beaux-Arts is modern. The city library has 75,000 volumes. This collection is installed in a former Jesuit college which has been provided with a handsome modern façade. The Maison-Carrée contains an archæological museum. In the picture gallery in the southern part of the town are some creditable paintings. Nîmes has a Calvinistic consistory, a lyceum, a Protestant normal school for women, a Catholic seminary for priests, and industrial and art schools. The manufacturing industries are still important, though declining. Silk, wine, liquors, are extensively produced and dealt in. Nîmes also manufactures upholstery, shawls, lace, handkerchiefs, carpets, leather, and iron products. Population, in 1901, 80,605, nearly one-fourth being of the Reformed faith.

Nîmes (Lat. *Nemausus*) was the leading Roman colony in Gaul after B.C. 120, and was a provincial city of true magnificence. It fell under the scourge of the Vandals in A.D. 407, and was plundered by the Northmen in 859. It turned Calvinist at the Reformation and entered upon a troubled career. After the fall of Napoleon its citizens—or the Bandes Verdets—persecuted the Protestants. Guizot and Daudet were born there. The beautiful ruined Pont du Gard is northeast of Nîmes. Consult: Pieyre, *Histoire de la ville de Nîmes, depuis 1830 jusqu'à nos jours*

(Nîmes, 1886-88); Bazin, *Nîmes gallo-romain* (Paris, 1891).

NIMRA'VUS (Neo-Lat., from *Nimr-od* + Lat. *avus*, ancestor). A fossil cat found in the John Day Miocene beds of Western North America. See SABRE-TOOTHED TIGER.

NIM'ROD (Heb. *Nimrôd*). According to Gen. x. 8 seq. (I. Chron. i. 10), the founder of the Babylonian, and later of the Assyrian Empire; also "a mighty hunter before Jehovah." No explanation of the name and legend has as yet received common assent. The mythical theory which found in Nimrod Orion or the sun is now generally abandoned, and the dispute lies between a mythological and an historical personage. (1) According to the mythological view, Nimrod is identified either with the Babylonian god Marduk, a theory which would well explain his name, through the correspondence of three radicals (see NISROCH), or he is identified with Gilgamesh (q.v.), the hero of the Babylonian epic, who appears typically in art as engaged in combat with a wild beast, and is associated with Erech, one of Nimrod's cities. (2) Advocates of the historical view seek, by reason of the exact historical details, a character in Babylonian annals whose name may be the original of Nimrod. Such a person is suggested in a certain Kassite King of Babylonia of the fourteenth century B.C., Nazi-marattash (the latter component being supposed to be a god of hunting). But at present under any theory the legend must be regarded as made up of several sources. Yet, while the name is a problem, the biblical reference is of great interest as giving a correct tradition of early Babylonian history. Cush, the father of Nimrod, is now identified with the Kassites, an Elamitic race, which ruled Babylonia for the greater part of the second millennium B.C. (See KASSITES.) The four cities of Nimrod's kingdom mentioned in Genesis x. 10 are ancient and famous. That "out of that land he went forth into Assyria [the proper translation], and built Nineveh," etc. (Gen. x. 11-12), corresponds with the facts of the ethnical and social origin of Assyria from Babylonia. Of the four cities here mentioned, Rehoboth and Resen are not yet identified. In Micah v. 6, "the land of Nimrod" is in parallelism to "the land of Assyria." The characterization of Nimrod as a huntsman (an ancient and doubtless pre-Israelite saying), would be appropriate to a mythological character or to many an Oriental monarch. The mythological expression "a mighty hunter before Jehovah" would mean that Nimrod attracted the attention of the deities by his prowess, or even rivaled them in the art of hunting. Consult: Maspero, *Dawn of Civilization* (London, 1894); Sayce, *Patriarchal Palestine* (London, 1895).

NIM'RUD. The modern name of a mound on the east bank of the Tigris, about 20 miles below Mosul (Map: Turkey in Asia, K 4), marking the ruins of an ancient Assyrian city identical with Calah (q.v.) mentioned in Gen. x. 11. It is one of a group of cities which clustered around Nineveh and may be regarded as a suburb of the latter. The chief discoveries were made at Nimrud by Layard in 1845-47 and 1849-51, though there were also later excavations by George Smith and Rassam. The city was a quadrangle about five miles in circumference, surrounded by a wall with towers. The most important buildings discovered were: (1) a stage-tower (*zikkurrat*) at the northwest corner of the mound; (2) temples near the tower, in which valuable inscriptions were found; (3) the so-called northwest palace built by Assurnazirpal (B.C. 885-860), and restored by Sargon (B.C. 722-705), 350 feet square; the sculptures found here were particularly fine and instructive, and there was a rich harvest of small objects of art, utensils of daily life, tools, armor, and the like; (4) the centre palace (of Shalmaneser II., B.C. 860-825, rebuilt by Tiglath-pileser III., B.C. 745-727); here was found one of the most interesting of all Assyriological monuments—the famous black obelisk of Shalmaneser II., now in the British Museum, which gives an account of the campaigns of the King during thirty-one years of his reign; (5) the southwest palace (Esarhaddon's, B.C. 681-668), built with materials taken from the northwest and centre palaces; (6) the southeast palace (Asshuretililani's, after B.C. 625); (7) a temple of Nebo, at first wrongly called the tomb of Sardanapalus. The history of Calah has been traced back to Shalmaneser I. (c.1300 B.C.), who calls himself its builder. It was afterwards neglected for a time, but was rebuilt by Assurnazirpal and was the capital of the Empire for two centuries. About B.C. 700 it gave way to Nineveh, and was destroyed by the Medes and Babylonians when they conquered Assyria. For bibliography, see NINEVEH; see also ASSYRIA; ASSYRIAN ART.

NIMWEGEN, nĭm'wā-gen. A city of the Netherlands. See NIMEGUEN.

NINDE, nĭnd, WILLIAM XAVIER (1832-1901). A bishop of the Methodist Episcopal Church. He was born at Cortland, N. Y., and graduated from Wesleyan University, Middletown, Conn., in 1855. After teaching for a year at Rome, N. Y., he entered the ministry. In 1861 he was sent to a church in Cincinnati, Ohio, and remained a pastor in that city until 1868, when he went abroad for travel through Europe and the East. The remainder of his pastoral life was spent in Detroit at the Central Methodist Episcopal Church. His terms here were divided by a period spent as professor of practical theology in Garrett Biblical Institute at Evanston, Ill. This institution called him to its presidency in 1879, and here he remained until 1884, when he was chosen a bishop of the Methodist Episcopal Church. He was one of the organizers of the Epworth League and its second president. He died at Detroit, Mich. Consult the memoir by his daughter (New York, 1902).

NINDEMANN, nĭn'de-män, WILHELM FRIEDRICH CARL (1850—). A German-American Arctic explorer, born at Gingst, island of Rügen. When seventeen, he came to the United States. He joined the *Polaris* expedition, and in 1872, when the vessel was caught in the ice, with eighteen of the crew he was carried on an ice field for nearly seven months. He was rescued off Labrador by the *Tigress;* volunteered on that vessel and afterwards on the *Jeannette* in the search for the *Polaris;* and after the loss of the *Jeannette* was sent south for help by De Long, in the quest for whom he later joined. Nindemann wrote in German a description of his Arctic voyages (1885).

NINE-EYES. In England, a lamprey (q.v.).

NINEKILLER. One of several similar names applied to shrikes, this one expressing a German rustic notion that the bird murders nine victims in a series. Compare BUTCHER-BIRD.

NINETY-SIX. A village in Abbeville County, S. C., about 80 miles southwest of Camden, said to have been so named from its having been located 96 miles from Keowee, the principal town of the Cherokees. During the Revolutionary War, it was an important strategic point, and in 1781, while occupied by a Loyalist force of about 550, under Lieutenant-Colonel Cruger, was unsuccessfully besieged by a force of Americans, under General Greene, from May 21st to June 19th, when, on receiving news of the near approach of a greatly superior British force under Lord Rawdon, General Greene withdrew. The loss of the Americans, incurred chiefly during an assault on June 18th, was about 185 in killed and wounded; that of the Loyalists was about 85. On June 29th the place was evacuated by Lord Rawdon. Consult Dawson, *Battles of the United States* (New York, 1858).

NIN'EVEH. The later capital of the great Assyrian Empire. The etymology of the name (written *Ninua* and *Ninâ* in cuneiform inscriptions) is unknown. A popular etymology connected it with *nûnu*, 'fish,' and made Nineveh the 'fish-city.' Presumably the word is connected in some way with *Ninâ*, a Babylonian goddess, subsequently identified with Ishtar (q.v.). Nineveh was situated on the east bank of the Tigris, opposite the present Mosul (Map: Turkey in Asia, K 4), where for centuries its ruins were indicated by a number of mounds, the two principal ones being known as Koyunjik and Nebi Yunus, the latter the traditional site of the preaching of the prophet Jonah and crowned by a famous Mohammedan shrine. References in Arabic geographers and early European travelers show that the location was always preserved in local tradition, although the value of this tradition was called in question in the eighteenth century. Its trustworthiness was established by Claudius James Rich, whose examination of the mounds in 1821 marks the beginning of scientific investigation; he gave the first accurate description and prepared excellent maps (published, after his death, in 1836). The first excavations were made at Koyunjik by Paul Botta in 1842-43. At this early stage of Assyriological investigation sculptures or other large objects which could be sent to Europe and arouse popular wonder were the main desiderata; and when three months' labor had brought to light nothing but fragments of reliefs and inscriptions, Botta considered the work disappointing and abandoned Koyunjik for Khorsabad (q.v.). Layard, while excavating at Nimrud (q.v.) in 1845-47, dug a few trenches at Koyunjik and made a tentative examination which located the so-called southwest palace (Sennacherib's). During his second expedition (1849-51) he made a more thorough examination of this palace, brought to light numerous valuable sculptures, and discovered the famous library of Assurbanipal. After Layard's departure operations were continued by Rassam (1852-54), while Victor Place was also attempting to excavate at the same mound, the work of the two investigators not always proceeding in a spirit of friendly coöperation. Rassam discovered the north palace (Assurbanipal's), the sculptures of which belong to the finest specimens of Assyrian art. He also found here the second half of Assurbanipal's library, including the Babylonian account of the deluge. The examination of the palace was continued for a short time after Rassam's departure by Loftus and Boutcher. The next attempt at Koyunjik was made by George Smith during two brief periods aggregating not more than three months together in 1873-74, and resulted mainly in the recovery of inscriptions from Assurbanipal's library, popularly considered disappointing after the brilliant successes of Layard and Rassam, but in reality as important as any discoveries yet made. Rassam, during his four campaigns in 1878-82, made further excavations at Koyunjik; owing to the unfortunate attempt to do too much and the unsystematic and unscholarly methods followed, the results were not all that could have been desired. Rassam also excavated at this time at Balawat (q.v.), about fifteen miles east of Mosul, like Khorsabad and Nimrud one of the many cities grouped around Nineveh, and attempted without success to examine Nebi Yunus. It is known that the latter mound contains memorials of Adadnirari III. (B.C. 812-783) and palaces of Sennacherib (B.C. 705-681) and Esarhaddon (B.C. 681-668), but this mound has not yet been examined. Much also still remains to be done at Kôyunjik. The earliest explorations of Layard were carried on at the expense of Sir Stratford Canning and Layard himself; other investigations have been supported by the British Museum, where most of the antiquities discovered are now stored. Besides ornaments, seals, and similar small objects of great importance as works of art, colossal statues were found, and small bas-reliefs representing incidents of war, hunting scenes, sacrificial rites, religious processions, building operations, and other events of daily life. The inscriptions on clay cylinders, obelisks, slabs, statues, and tablets of stone and other material have furnished data for tracing the history of the Assyrian empire with considerable detail from about B.C. 1100 to the fall of Nineveh.

The ancient city was a strongly fortified town, an irregular trapezium in shape. The walls have been traced and found to have been about a mile and one-quarter in length on the north, something less than three miles on the east, about half a mile on the south, and two and one-half miles along the Tigris on the west. A remarkable gate was discovered by Layard near the centre of the northern wall; on the city side there were colossal man-headed bulls and winged human figures. The river Khosar flowed through the city from west to east, dividing it into two nearly equal parts. The superficial area was about 1800 acres. According to a statement of the Book of Jonah (iv. 11), the population when the city was at the height of its glory has been estimated at 600,000. This is probably too great. Commander Jones calculated in 1852 that the population of the city and suburbs cannot have exceeded 350,000, while the city itself may have been the home of about 175,000 souls. The statement that "Nineveh was an exceeding great city of three days' journey" (Jonah iii. 3) does not seem greatly exaggerated, if the suburbs be taken into account.

The first certain mention of Nineveh is in the code of Hammurabi—latter half of the twenty-third century B.C. (See HAMMURABI.) The name occurs in certain Babylonian inscriptions which are at least 500 years older, but it is not certain that the reference is to the Assyrian capital. The earliest seat of the Assyrian rulers was at Asshur (Kileh Shergat, on the west bank of the Tigris, about 50 miles below Mosul). The seat of government was first transferred to Calah (Nimrud, q.v.). Shalmaneser I. (c.1300 B.C.), who calls himself the builder of the latter city, is known to have restored a temple of Ishtar at Nineveh, which is also mentioned in an inscription of Shamshiadad (c.1800 B.C.) and in the code of Hammurabi. From the time of Asshurbelkala (c.1090 B.C.) to the reign of Assurnazirpal (B.C. 885-860) Nineveh was the capital. The latter King returned to Calah, but in the days of Sennacherib (B.C. 705-681) Nineveh regained its position. Sennacherib's predecessor, Sargon II. (B.C. 722-705), seems to have given the preference to Khorsabad. Under Sennacherib and his successors Nineveh attained to its greatest prosperity and fame. It fell before the combined efforts of Medes and Babylonians, the Median King, Cyaxares (B.C. 625-585), entering into an alliance with the Babylonian King, Nabopolassar (B.C. 625-605), for the destruction of the Assyrian Empire. The last days of Nineveh are obscure. That the city held out for a considerable time by virtue of its strong fortifications is probable. The year of its fall is uncertain; a probable date is B.C. 607. According to tradition its King, Sinsharishkun, ended his life in the flames which consumed his capital. The destruction of the city was complete. Xenophon with the Ten Thousand Greeks passed by its site about two centuries later, and does not even mention its name. It is probable, however, that the 'great uninhabited cities' which he calls Mespila and Larissa (*Anab.* iii. 4, 7-12) were Koyunjik and Nebi Yunus, respectively.

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NINE WORTHIES, THE. Nine heroes of history and romance, long popular in mediæval art and story. They are mentioned in the preface to Caxton's Malory's *Morte d'Arthur*, as the "Nine Worthy and the best that ever were;" to wit, three Paynims, three Jews, and three Christian men. These are Hector of Troy, Alexander the Great, Julius Cæsar, Joshua, David, Judas Maccabæus, King Arthur, Charlemagne, and Godfrey of Bouillon. These heroes were a familiar and popular subject in tapestries and paintings, and figured also in masks and pageants. Dunlop mentions in *History of Prose Fiction* a rare romance, the "Triumphes des neuf Preux," in which the author had a vision of the nine worthies. Brunet intimates that the original was of Spanish origin. The nine are mentioned also in English literature. Shakespeare parodies them in *Love's Labor's Lost*, and Dryden alludes to them in *The Flower and the Leaf*.

NING-PO, nĭng′pō′ (Chin., Calm Waves). A treaty port in the Province of Che-kiang, China, on the river Tatsish, 12 miles from the sea (Map: China, F 6). The inclosed space is about five miles in circumference. The brick walls, 25 feet high and 22 feet thick at the base, are pierced by six gates. The city is famous for its temples, pagoda, stone bridges, and a library, the fourth in point of number of volumes in the Empire. The gold and silver work, confectionery, lacquer work, and carving are noted all over China. The Portuguese settled in 1522 in Ning-po, but were driven out in 1545 after a massacre, in which 800 out of 1200 Europeans were slain. The city was occupied by the British forces for six months in 1841-42, and was opened to foreign trade in 1842. It is an important centre of Christian missions. Ning-po has little direct trade and is principally a distributing station for Shanghai. Its total trade, chiefly imports, amounted in 1900 to more than $10,000,000. The principal articles of commerce are green tea, cotton, opium, silk, and sugar. Population, estimated at 255,000.

NIN′IAN, SAINT. The Apostle of the Picts. He lived in the latter half of the fourth and the beginning of the fifth century. Whether Christianity had been introduced among the Picts before the time of Ninian has been a subject of controversy. However this may be, it is certain that when Ninian appeared among them, the Picts were in the main a pagan people. He was a Briton, and of noble birth, but had been educated at Rome, and there ordained a bishop in 394. The exact time of his preaching in Scotland is unknown. His labors appear to have commenced in Cumbria, and to have extended over the greater part of the district as far north as the Grampian Hills, his see being fixed at Candida Casa, or Whithorn, in the modern Wigtonshire. His death is placed by the Bollandists in 432; his festival is September 16th. His *Life*, by Ailred, is in Forbes, *Historians of Scotland*, vol. v. (Edinburgh, 1874).

NINIGRET (c.1610-c.1677). A sachem of an Algonquian tribe of Indians, the Niantics. He assisted the English colonists in the Pequot war of 1637, but soon afterwards began to scheme for their expulsion or extermination. A visit to the Dutch on Manhattan Island in 1652-53 caused him to be suspected of plotting against the United Colonies, whose commissioners, in April, 1653, declared war against him, but were unable to prosecute it, owing to the opposition of Massachusetts. Ninigret, however, soon attacked the Long Island Indians, allies of the English, and the commissioners, after summoning him in vain to Hartford, sent Major Samuel Willard against him with a force of 310 men. Ninigret took refuge in a swamp, but subsequently (1662), in conjunction with several other chiefs, sold a large part of his territory to the colonists. Several of his successors from whom land titles were secured by Rhode Island were also called Ninigret.

NIÑO, nē′nyȯ, PEDRO ALONSO (c.1455-c.1505). A Spanish navigator, born at Moguer. He had sailed to the west coast of Africa several times in Portuguese vessels before 1492, when he became pilot of one of Columbus's three ships. In June, 1496, Niño sailed to Santo Domingo with supplies, and on his return nearly ruined the fortunes of Columbus by his braggadocio and his tardiness in reporting at court. After sailing on Columbus's third voyage, he planned with Cristóbal de la Guerra, a Spanish merchant, the first successful commercial voyage to the New World (1499). Niño died soon after his return, after having been accused of cheating the Crown of a part of its share in the profits of the voyage.

NINON DE L'ENCLOS, nē′nôɴ de läɴ′-klō′, or LENCLOS (1616-1706). A Parisian courtesan, remarkable for beauty, grace, and intellectual culture, as well as for keen wit. Her career began at sixteen. Among her many lovers were successively the Count de Châtillon, the Marquis de Villarceaux, the Marquis de Sévigné, the Marquis de Gersay, Marshal Condé, the Duc de la Rochefoucauld, Marshal d'Albret, Marshal d'Estrées, Abbé d'Effiat, Gourville, and La Châtre. She counted among her friends Queen Christina of Sweden, Madame Scarron (afterwards Madame de Maintenon), and Madame de La Fayette. Her salon seemed for a time a rival of the Hôtel de Rambouillet. Molière and Scarron are said to have taken literary counsel with her. Her beauty lasted into old age. Consult: Douxmesnil, *Mémoires* (Rotterdam, 1752); and the *Works* of Saint-Evremond (Amsterdam, 1706), but especially the contemporary 'portrait' in Mlle. de Scudéry's *Clélie* (Paris, 1556-60), where she figures as 'Clarisse.'

NIOBE, nī′ō-bē (Lat., from Gk. Νιόβη). In Greek legend, the daughter of Tantalus, King of Lydia, and (according to the most popular version) the sister of Pelops. She was the wife of Amphion, King of Thebes, and bore him many children, the numbers varying usually between twelve and twenty. In her pride she boasted her superiority to Leto, the mother of Apollo and Artemis. The angry goddess moved her children to avenge the insult, and Apollo with his arrows slew the sons, while Artemis killed the daughters in the palace. Niobe in her grief prayed the gods, who in pity transformed her into a stone image on Mount Sipylus in Lydia. The story appears in the epic, and was retold by tragedians, poets, and chroniclers with many divergencies in detail. The fullest version which has survived is by Ovid (*Metam.*, vi. 146 sqq.). Representations of the story on vases and reliefs are not numerous, but it is the subject of one of the most famous groups of ancient statues. Consult: Stark, *Niobe und die Niobiden* (Leipzig, 1863); Amelung, *Führer durch die Antiken in Florenz* (Munich, 1897).

NIO′BIUM (Neo-Lat., from Lat. *Niobe*, daughter of Tantalus; so called from its close resemblance to the metal tantalum, from Lat. *Tantalus*, father of Niobe). A metallic chemical element, same as columbium (q.v.).

NIOBRARA, nī′ō-brä′rȧ. A river rising in Laramie County, Wyo., flowing east through northern Nebraska, and emptying into the Missouri River at Niobrara, after a course of about 450 miles (Map: Nebraska, C 1). It is a shallow and rapid stream, and is not navigable. In its upper course it flows through a sandy region, after which it traverses a deep, rocky cañon; but in the lower part it winds through fertile bottom lands.

NIOBRARA STAGE. The name given to a division of the Cretaceous system (q.v.). The rocks, including sandstones, limestones, and chalks, are exposed in Kansas, South Dakota, and in the States farther westward, and attain a maximum thickness of 2000 feet.

NIORT, nyōr. The capital of the Department of Deux-Sèvres, France, on the Sèvre-Niortaise River, 49 miles by rail southwest of Poitiers (Map: France, F 5). Its chief points of interest are the Church of Notre Dame, with its famous tower and elaborate interior, the Church of Saint Andrew, Museum of Art and Natural History, Museum of Antiquities and the Public Garden. The inhabitants of the adjoining region are engaged in cattle-raising and farming, and the town has a large trade in gloves, oil, brushes, and leather; there are also extensive nursery interests. Niort dates from 1155; was under the rule of England for a short period; and as a Protestant stronghold endured many hardships during the Religious Wars. Madame de Maintenon was a native of Niort. Population, in 1901, 23,897.

NI′PA (Neo-Lat., from the native name). A genus of plants referred by most botanists to the order Palmæ. *Nipa fruticans*, the only species recognized, common in the East Indian Archipelago, is a low-growing tree, which flourishes with the mangrove in places inundated by the tide. It abounds in saccharine sap, from which a kind of palm wine and also excellent sugar are made. The leaves are employed for roofing and are exported from Tenasserim for this purpose.

NIPH'ER, Francis Eugene (1847—). An American electrical engineer and physicist. He was born at Port Byron, N. Y.; graduated from Iowa State University in 1870; and, after four years as instructor of physics in that institution, was chosen professor of physics and of electrical engineering in Washington University. Nipher organized the Missouri weather service (1877) and the Magnetic Survey of the State (1878); became a prominent member of the Saint Louis Academy of Science; and contributed to its *Transactions* articles on physics and meteorology. His more interesting researches include his proof that a photographic plate over-exposed may be developed as a positive, and that between positive and negative there is a zero value which cannot be developed.

NIPIGON, nĭp'ĭ-gŏn (or **NEPIGON**), Lake. A lake of Ontario, Canada, 35 miles north of Lake Superior (Map: Ontario, M 8). It is about 60 miles long from north to south, and 45 miles wide. A coast line with bold headlands and deep bays gives a total length of shore of 580 miles. It is 813 feet above Lake Superior. A great number of mountain streams flow into it, and its waters flow out through the Nipigon River, 40 miles in length, southward, to Nipigon Bay, an arm of Lake Superior. The lake is very deep, studded with islands, and well stocked with fish.

NIPISSING, nĭp'ĭs-sĭng (still-water place, or little-water place). An Algonquian tribe, formerly residing about the lake of the same name in Northern Ontario, Canada. When first known to the French, early in the seventeenth century, they were one of the most prominent and influential tribes of Canada, and were regarded by the Jesuit missionaries as the typical Algonquian tribe, and their language as the standard for the whole linguistic stock. On the destruction of the missions by the Iroquois about 1650 they were forced to fly to the north and west, almost to the extreme western end of Lake Superior. They afterwards returned and settled, some in their old country on the lake shores, others at the Three Rivers, and also with the Catholic Iroquois at the Lake of Two Mountains, near Montreal, where they still have a village. It is impossible to give any reliable statement of the past or present number of the Nipissing, as they are generally included in the estimates with the other tribes known collectively as Algonquian (q.v.). The Indians now on a reservation on Lake Nipissing are officially classed as Ojibwa (q.v.).

NIPISSING (or **NEPISSING**), Lake. A lake in Ontario, Canada, nearly midway between Lake Huron and the Ottawa River, with a length of about 55 miles, and a maximum breadth of 28 miles (Map: Ontario, D 1). Its waters are mostly received from the north through Sturgeon River, which connects it with a chain of smaller lakes. The only outlet is French River, by which the lake discharges into Georgian Bay, an inlet of Lake Huron. There are a number of small islands. The vicinity is inhabited by Indians. There is a regular steamer service on the lake, and its waters and shores are extensively resorted to for angling and shooting. Le Caron, a Récollet priest, was the first European to visit the lake, in 1614.

NIP'MUC (fresh-water people). A collective term for the small inland tribes of Algonquian stock formerly living in central Massachusetts and the adjacent sections of Connecticut and Rhode Island. Their chief seats were at the headwaters of the Blackstone and the Quinebaug rivers, and about the ponds of Brookfield. Their villages had no apparent political connection, and the various bands were subject to their more powerful neighbors, the Massachuset, the Wampanoag, the Narraganset, and the Mohegan, or even tributary to the distant Mohawk. There were seven villages of "praying Indians" among them in 1674, but on the outbreak of King Philip's War the next year almost all of them joined the hostiles, and at its close some of them fled to Canada or westward to the Mohican, and others to the districts about the Hudson.

NIP'PER, Susan. A character in Dickens's novel *Dombey and Son*, the nurse of Florence Dombey, sharp-tongued but faithful.

NIPPERDEY, nĭp'pēr-dĭ, Karl Ludwig (1821-75). A German philologist, born in Schwerin, September 13, 1821. He studied at the universities of Leipzig and Berlin, and after teaching in the former university, became professor at Jena, 1852. He published a number of translations and critical studies of Latin prose, among them works on Cæsar, Nepos, and the *Annales* of Tacitus. These works passed through many editions, the translation of Nepos having reached its tenth edition in 1896, and the translation of the *Annales* of Tacitus, with exegetical notes, having passed through the ninth edition in 1892. Consult Schöll's collection of his works, under the title of *C. Nipperdeii Opuscula* (1877), and the biography by the same author (1875). Nipperdey committed suicide, January 2, 1875.

NIPPLES. See Breast.

NIPPOLD, nĭ'pōlt, Friedrich (1838—). A German Church historian. He was born at Emmerich and studied at Halle and Bonn. After 1865 he served as professor of Church history at the universities of Heidelberg, Bern, and Jena. Nippold became a representative of liberal theology, and took a prominent lead in the modern Church movement. His numerous theological treatises include *Handbuch der neuesten Kirchengeschichte* (1857), which is his chief work, and *Amerikanische Kirchengeschichte* (1892).

NIP'PON, or **NIHON**, nē'hŏn'. The Japanese pronunciation of the name "Jih-pen" (sun-origin) given to 'Japan' by the Chinese. 'Japan' is a corruption of the same words. The name was employed first officially by the Japanese Government about A.D. 670. Before that time various high-sounding titles had been used, and two native names still survive in literature, 'Yamato,' strictly speaking, the name of a province, and 'O-mi-kuni' (Great August Country). 'Nippon' was misapplied by Occidentals for a time as the name of the largest island of the archipelago.

NIP'PUR (modern name, Nuffar). One of the most important cities of ancient Babylonia, situated on the northeast edge of the district now occupied by the Afej tribes of Arabs, between the Tigris and the Euphrates, about 100 miles southeast of Bagdad. The Talmud identifies it with Calneh (Gen. x. 10). Nippur was famous as the seat of worship of the god Bel (or En-lil), who at an early period acquired a unique position as the chief deity of the Babylonian Pantheon. This is indicated by his name, which signifies 'lord' par excellence. The close connection in ancient Babylonia between political supremacy and religious prominence justifies the supposition that for a considerable period Nippur, the city of Bel, also exercised control over at least a large portion of the Euphrates Valley. The religious sanctity of the place, however, outlasted its political history, and for many centuries after Nippur had yielded its political supremacy to other centres it continued to be a favorite place of pilgrimage, and the kings of both Babylonia and Assyria vied in rendering homage to the great Bel by restoring ruined portions of his temple. The chief temple was known as Ekur, 'Mountain House,' and there was also a stage-tower (*zikkurrat*), rising to a considerable height, with a shrine of Bel at the top. Besides Bel and his consort, Belit, other gods were worshiped at Nippur, and temples or shrines were erected to them, so that there came to be a large sacred complex, shut off from the rest of the city by a double wall.

Systematic explorations at Nippur have been conducted by the University of Pennsylvania, beginning in 1888 under the direction of the Rev. Dr. John P. Peters, the founder and organizer of the expedition, and continued at intervals till 1900. During 1893-96, and again in 1898-1900, the work was in charge of J. H. Haynes, who was joined in the field during the spring of 1900 by Prof. H. V. Hilprecht. As a result a considerable portion of the temple area and adjoining grounds has been laid bare, the character and plans of the ancient buildings have been determined, and a large number of inscriptions, historical and votive, as well as over 30,000 commercial and literary tablets, have been found. The larger number of the tablets were discovered in a section of the mound containing an edifice or edifices used for the legal and literary archives of the temple. Through the historical and votive inscriptions, of which two volumes have been published by Professor Hilprecht (*Old Babylonian Inscriptions, Chiefly from Nippur*, Philadelphia, 1893-96), the history of Nippur has been traced to a date, according to some, as early as c.4500 B.C., according to others to c.3200 or 3000 B.C. Much light has been shed on the general course of events from this early period down to the rule of the Kassites in Babylonia (c.1700-1200 B.C.), who appear to have been particularly attached to the cult of Bel of Nippur. A third volume by Professors Hilprecht and Clay (*Business Documents of Murashû, Sons of Nippur*, Philadelphia, 1898) consists of 120 tablets of a commercial character, illustrating business methods in Babylonia during the Persian period. Consult, besides the works already mentioned: Peters, *Nippur, or Explorations and Adventures on the Euphrates* (New York, 1897); Hilprecht, *Explorations in Bible Lands during the Nineteenth Century* (Philadelphia, 1903).

NIRGUA, nĕr'gwȧ. A town of the State of Carabobo, Venezuela, 110 miles southwest of Caracas (Map: Venezuela, D 2). It is situated in the richest district of the State, in a region producing coffee, cacao, sugar, tobacco, and cotton, as well as live stock. Nirgua was founded in 1554, and in 1565 rich gold deposits were discovered in the vicinity. The population of the municipality, in 1891, was 8394.

NIRUKTA, nȇ-rōōk'tȧ (Skt., explanation, from *nis*, out + *ukta*, p.p. of *vac*, to speak). The name of that one of the six *Vēdāngas* (see VĒDĀNGA) which explains difficult Vedic words. There must have been several works of this character in a remote period of Hindu antiquity, which bore the name Nirukta, for 'Nirukta authors' are quoted either generally or by name in several Sanskrit authors; but the work which is especially called *Nirukta*, and which, thus far, is the only surviving representative of this important division of the Vedangas, is that of Yaska, who was a predecessor of Panini (q.v.). His work consists of three parts—the *Nāighaṇṭuka*, where, for the most part, synonymous words are given; the *Nāigama*, which contains words that usually occur in the Vedas only; and the *Dāivata*, which contains words chiefly relating to deities and sacrificial acts. A commentary on this work has been composed by the same Yaska, and it likewise bears the name of Nirukta. In this, Vedic passages are quoted in illustration of the words to be explained, and the comment given by Yaska on these passages is the oldest known instance of a Vedic gloss. Besides the great importance which Yaska's *Nirukta* thus possesses for a proper understanding of the Vedic texts, it is valuable also on account of several discussions which it raises on grammatical and other questions, and on account of the insight it affords into the scientific and religious conditions of its time. The text and commentary of the *Nirukta* have been edited by Roth (Göttingen, 1852), and by Samassami, *The Nirukta, with Commentaries* (Calcutta, 1882-91).

NIRVANA, nȇr-vä'nȧ (Skt. *nirvāṇa*, extinction, from *nis*, out + *vāna*, a blowing, from *vā*, to blow). In Buddhistic doctrine, the term denoting final deliverance from transmigration. It implies, consequently, the last aim of Buddhism, since transmigration is tantamount to a relapse into the evils or miseries of *saṁsāra*, or the world. But as Hinduism, or the Brahmanical doctrine, professes to lead to the same end, the difference between *nirvāṇa* and *mōkṣa*, *apavarga*, or the other terms of Brahmanism designating eternal bliss, and consequent liberation from metempsychosis (q.v.), rests on the difference of the ideas which both doctrines connect with the condition of the individual after that liberation. According to the Brahmanical doctrine, man has a soul, and Brahma being the existing and everlasting cause of the universe, eternal happiness is to the Brahmanical Hindu the absorption of the soul into that cause whence it emanated, never to depart from it again. On the other hand, as the ultimate cause of the universe, according to Buddhism, is non-entity, the deliverance from transmigration is, to the Buddhists, the return to non-entity, or the absolute extinction of individuality. Buddhism acknowledges no soul. In Brahmanism the separate soul is reabsorbed into the All-soul. In Buddhism, individuality ceases. But to some Buddhists, as also to the Jains, nirvana became a term significant rather of emancipation, eternal blissful repose. Further changes naturally followed. We are told, for instance, that nirvana is quietude and identity, whereas samsara is turmoil and variety; that nirvana is freedom from all conditions of existence, whereas samsara is birth, disease, decrepitude, and death, sin and pain, merit and demerit, virtue and vice; that nirvana is the shore of salvation for those who are in danger of being drowned in the sea of samsara; that it is the port ready to receive those who have escaped the dungeon of existence, the medicine which cures all diseases, and the water which quenches the thirst of all desires. To Buddha, who received the term from earlier Hinduism and did not invent it, nirvana meant, first of all, the extinction of desire, of anger, of ignorance. Whether it was also synonymous with annihilation he refused to state, although this may be inferred.

The later Buddhistic interpretations show that it was impossible to retain the notion of a non-psychic individuality persisting after death, and that the goal of extinction steadily faded before the older and more permanent notion of eternal felicity in one form or another. The first of these later views is that which confounds with nirvana the preparatory labor of the mind to arrive at that end, and therefore assumes that nirvana is the extinction of mentality, or even of self-consciousness. The erroneousness of this view is based on the fact that the mind, even though in a state of unconsciousness, as when ceasing to think, or when speculating, is still within the pale of existence. Thus, to obviate the mistaken notion that such a state is the real nirvana, Buddhistic works sometimes speak of the "nirvana without a remainder of substratum" in contradistinction to the "nirvana with a remainder;" meaning by the latter expression that condition of a saint which, in consequence of his bodily and mental austerities, immediately precedes his real nirvana, but in which, nevertheless, he is still an occupant of the material world.

The second heterodox view of nirvana is that which, though acknowledging in principle the original notion of Buddhist salvation, clearly represents a compromise with popular prejudice. It belongs to a still later period of Buddhism, when this religion, in extending its conquests over Asia, had to encounter creeds which abhorred the idea of an absolute nihilism. This compromise coincides with the creation of a Buddhistic pantheon, and with the classification of Buddhist saints into three classes, each of which has its own nirvana; that of the two lower degrees consisting of a vast number of years, at the end of which, however, those saints are born again; while the absolute nirvana is reserved for the highest class of saints. Hence Buddhistic salvation is then spoken of, either simply as *nirvāṇa*, the lowest, or as *parinirvāṇa*, the middle, or as *mahāparinirvāṇa*, final and absolute extinction of individuality; and as those who have not yet attained to the highest nirvana must live in the heavens of the two inferior classes of saints until they reappear in this world, their condition of nirvana is assimilated to that state of more or less material happiness which is also held out to the Brahmanical Hindu before he is completely absorbed into Brahma.

When, in its last stage, Buddhism assumes an Adi, or primitive Buddha, as the career of the universe, nirvana, then meaning the absorption into this Buddha, ceases to have any real affinity with the original Buddhistic term, and becomes identified with the *mōkṣa*, or salvation by absorption, of the pantheistic philosophers. See also BUDDHISM and LAMAISM. Consult: Oldenberg, *Buddha, His Life, His Doctrine, His Order* (London, 1882); Hopkins, *Religions of India* (Boston, 1895); Dahlmann, *Nirvana, eine Studie zur Vorgeschichte des Buddhismus* (Berlin, 1896).

NI'SAN. In the Jewish calendar, the first month of the ecclesiastical year. See ABIB.

NISARD, nē'zär', DÉSIRÉ (1806-88). A French literary critic and historian, born at Châtillon-sur-Seine, Côte-d'Or. Nisard began literary life as a liberal journalist. He supported the July Monarchy after a brief period of vigorous radicalism as editor of *Le National* and fellow-worker of Armand Carrel. In 1835 he was made Supervisor of Normal Schools, and, with official promotions, grew yearly more conservative and even reactionary. From 1842 to 1848 he was Deputy, and, after temporary eclipse at the Revolution of 1848, recovered under Napoleon III. favor and office, which he used so servilely, in lecturing at the Collège de France, as to provoke student riots and require police protection (1855). In recompense for this he was made Commander of the Legion of Honor (1856), Director of the Normal School (1857), and Senator (1867). He had belonged to the Academy since 1850. His more noteworthy works are *Histoire de la littérature française* (1844-61); *Etudes* (1859); and *Nouvelles études* (1864). As critic he stands for classic as opposed to romantic ideals. He neglects the Middle Ages and the Renaissance, and regrets alike the perversity of the eighteenth century and the degeneracy of the nineteenth. His objective method and martinet spirit delighted only in the clear precision of the Classic School. Thus he is the opposite of Sainte-Beuve and the forerunner of Brunetière. Nisard died March 15, 1888, at San Remo. Consult his *Souvenirs et notes biographiques* (1888).

NISCEMI, nē-shä'mē. A town in the Province of Caltanissctta, Sicily, 30 miles southeast by south of the city of Caltanissetta (Map: Italy, J 10). A ruined castle is the chief object of interest. In 1790 the town suffered from an earthquake, the ground sinking in one place to the depth of 30 feet. Population (commune), 1881, 11,962; 1901, 14,689.

NISH, nēsh, or **NISSA,** nĭs'sȧ. The second city of Servia, situated on the Nishava, a tributary of the Morava, about 130 miles southeast of Belgrade (Map: Balkan Peninsula, D 3). It is fortified and divided into a Turkish and a Servian town. It is gradually assuming a European aspect. Its educational institutions include a gymnasium and a training school for teachers. Situated at the junction of the Vienna-Belgrade-Constantinople and the Nish-Saloniki railway lines, as well as at the converging point of several important roads, Nish is of great commercial and strategic importance. It was prior to 1901 the seat of the National Assembly. Population, in 1895, 21,524, including about 2000 Mohammedans.

Nish is the Niassus of the Romans, a prominent city, according to Ptolemy, and the birthplace of Constantine the Great. It fell in 1456 into the hands of the Turks, under whom it was an important stronghold. It was the scene of a severe defeat of the Servians by the Turks in 1809, and was captured by the Servians under Milan in 1878.

NISHAN EL-AAMAN, nĭ-shän′ ĕl ä-män′ (Ar. *nishān al-āman,* order of the best). A Tunisian order with one class founded by Mohammed-es-Sadok in 1859 in commemoration of the adoption of the Constitution.

NISHAN EL-IFTIKHAR, ĭf′tĭ-kär′ (Ar. *nishān al-iftihār,* order of honor). A Tunisian order of merit, civil and military, modeled on the French Legion of Honor, founded by Ahmed Bey. It has five classes. The decoration is a star with the Bey's monogram.

NISHAN EL-IFTIKHAR. A Turkish order, conferred on foreigners for services to the Turkish State. It was founded by Sultan Selim III. and renewed in 1827. The decoration is an ornate medallion with the Sultan's monogram suspended from the star and crescent.

NISHAN-I-IMTIAS, ē-ēm′tē-äs′ (Ar.-Pers. *nishān-i-imtiyās,* order of excellence). A Turkish order of merit conferred on civil and military officials who have displayed at least three of the qualities the names of which appear on the decoration: patriotism, zeal, bravery, and fidelity. It was founded in 1879 by Sultan Abdul Hamid.

NISHAN-I-SHEFKAT, ē-shĕf-kät′ (Ar.-Pers. *nishān-i-shifqat,* order of clemency). A Turkish order with three classes, conferred on women for services in war and in times of distress. It was founded by Sultan Abdul Hamid in 1878. The decoration is a sun with laurel wreath and star suspended from a crescent.

NISHAPUR, nish′ȧ-po͞or′. A town of Northeastern Persia, in the Province of Khorasan (Map: Persia, G 3). It is situated in a fertile and populous plain 40 miles west of Meshed, and is surrounded by half-ruined walls. It was formerly one of the most important cities of Persia, but has greatly declined. It still has some trade in turquoises. Population, about 11,000. Nishapur was the birthplace of Omar Khayyam.

NIS′IBIS (Lat., from Gk. Νίσιβις). The capital of ancient Mygdonia, the northeastern part of Mesopotamia. It was situated in a fertile district, and was of importance, both as a place of strength and as an emporium of the trade between the East and the West. Nisibis is mentioned in the cuneiform inscriptions under the name Nasibina. It seems to have been rebuilt by Seleucus, and during the Macedonian rule was known as *Antiochia Mygdoniæ.* It was taken in B.C. 149 by the Parthians, and in their wars with Rome changed hands more than once, being captured by Lucullus (B.C. 68) and again by Trajan (A.D. 116). After its third capture by Lucius Verus, A.D. 165, it remained the chief bulwark of the Roman Empire against the Persians, till it was surrendered to them by Jovian after the death of Julian in 363. Nisibin is still the name of a Turkish village near the ruins of the ancient city.

NISI PRIUS (Lat., unless before). A term applied to certain trial courts, consisting of one judge and a jury, which have jurisdiction for the trial of civil cases. The term originated in England through the practice of inserting in writs of venire (q.v.), by which jurors were summoned, a clause directing them to appear at the Court of Common Pleas at Westminster on a certain date, unless before (*nisi prius*) that time one of the judges in Eyre (circuit) should hold court in their county. It also became common, when cases from a distant county were commenced at Westminster, to fix a certain day on which they were to be tried unless before that time court was held in that county, and this was entered on the record, being known as the '*Nisi prius* clause.' This practice was sanctioned by the statute of 13 Edw. I., c. 30, known as the "Statute of *Nisi Prius.*" The sessions held by these circuit judges came to be known as *Nisi Prius* Courts, and this continued until after the sittings of the judges became fixed and certain, when the alternative phrase was omitted from the venire; and thereafter the use of the term as applied to the courts was gradually discontinued. To-day the cases tried before the judges of the King's Bench Division of the High Court of Justice in London are known as *nisi prius* actions, and this seems to be the only use of the term which has judicial sanction in England at present, although in the country districts the name is still popularly applied to the proceedings in the civil courts held in the various circuits under the Judicature Acts (q.v.). In a few of the United States the term is applied to certain civil courts, the sessions of which are held by judges who travel from one county to another, in a fixed circuit of several counties, during the year; but the original significance of the term has become obsolete. See CIRCUIT; COURT; JUDICATURE ACTS, and consult the authorities there referred to.

NISQUALLI, nĭz′kwȧ-lē. A Salishan tribe of North American Indians originally occupying the territory about the river of the same name at the southern end of Puget Sound, Washington. With the Puyallup (q.v.) and several smaller bands, all speaking dialects of the same language, they participated in the Medicine Creek Treaty of 1854 and were assigned to a reservation, but have recently been given industrial allotments and are now citizens. They subsisted chiefly upon wappato and camas roots, wild berries, and salmon. They lived in great communal houses of cedar planks and used cedar dugout canoes of elaborate workmanship and ornamentation. Slavery was a regular institution, and head-flattening was practiced, but not scalping. They buried their dead in canoes raised upon posts. They took part in the general Indian war in Washington in 1858. They number now only about 100 souls.

NIS′ROCH (Heb. *Nisrōk*). According to II. Kings xix. 37 (Is. xxxvii. 38), the god in whose temple Sennacherib was assassinated by his sons. No such god, however, has been discovered in the Assyrian pantheon, and the word is manifestly a corruption. It has been variously identified with Asshur, Nusku, and others, but most probably it represents Marduk, the chief of the later Babylonian pantheon. (See MERODACH.) For a like corruption, see NIMROD. Consult Cheyne, *Sacred Books of the Old Testament* (London, 1896, et seq.).

NISSA, nĭs′sȧ. A city of Servia. See NISH.

NIS'SEN, Heinrich (1839—). A German archæologist. He was born at Hadersleben, studied at Kiel and Berlin, and became professor of ancient history at Marburg (1869), Göttingen (1877), Strassburg (1879), and Bonn (1884). Nissen especially devoted himself to the critical study of early Roman history. He wrote *Kritische Untersuchungen über die Quellen der vierten und fünften Dekade des Livius* (1863), *Das Templum* (1869), *Pompejanische Studien* (1877), *Italische Landeskunde* (1883), and "Griechische und römische Metrologie" (1887) in Iwan Müller's *Handbuch der klassischen Altertumswissenschaft.*

NI'SUS (Lat., from Gk. Νῖσος, *Nisos*). (1) In Greek mythology, a King of Megara, and son of King Pandion of Athens. His daughter Scylla fell in love with Minos, King of Crete, when the latter, on his expedition against the Athenians, besieged Megara, and betrayed the city to him. She slew her father by cutting off a purple lock of hair, on the preservation of which his life depended, but Minos punished her treachery by dragging her after his ship and drowning her. She was changed into the bird called Ciris, in which form she was constantly pursued by Nisus, transformed into a sea-eagle. The legend is treated by Vergil in the *Ciris*, and by Ovid, *Met.*, viii. 145. (2) A companion of Æneas and friend of Euryalus, with whom he was slain in the war against Turnus.

NIT'HARD (c.795-843). A Frankish historian, son of Bertha, daughter of Charles the Great. He was a warrior and a statesman and sided with Charles the Bald in the quarrels between the sons of Louis the Pious. Nithard fought in the great three days' fight at Fontenoy in 841, and was killed two years after in a battle with the Northmen near Angoulême. His Latin history deals with the dissensions of the sons of Louis the Pious; it is valuable, but strongly partisan, and is remarkable as one of the few documents of the Middle Ages written by a layman. The work is edited by Pertz (Hanover, 2d ed., 1870). Consult: Pätz, *De Vita et Fide Nithardi* (Halle, 1865), and Meyer von Knonau, *Ueber Nithards vier Bücher Geschichten* (Leipzig, 1886).

NITHSDALE, nĭch'dāl, William Maxwell, Earl of (1676-1744). A Scotch Jacobite, the Willie of 'Kenmure's up and awa'.' He participated in the Jacobite rising of 1715. He was captured after Preston, and was rescued from the Tower by his wife, who took his place in prison while he escaped in her clothes. He made his way to Rome, where he joined the Pretender. The Countess of Nithsdale wrote the story of his escape published in the first volume of the *Transactions of the Societies of Antiquaries of Scotland.*

NITO'CRIS. A Queen of Egypt (Nitaqert, or Nitaqrit), the last ruler of the Sixth Dynasty. She was sister of Menthuophis, whom she succeeded, and whose murder she avenged by drowning all she suspected of connection with the plot, after having called them together for a feast. The third in size of the great pyramids was enlarged by Nitocris, and there she was buried. About her beauty legends grew up; the Greeks called her Rhodopis, translating the Egyptian epithet, red-cheeked; they argued she must have been a Greek, made her a courtesan, and told how the King married her, having fallen in love with her lost slipper—the earliest form of the legend of Cinderella. Another legend in the Middle Ages makes her a beautiful spirit who haunts the pyramid and drives men mad for the love of her.

NITRATE OF SODA. See Manures and Manuring.

NITRATES. See Nitric Acid.

NITRE. See Saltpetre.

NITRIC ACID (from Neo-Lat. *nitrum*, nitre, natron, Lat. *nitrum*, from Gk. *νίτρον*, *nitron*, *λίτρον*, *litron*, natron, of Semitic origin, cf. Heb. *neter*, natron, from *nātar*, to loose), HNO_3. A powerfully acid compound of hydrogen, nitrogen, and oxygen. Geber, in his *De Inventione Veritatis*, described a method of preparing the acid by heating potassium nitrate with alum and copper sulphate, and Glauber was probably the first to prepare it by the action of free sulphuric acid upon saltpetre (the acid was long known as '*spiritus nitri fumans Glauberi*'). In 1669 Mayow described nitric acid as containing two components, one from the air and one from the earth. In 1776 Lavoisier demonstrated that one of its constituents was oxygen, and in 1785 Cavendish showed the composition of the acid by synthesizing it from oxygen and nitrogen in the presence of water. However, the true composition of its molecule was not recognized until long afterwards, when chemists had realized that acids in general were compounds necessarily containing hydrogen. (See Chemistry.) Nitric acid does not occur in a free state in nature, but after thunder storms traces of it are found in rain water, and according to Boussingault, amounts of nitric acid up to 0.66 mg. to the liter have been found in the rain falling on the Alps. It occurs largely, however, combined in the form of alkaline nitrates, in Chile and elsewhere, the formation of the nitrates being supposed to originate in the putrefaction of nitrogenous organic matters: the latter are assumed to be converted into ammonia, and this to be oxidized in presence of the hydroxide of potassium, sodium, or calcium, into the corresponding nitrate. Nitric acid may be made by the action of strong sulphuric acid on the nitrate of sodium or potassium, the former being generally employed on a commercial scale on account of its cheapness. Cast iron retorts are charged with about 670 pounds of dry sodium nitrate, about 530 pounds of strong sulphuric acid are added, and heat is applied. The volatile nitric acid, on forming, passes into a series of large bottles provided with inlet and outlet tubes ('Woulff's bottles') and containing small amounts of water. Nitric acid is, however, not the only product, a certain amount of peroxide of nitrogen being formed at the same time. Some of this dissolves in the nitric acid, imparting to it a more or less intense red coloration. Another portion of the peroxide is caused to come into contact with moist air, in a tower attached to the last of the large bottles, and thus this portion of the peroxide is converted into nitric acid. Sodium sulphate remains as a by-product of the process in the cast-iron retorts. The acid product generally contains about 55 per cent. of nitric acid, the rest being water and small amounts of chlorine, iodic acid, oxide of iron, sulphuric acid, sodium sulphate, and peroxide of nitrogen, the non-volatile of these impurities being carried over mechanically during the process of distillation. Most of the impurities may be readily gotten rid of by a second distillation, the first portion of the distillate and a small last portion containing nearly all the impurities, while the large intermediate portion is practically pure, although it still contains a large percentage of water and a small amount of nitrogen peroxide. A third distillation, this time after mixing the liquid with an equal volume of concentrated sulphuric acid, yields a nitric acid of over 99.5 per cent. strength. To free this from peroxide of nitrogen, it is gently warmed, then removed from the source of heat, and a current of dry air is passed through it until the temperature has been reduced to that of the surroundings. Thus nitric acid is purified for use in chemical laboratories. For many purposes in the arts, however, the acid need be neither very strong nor very pure. Pure nitric acid is a colorless liquid with a specific gravity of 1.53 at ordinary temperatures. The pure acid, as well as its strong aqueous solutions, decomposes slowly under the influence of light, with formation of water, oxygen, and peroxide of nitrogen, the latter coloring the acid yellow. A similar decomposition, only more rapid, is effected by heat, at temperatures above 86° C. (187° F.). A given amount of nitric acid may be decomposed entirely by sealing it up in a glass tube and raising the temperature to 260° C. (500° F.). Under reduced pressures nitric acid may be distilled without decomposition; thus, it may be entirely freed from nitrous acid by several distillations under a pressure of 15 millimeters of mercury, at the temperature of 45° C. (113° F.).

Nitric acid is used in large quantities in chemical laboratories, in both analytical and synthetic work. Its uses in the manufactures are very extensive indeed. It is used in the manufacture of explosives, of coal-tar colors, and of commercial nitrates, including those of silver, lead, iron, aluminum, barium, and strontium. A mixture of nitric and hydrochloric acids is known as *aqua regia* (q.v.). Nitric acid is one of the most powerful oxidizing agents and in a concentrated state readily oxidizes sulphur, phosphorus, carbon, most metals, and many organic substances. The oxidation of turpentine, for example, when added to strong nitric acid, is rapid enough to be accompanied by an evolution of light and of heat of a very high temperature. The following may be mentioned among the *physiological effects* of nitric acid: the strong acid is a powerful caustic, staining the skin yellow and causing erosions and ulcers; even a 10 per cent. solution in water will cause swelling if applied to the skin. In highly dilute form the acid is sometimes administered internally, the effect being an improved appetite and an increased secretion of urine. If continued, however, the administration of the acid will cause the gums to turn spongy and to bleed, and will loosen the teeth. Whether given internally or employed in the form of baths, nitric acid will further cause dyspepsia, foul breath, headaches, debility, etc. It has been successfully given in cases of intermittent fever, to allay thirst in diabetes, and for a variety of other purposes. Externally it is used as an ingredient of gargles, in the treatment of chilblains, for the removal of warts, etc. Aqua regia is sometimes used for the same purposes as nitric acid alone. For a convenient method of detecting nitric acid, see below under *Nitrates.*

NITRATES. The salts of nitric acid, i.e. the compounds resulting from the substitution of metals for the hydrogen of nitric acid, are termed nitrates. The most important of these is *nitrate of silver,* $AgNO_3$, which is extensively used in photography and in medicine. It is made by dissolving metallic silver in gently heated 30 per cent. nitric acid, the pure salt crystallizing out on cooling. It may be purified by fusing, when the nitrates of other metals that are likely to be present are reduced and rendered insoluble, so that pure silver nitrate may be dissolved out of the fused mass on cooling. Silver nitrate is very soluble in water and dissolves in four times its weight of cold alcohol. It forms colorless tabular crystals of the rhombic system. It melts at 198° C. (388.4° F.) without decomposition; but if heated to redness it is reduced to metallic silver. Fused silver nitrate, usually in sticks rendered firm by the addition of a little potassium nitrate, or silver chloride, is used as a cauterizing agent, being commonly known as *lunar caustic.* When applied to the skin, silver nitrate combines with albumin to form an insoluble white albuminate of silver. When used, the sticks are moistened with water and rubbed over the surface of the skin. The nitrate is thus used in diphtheria, croup, chronic ulceration and simple inflammation of the larynx and trachea, simple chronic laryngitis, whooping cough, various forms of neuralgia, in various diseases of the eye, in erysipelas, for burns, etc. The stain left by it on the skin may be removed by the use of potassium cyanide. Internally nitrate of silver is sometimes given in certain diseases of the stomach and the heart and in bronchitis, and it has been found useful in certain diseases of the nervous system; for example, in paralysis and epilepsy. In cases of poisoning by silver nitrate, the patient should swallow a large amount of a solution of common salt, which transforms the nitrate into the insoluble and harmless silver chloride, and induces vomiting; the solution of salt should be followed by moderate amounts of milk. Nitrates of lead, iron, and aluminum are used in dyeing and calico printing. *Lead nitrate,* $Pb(NO_3)_2$, may be obtained by dissolving metallic lead, or oxide or carbonate of lead, in dilute nitric acid, the salt crystallizing out on slow evaporation. It is soluble in water, but is insoluble in strong alcohol. It is sometimes used in medicine, especially as an application for sore nipples. *Nitrate of iron,* or ferric nitrate, $Fe_2(NO_3)_6$, is likewise sometimes used in medicine, its solution being prepared by the action of nitric acid on freshly obtained moist ferric hydroxide. *Barium nitrate,* $Ba(NO_3)_2$, and *strontium nitrate,* $Sr(NO_3)_2$, are used in making fireworks. The nitrates of potassium and sodium will be found described under SALTPETRE. Nitric acid and its salts may be most readily detected in solutions by the use of the alkaloid brucine: a little brucine in solution and a few drops of strong sulphuric acid are added to the liquid under examination, which turns pink if it contains nitric acid or a nitrate. The nitrates also include a number of organic substances, the most important of which are nitroglycerin and guncotton (qq.v.). See also NITROGEN.

NI'TRIFICA'TION. The term applied to the formation of nitrates in soils and manures through the agency of micro-organisms. It includes three different stages, viz., (1) *ammonization*, the transformation of organic nitrogen compounds into ammonia; (2) *nitrozation*, or the conversion of ammonia into nitrites; and (3) *nitration*, or the formation of nitrates from the nitrites. Modern investigation has shown that all three of these changes are due to the activity of micro-organisms, the first being brought about by a variety of organisms of the putrefactive class, the most prominent being Bacillus mycoides and Proteus vulgaris, while the second and third are the work of specific organisms (*nitrosomas*, nitrous organisms, and *nitrobacteria*, nitric organisms), which have been isolated and studied with some minuteness. The retrograde action known as denitrification, by which nitrates are reduced to the less highly oxidized forms and even to free nitrogen, has also been shown to be the work of micro-organisms, mainly Bacillus denitrificans I. and II., although a large number of other organisms bring about denitrification. The first of the denitrifying organisms named works best in absence of oxygen; the second is aërobic and works most energetically in connection with Bacillus coli-communis. The discovery of the true nature of nitrification was made by Schloesing and Müntz in 1877. Since that date the nature of the organisms causing nitrification and the conditions best suited to their activity have been carefully studied by many other investigators. These studies have shown that the activity of the nitrifying organisms is limited by a certain range of temperature, viz. from slightly above freezing to about 50° C., the organisms being most active, according to Schloesing and Müntz, at a temperature of about 37° C. Other essential conditions are an adequate supply of air (oxygen), for which reason activity is generally confined to the surface layer of soil and moisture, and the presence of certain mineral plant food constituents, especially phosphoric acid and a salifiable base (lime as carbonate).

Nitrification will go on only in a slightly alkaline medium, but excessive alkalinity is as fatal to the process as acidity. Winogradsky, Warington, and Frankland have demonstrated the interesting fact that the nitrifying organisms do not require organic matter, but can grow in a purely mineral medium, deriving their carbon from carbon dioxide. The organisms are widely distributed and very abundant in all soils except such as are deficient in lime compounds and are acid. Müntz found them in abundance on the bare surfaces and in the cracks and fissures of rocks at the summit of mountains in the Pyrenees, Alps, and Vosges. They are also found in well water, river water, and sewage. As a rule they do not occur in rain or in the air. They decompose carbon dioxide most readily, and hence cause nitrification most rapidly in the dark.

While nitrification probably goes on to some extent during the winter, the conditions are usually most favorable to rapid nitrification during the summer months, especially in fields lying in bare fallow. The rate is of course very variable. Warington found it in an unfertilized Rothamsted soil to be 1.3 pounds of nitric nitrogen per day per acre to a depth of nine inches. Similar soil fertilized with sulphate of ammonia showed nearly twice this rate. Much higher rates than these have been reported. Ammonium salts, since they have already passed the first stage of nitrification, are considered more readily nitrifiable than organic substances which must first be converted into ammonium compounds. Müntz and Girard place them first in order of nitrifiability; then follow guano, green manures, dried blood and meat, powdered horn, poudrette, wool, and leather. Frequently, however, the rate of nitrification of ammonium salts is found to be much slower than that of organic manures. This may be due to a deficiency of lime or to other unfavorable conditions, but Withers and Fraps report experiments in which the order of nitrification of different fertilizing materials in presence of an abundance of calcium carbonate was: dried blood, cottonseed meal, dried fish, bat guano, tankage, ammonium sulphate, bone. A portion of the nitrogen of soil humus is readily nitrifiable, while a part strongly resists the action of nitrifying organisms. The rate of nitrification in barnyard manure in the soil is very variable, but is probably greater than that of soil nitrogen. The old-time nitre beds or plantations were simply examples of rapid nitrification under peculiarly favorable conditions.

The constant production of nitrates in the soil and the readiness with which they are washed out in the drainage furnish a strong argument in favor of the practice of a system of cropping which keeps the soil covered with vegetation as constantly as possible. The conditions favorable to denitrification are exactly the opposite of those which favor nitrification, viz. excess (and deficiency) of water and a limited supply of air (oxygen). Under certain conditions denitrification is especially rapid in barnyard manure and results in considerable losses of nitrogen from this material.

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NITRITE OF AMYL. See AMYL NITRITE.

NITRITES. The salts of nitrous acid (q.v.).

NITRO-BENZENE, or NITRO-BENZOL, $C_6H_5NO_2$. An aromatic nitro-compound manufactured from the benzene derived from coal-tar, and in its turn transformed into the aniline that is used in making dye-stuffs. Nitro-benzene is an oily yellow liquid of specific gravity 1.2 at 0° C. (32° F.) and boiling at 205° C. (401° F.); it may be distilled without decomposition. It has a sweet taste, is insoluble in water, but dissolves freely in alcohol and ether. Its odor is very similar to that of oil of bitter almonds, which has led to its use in perfumery, under the name of *essence of mirbane*. Most of the nitrobenzene of commerce is, however, transformed into aniline. On a large scale nitro-benzene is made by gradually adding a quantity of benzene to a mixture of concentrated nitric and sulphuric acid placed in a large iron vessel, the temperature being kept low by cooling with water, and the mixture being constantly stirred with the aid of some special arrangement with which the vessel is provided. After all the benzene has been added, the temperature is raised for a short time to about 80° C. (176° F.). Then the mixture is diluted with water and distilled with a current of steam. For laboratory purposes nitro-benzene may be purified by washing with dilute soda, drying, and subjecting to a process of fractional distillation. Nitro-benzene is a very poisonous substance, its vapors, if inhaled, being capable of causing coma and death in a few hours.

NITRO-CELLULOSES. See GUNCOTTON.

NITROGEN (from Neo-Lat. *nitrum*, nitre, natron, Lat. *nitrum* + Gk. *-γενής*, *-genēs*, producing, from *γίγνεσθαι*, *gignesthai*, to become). A gaseous element discovered by Rutherford in 1772, who found that when a small animal was allowed to breathe air in a confined space for a time, and the carbon dioxide thereby produced removed by absorption, a gas still remained which was incapable of supporting respiration. On account of its presence in nitre, Chaptal named it nitrogen (French *nitrogène*); and owing to its incapacity for supporting life, Lavoisier named it *azote* (1787). It is one of the most widely distributed of the elements, and is found free in the atmosphere, of which it forms about four-fifths by volume. Considerable quantities of it occur in volcanic gases and in the air-bladders of certain fishes, the bone cavities of birds, and in plants. It is likewise found in meteorites, and its presence has been demonstrated in the atmosphere of the sun. In combination it is found associated with oxygen as nitric and nitrous acids, with hydrogen as ammonia, and with oxygen, hydrogen, and carbon in many substances of organic origin. It is an essential constituent of animal and vegetable organisms, and is found in many minerals, as saltpetre and soda nitre. The separation from nitrogen of the other gases contained along with it in atmospheric air was considered a very easy matter before the discovery of argon (q.v.). In fact, the water-vapor of the air can be readily removed by the use of strong sulphuric acid or burnt lime or any other good dehydrating agent; the carbonic acid of the air can be removed by means of the caustic alkalies or alkaline earths; the oxygen can be removed by passing air over red-hot copper, by burning phosphorus in the air, and by similar methods. But argon is itself an inert substance that cannot be removed by any known chemical reagent. Nitrogen might possibly be isolated from it by liquefying the mixture and subjecting it to fractional distillation. But an easier and more certain way of obtaining pure nitrogen consists in causing it to be liberated from certain of its compounds. Thus pure ammonium nitrite breaks up, on heating, into pure nitrogen and water. Similarly, nitrogen may be obtained by heating a mixture of potassium nitrite and ammonium chloride, or by heating equal parts of potassium nitrite and ammonium sulphate with a mixture of three parts of water and two parts of glycerin.

Nitrogen (symbol, N; atomic weight, 14.04) is a colorless, tasteless, and odorless gas. By the application of pressure at low temperature (see CRITICAL POINT), nitrogen has been liquefied, and the liquid has been caused to freeze. In the gaseous state it is slightly soluble in water. It combines directly with but very few elements, although indirectly it can be made to form compounds with a large number of the elementary bodies. Nitrogen combines with oxygen to form the following five oxides: (1) *Nitrogen monoxide*, or nitrous oxide, N_2O, called also 'laughing gas,' was originally obtained by Priestley in 1772, by the action of moist iron filings on nitric oxide (NO). It is now usually prepared by the distillation of ammonium nitrate, and is a colorless gas of pleasant odor and sweetish taste. It is a valuable anæsthetic (q.v.), and is largely employed for producing insensibility during short operations. It may be considered as the anhydride of hyponitrous acid (q.v.). (2) *Nitrogen dioxide*, or nitric oxide, NO, was first obtained by Van Helmont, who failed, however, to recognize it as a distinct chemical substance. Its properties have been clearly known since 1772, when Priestley succeeded in isolating it, and its composition was correctly determined by Cavendish in 1784. It is formed when various substances (hydrogen, illuminating gas, wood, coal, etc.) are burned in the air. It may be prepared by the action of cold dilute nitric acid on metallic copper (concentrated nitric acid yields laughing gas). In the absence of oxygen it remains colorless; but it readily combines with oxygen to form red fumes of nitrogen tetroxide. Still, if heated alone to 520° C., nitric oxide decomposes with formation of laughing gas, free nitrogen, nitrogen trioxide, and nitrogen tetroxide. Solutions of ferrous salts absorb considerable quantities of nitric oxide. (3) *Nitrogen trioxide*, N_2O_3, may be obtained by heating nitric acid with starch in a large retort, drying the gaseous product over calcium chloride, and liquefying it by means of freezing mixtures. At 10°C. it is a dark blue liquid and it boils below 0° C. Within a few degrees above that point its vapors decompose into nitric oxide and nitrogen tetroxide. The decomposition, however, is partial, and even at as high as 150° C. the trioxide is not yet completely decomposed. The trioxide has been recommended as a disinfectant; for this purpose a mass containing one part of sodium nitrite, two parts of acid sodium sulphate, and two parts of gypsum, is kept dry when not used; on mixing it with water it yields the trioxide of nitrogen. Nitrogen trioxide is the anhydride of nitrous acid (q.v.). (4) *Nitrogen tetroxide*, or nitrogen peroxide, has the formula N_2O_4 at lower temperatures and NO_2 at high temperatures. (See DISSOCIATION.) The tetroxide is formed when dry nitric oxide comes in contact with oxygen. It may be prepared by passing a perfectly dry mixture of two parts (by volume) of nitric oxide and one part of oxygen into a U-tube immersed in a freezing mixture at —20° C., and if the mixture is absolutely dry the tetroxide is thus obtained in the form of colorless crystals. Above —20° C. it is usually a liquid of yellow color, the color becoming more and more intense as the temperature rises. The vapor is the more intensely colored, the more it is dissociated. (See DISSOCIATION.) The boiling-points of the liquid, as given by different observers, are between 22° and 28° C. (5) *Nitrogen pentoxide*, N_2O_5, was discovered by Sainte-Claire Deville in 1849. It may be prepared by the action of phosphorus pentoxide on nitric acid completely dehydrated by repeated distillations with sulphuric acid and freed from nitrogen trioxide by passing a current of dry air. The nitrogen pentoxide thus obtained is passed into a suitable receiver kept in a freezing mixture; when a crystalline mass has formed in the receiver, the portion remaining liquid is decanted off; then the crystals are allowed to melt, the liquid is again caused to solidify, and any portion remaining liquid is again rejected. By repeating this operation several times, it is easy to obtain perfectly pure nitrogen pentoxide. The colorless rhombic crystals of this substance may be preserved very long by keeping out of contact with the air and away from light. They melt at about 30° C. and the liquid boils at about 45° C., but slightly above this temperature the substance undergoes decomposition. If exposed for some time to the light the crystals melt and may decompose with explosive violence. Nitrogen pentoxide is the anhydride of nitric acid.

The compounds of nitrogen with hydrogen include ammonia, NH_3, hydrazine, N_2H_4, and hydrazoic acid, N_3H. The most important of the compounds of nitrogen with the halogens is nitrogen tri-chloride, NCl_3, which may be considered as ammonia in which all the hydrogen has been replaced by chlorine. It is prepared by passing chlorine gas into a warm solution of ammonium chloride. It is a yellowish, volatile, extremely explosive, oily substance, which must be handled with extreme caution and the preparation of which should not be undertaken by any one not thoroughly accustomed to experimenting with dangerous substances. Its explosion may be brought about by the action of heat or light, or by contact with phosphorus, turpentine, and other substances.

NITROGLYCERIN, or GLONOIN, $C_3H_5O_3(NO_2)_3$. An explosive substance discovered by Sobrero in 1846. Although Sobrero pointed out the possibilities of the substance as an explosive agent, it found no other than a limited use, in dilute alcoholic solution, as a remedy for headache, under the name of 'glonoin.' Its use as an explosive remained undeveloped until 1862, when Alfred Nobel (q.v.) discovered means of controlling its explosive properties and devised a practical method of making it on a large commercial scale. Nitroglycerin is made by running from 210 to 230 pounds of pure glycerin into 1500 pounds of mixed acids, consisting of three parts by weight of concentrated sulphuric, and two parts by weight of concentrated nitric acid. As considerable heat is set free by the reaction it is necessary that the glycerin should be added slowly and intimately mixed with the acids. This is accomplished by injecting the glycerin into the acid mixture, stirring the whole, and cooling it by means of cold water run through pipes which are coiled within the leaden vessel ('the converter') in which the conversion is carried out. When all of the glycerin is converted into nitroglycerin, the entire charge of the converter is run into a tank, where, on standing, the nitroglycerin separates in a layer on top of the acids. The nitroglycerin is then drawn off, washed with water until nearly free from acid, then with a dilute solution of sodium carbonate until it is neutral in reaction, and then run through a filter by which it is dried.

Pure nitroglycerin is a colorless, odorless, transparent oily liquid, but as made on a commercial scale it is colored various shades of yellow. Solidified nitroglycerin melts at 8° C. (46.4° F.). Its specific gravity in the liquid state is 1.599; when frozen, 1.735. It gives off vapors to a slight extent at the ordinary temperature, and it may be completely evaporated by continuous exposure at a temperature of 70° C. (158° F.). It is soluble in methyl alcohol, ethyl alcohol, ether, benzene, and many other organic liquids, but it is nearly insoluble in water. When the vapors of nitroglycerin are inhaled or the substance is taken into the stomach, it produces most violent headaches. Some persons are so sensitive to its action that they are poisoned by it when nitroglycerin touches the skin. The production of undecomposed vapor of nitroglycerin, when the substance is exploded, seriously interferes with its use in tunnels, mines, and other confined places. The common antidote is black coffee. Pure nitroglycerin will keep indefinitely at common temperatures; but if continuously exposed to temperatures above 45° C. (113° F.) it undergoes decomposition, which progresses the more rapidly the higher the temperature. At 180° C. (356° F.) it explodes violently. It is also decomposed by contact with sulphuric acid, or with an alkali, and decomposition due to the presence of acid has repeatedly given rise to accidental explosions of this substance. It may be exploded by percussion, concussion, or fire, but the surest and safest way of firing it is by exploding a detonator containing mercuric fulminate in contact with it.

The name nitroglycerin, as applied to the substance discovered by Sobrero, is a misnomer, and conveys a false impression as to its accepted constitution; for instead of being, as supposed when the name was given, a nitro-substitution compound, it has been shown by Berthelot to be a nitric ester, namely, the tri-nitrate of glyceryl ($C_3H_5O_3$), a radicle forming part of the molecule of glycerin.

Nitroglycerin is used directly in 'shooting' oil wells to make them yield more freely, and in blasting under water; but its liquid state renders it unsuitable and even dangerous for general use as an explosive. Its largest uses are in the manufacture of dynamite, blasting gelatin, and some varieties of smokeless powders, notably cordite and ballistite. Medicinally, nitroglycerin is used in a weak dilution to reduce arterial tension and relieve the heart of strain, by dilating the arterioles and capillaries. Its action is similar to, though less rapid and fugacious than that of amyl nitrate, and less persistent than that of the nitrite of sodium or potassium. It is employed in a certain type of asthma, in chorea, epilepsy, angina pectoris, and gastralgia. It has been recommended in certain forms of Bright's disease. Although the manufacture of nitroglycerin did not begin in the United States until 1867, and its progress was at first slow, in the year 1900 there were manufactured here 35,482,947 pounds, of which amount 31,661,806 pounds were used in the manufacture of dynamite, blasting gelatin, and smokeless powder. Consult: Mowbray, *Trinitro-Glycerin* (New York, 1874); Nobel, Roux, and Sarrau, *Les explosifs modernes* (Paris, 1876); Guttmann, *The Manufacture of Explosives* (New York, 1895). See EXPLOSIVES.

NITRO-HYDROCHLORIC ACID, NITRO-MURIATIC ACID, or AQUA REGIA. See AQUA REGIA.

NITROPH′ILOUS PLANTS (from Lat. *nitrum*, natron + Gk. *φίλος*, *philos*, loving, from *φιλεῖν*, *philein*, to love). Plants which thrive best in soils rich in nitrogenous materials. The term is objectionable, since it implies qualities about which there is great doubt. Certain plants found particularly in the neighborhood of manure piles have been supposed to prefer soils rich in nitrogenous substances, but the evidence upon which this based is very slight. It is, of course, true that all plants require nitrogenous food, which is particularly hard to get in certain cases, and especially in the case of plants which have no symbiotic fungus relation. It may be, therefore, that autophytes require larger amounts of nitrate of ammonia than do mycotrophic plants.

NITROUS ACID (from Lat. *nitrosus*, full of natron, from *nitrum*, natron), HNO_2. An acid compound of hydrogen, nitrogen, and oxygen, known chiefly by its salts, which are called *nitrites*. The acid itself is not known in an isolated state, being a very unstable compound; even in an aqueous solution rapidly decomposing into nitric acid and nitric oxide (NO). Nitrites, however, are very stable bodies and are usually formed by the reduction of nitrates. Small quantities of ammonium nitrite are found in our atmosphere, and other nitrites are contained in the juices of certain plants. In nature the nitrites are formed usually by the decomposition of organic matter, and generally indicate contamination with sewage. One of the most important nitrites is that of potassium, which is formed either by fusing potassium nitrate or by heating that salt with lead or copper. Certain organic compounds of nitrous acid are of considerable importance.

NITROUS ETHER, or ETHYL NITRITE, $C_2H_5NO_2$. A pale yellow fluid, lighter than water, and evolving an agreeable odor of apples. On evaporation, it produces a great degree of cold; it boils at 64.4° F. (18° C.), and it is very inflammable. It does not mix with water, but is readily miscible with alcohol. When kept in contact with water it soon decomposes, and an acid mixture of a very complicated character is formed. It is usually prepared by the action of nitric acid on alcohol. The *spirit of nitrous ether* or *sweet spirit of nitre* used in medicine is a mixture of nitrous ether with about four times its volume of rectified spirit. It is used, in conjunction with other medicines, as a diuretic, especially in the dropsy which follows scarlatina; and it is employed, in combination with acetate of ammonia and tartarized antimony, in febrile affections.

NITROUS OXIDE. Nitrogen monoxide, or laughing gas, N_2O. It is made by heating solid ammonium nitrate in a flask. The result is water and nitrous oxide, $NH_4NO_3=2H_2O+N_2O$. Laughing gas possesses the peculiar property of intoxicating animals. It may be inhaled pure or mixed with atmospheric air for a considerable period with safety. When first inhaled there is a feeling of exhilaration experienced, which is succeeded by profound anæsthesia, during which minor surgical and dental operations may be performed. There is no resulting depression, and in cases where the inhalation is not continued over twenty minutes the patient experiences absolutely no unpleasant sensations, and is able to go about his avocations without loss of time, on recovering consciousness. It is the custom with many American surgeons to secure anæsthesia by the use of nitrous oxide and then substitute ether as the anæsthetic, in all operations where over fifteen or twenty minutes are requisite for the completion of the work. This expedient prevents the nervous excitement consequent upon the administration of ether from the first, diminishes shock, and prevents much of the nausea consequent to ether anæsthesia. The term laughing gas is used because the patient is apt to laugh or exhibit other emotion if but a little gas is administered, and then the inhalation is intermitted. See NITROGEN.

NIT′TIS, GIUSEPPE DE (1846-84). An Italian painter, born at Barletta, Naples. He was a pupil of the Naples Academy, but found his style rather by diligent observation of nature, and in 1868 went to Paris, where he studied under Brandon, Gérôme, and Meissonier. After exhibiting genre scenes and landscapes he devoted himself chiefly to the painting of city views, the result of extensive travels, and distinguished for keen observation, elegant drawing, and extraordinary transparency of color. In 1878 he was awarded a first-class medal for a "Corner of Boulevard," "Triumphal Arch," a water color, and "In the Bois de Boulogne," a pastel. His frequent studies in the open air led him gradually to a conception of nature much akin to that of the Impressionists, and from 1879 on he cultivated especially the pastel. Of his Parisian views the "Place des Pyramides" (1876) and "Place du Carrousel" (1883) found their way into the Luxembourg Museum, and several genre scenes are in private collections in New York City and Philadelphia.

NITZSCH, KARL IMMANUEL (1787-1868). A German theologian. He was born at Borna, Saxony. He studied for the church at Wittenberg, where he took his degree in 1810, and where, in 1813, he became parish minister. In 1822 he was called to Bonn as ordinary professor of theology and university preacher. In 1847 he succeeded Marheineke at Berlin, and as professor, university preacher, and upper consistorial councilor, he exercised with prudence and moderation a wide ecclesiastical influence. He belonged to the school, of which Neander was the chief representative, which sought to reconcile faith and science by pointing out their distinctive spheres; in theology he subordinated dogma to ethics, and became one of the leaders of the *Vermittelungstheologie*. Besides numerous smaller treatises on dogmatics, the history of dogmas and liturgies, three larger works call for special mention: his *System der christlichen Lehre* (1829; 6th ed. 1851; Eng. trans., *System of Christian Doctrine*, Edinburgh, 1849); his *Praktische Theologie* (1847); and his *Predigten*, or sermons, of which several collections have appeared.

NIU-CHWANG, nū′chwäng′, or YING-TSE. The only treaty port of Manchuria, China, situated in the Province of Shing-king, about 13 miles from the mouth of the Liao River, which falls into the Gulf of Pe-chi-li, and on the southern branch of the Trans-Siberian line (Map: China, F 3).

It has greatly increased in importance since the construction of the Trans-Siberian line, and the recent Russian acquisitions in the southern part of the peninsula, which make Niu-chwang the only port of Manchuria open to foreign trade. The vicinity of Niu-chwang is not very productive agriculturally, but important coal mines have lately been opened along the railway line, and the city acquires additional importance from its railway connection with Tien-tsin and Peking. The chief exports are beans, bean cake, and oil, which go largely to Japan. The imports consist mostly of cotton goods, which come largely from the United States, petroleum, and opium. The value of the exports in 1900 was nearly $8,000,000, of which the exports to foreign countries amounted to about $2,700,000. The imports for the same year were valued at over $7,000,000, of which foreign imports amounted to over $5,000,000.

Niu-chwang has a considerable foreign colony, and many consular representatives, including two from the United States. The population of the city is estimated at 50,000. Niu-chwang, or rather the small town of the same name, about 40 miles from the coast, was opened to foreign trade by the treaty of 1858. The present port was taken by the Japanese in 1895, and was originally a part of the territorial concessions of China, but Japan was forced to relinquish it. Since the uprising of Manchuria against Russia in 1900 Niu-chwang has been occupied by Russia, and its administration is still to a large extent in Russian hands, although the date set for its evacuation (April 8, 1903) is passed.

NIUE, nē-ōō'ȧ, or SAVAGE ISLAND. A small coral island in the Pacific Ocean, situated about 350 miles southeast of the Samoan Islands, in latitude 19° S., longitude 170° W. Area, 36 square miles. It is 200 feet high, consisting of coral limestone, and has a fertile soil. The chief export is copra. Population, in 1901, 4050, all Christians. In 1900 Niue was taken under British protection as a dependency of New Zealand.

NIVELLES, nē'vĕl' (Flem. *Nyvel*). A town in the Province of Brabant, Belgium, 18 miles south of Brussels (Map: Belgium, C 4). Its most important edifice is the Romanesque Church of Saint Gertrude, dating from 1048 and containing interesting relics. Nivelles has manufactures of linen, cotton, and lace, and carries on an active trade in grain and live stock. The town grew up around the ancient convent founded in the seventh century by the daughter of Pepin of Landen. Population, in 1900, 11,475.

NIVERNAIS, nē'vâr'nâ'. A former province in the middle of France. It was ruled in the Middle Ages by the Counts of Nevers, who were succeeded by the Duke of Nevers. It is at present included almost entirely in the Department of Nièvre.

NIVÔSE, nē'vōz' (Fr., snow month). The fourth month in the French Republican calendar. It ran from December 21st to January 19th in the years I., II., III., V., VI., and VII.; from December 20th to January 20th in the years IV., VIII., IX., X., XI., and XIII.; and from December 23d to January 21st in the year XII.

NIX (Ger. *Nix*, OHG. *nichus*, *nikhus*, Icel. *nykr*, AS. *nicor*, water-goblin, water-beast, Eng. *Nick*, name of the Devil; connected with Gk. *νίπτειν*, *niptein*, Skt. *nij*, to wash). The common name for all water spirits in the Teutonic mythology. They are represented as of human form, or sometimes as passing into that of a a fish or of a horse. They love music and dances, and possess the gift of prophecy, like the Greek muses, sirens, and other water-gods. The nix taught, in return for a good gift, the art of playing on a stringed instrument; and in the evening sunshine the nixes, combing their long hair, were wont to mingle in the dances of mortals; but their company was dangerous, for, though sometimes wearing a mild appearance, they were more frequently cruel and malignant.

NIX'ON, JOHN (1733-1808). An American soldier. He was born in Philadelphia, and was the son of a shipping-merchant. Upon the passage of the Stamp Act, in 1765, he became active in opposing the encroachments of the English Government upon American liberties, signed the non-importation agreement, and was a member of the first committee of correspondence in Pennsylvania. In April, 1775, he became lieutenant-colonel of the 3d battalion of the 'Associators,' and he was also a member of the Committee of Safety. From May to July, 1776, he had charge of the defenses of the Delaware at Fort Island, after which he was placed in command of Philadelphia. On July 8th he made the first public proclamation of the Declaration of Independence from the steps of the Philadelphia Court House. He resigned from the army in 1780, and in the same year became a director of the so-called 'Bank of Pennsylvania.' Afterwards he assisted in organizing the Bank of North America, of which he was president from 1792 till his death in 1808.

NIXON, LEWIS (1861—). An American naval architect, born in Leesburg, Va. He graduated at the United States Naval Academy in 1882, being first in his class; then spent three years in the Royal Naval College, Greenwich, England, where he specialized in ship-building and graduated in 1885; and having been appointed naval constructor in the United States Navy, in 1884, went on several tours of inspection through European navy yards, before his return to America. He was superintending constructor of the navy at Cramp's shipyard and assistant constructor at the Brooklyn Navy Yard, and in 1890 designed the battleships of the *Indiana* class. When these vessels were contracted for by the Cramps of Philadelphia Nixon became their superintending constructor, resigning from the navy. Five years afterwards he left the Cramps and leased the Crescent Shipyard, Elizabeth, N. J., where, with only four hundred feet of water front, he built many vessels. He became connected with many other manufacturing concerns, and in 1898 was appointed president of the New York East River Bridge Commission. In 1901 he was named head of Tammany Hall, but resigned the post in May of the next year after five months' service. He became president of the United States Shipbuilding Company of New York City in 1902.

NIZA, *Sp. pron.* nē'thȧ, MARCOS, or MARCO DE, known as Fray MARCOS (c.1495-c.1550). An

Italian missionary and explorer in the service of Spain, born at Nice, whence his name. He became a Franciscan monk, was sent to America in 1531, and went first to Peru, then to Guatemala, and finally to Mexico. In 1539, under the immediate direction of Francisco Vasquez de Coronado, Governor of 'New Galicia,' he, accompanied by a number of natives and a negro, Estevanico (or Stephen), who had been with Cabeza de Vaca on his journey across the continent, made an extended journey of exploration into the Northwest to investigate the stories told by Cabeza de Vaca. He penetrated into territory now forming part of Arizona, thus earning the title 'Discoverer of Arizona,' by which he is sometimes known, and on his return made a report, *Descubrimiento de las siete ciudades*, in which he gives the first positive account of the Seven Cities of Cíbola. The exact route taken by Fray Marcos is not known, but it is fairly certain that he crossed Sonora and Arizona to the region of Zuñi, and that the seven cities to which he referred were Zuñi pueblos. After his return, Fray Marcos was made provincial of his Order, and in 1540-42 accompanied Coronado in the latter's famous expedition into what is now Arizona and New Mexico, as a result of which Fray Marcos's accounts of the great wealth of Cíbola were proved to be fabulous.

NIZAMI, nė-zä'mė (1141-1203). A Persian poet, whose full name was Nizam ed-Din abu Mohammed Ilyas. He was one of the canonic seven epic poets of Persia. His place of birth is uncertain; from his early home, Ganjah, he is called Ganjavi. The poet's early years were spent in asceticism, and his first poem, *Makhzān al-'asrār*, or 'Treasury of Mysteries,' is didactic in tone and strongly influenced by the Sufi poets, although it shows in the narrative parts traces of the *Shāh-Nāmah* of Firdausi. It was written when Nizami was forty. Soon after he wrote *Khusrū wa Shīrīn* (1180), which dealt with the love of Khusru Parwiz and his rival, the architect Farhad, for Shirin, an Armenian princess (possibly an Irene of Byzantium), and the Shah's success. The poem won Nizami high favor at court, which did not corrupt his independence. The *Dīvān*, a collection of ethical poems, dates from 1188. With the old theme of Laila and Majnun, a Bedouin tale of lovers separated by family feud, their brief joy on earth and their happy meeting in Paradise, the poet returned to his own field of the romantic epic. The *Iskandar-Nāmah*, an account of the legendary adventures of Alexander the Great, is an attempt to rival Firdausi; its latter part is ethical and makes Alexander a searcher for truth. In 1197 Nizami wrote his great romance, the *Haft Paikār*, or 'Seven Beauties,' in which seven princesses, the daughters of Behram Gur, each tell a story. Nizami died at Ganjah. His five poems called *Panj Ganj*, or the 'Five Treasures,' were prototypes of several quintuples or series of five. The *Makhzān al-'asrār* was edited by Bland (London, 1844); the *Khusrū wa Shīrīn* was translated by Hammer (Leipzig, 1809); the *Lailā wa Majnūn* was edited at Lucknow in 1888 and translated by Atkinson (London, 1836); the *Haft Paikār* was edited and translated by Erdmann (Kazan, 1844); the first part of the *Iskandar-Nāmah* has been edited repeatedly, as at Lahore in 1889, and translated by Clarke (London, 1881), and in part by Rückert (Nuremberg, 1824); the second part was edited by Sprenger (Calcutta, 1852-69). Complete editions of Nizami's works have been issued at Bombay in 1834 and 1839, and at Teheran in 1845. Consult Bacher, *Nizamis Leben und Werke* (Leipzig, 1872).

NIZAM'S DOMINIONS. A native State of India. See HYDERABAD.

NIZHNI-NOVGOROD, nyėzh'nyė nŏv'gŏ-rŏd. A government of Russia, bounded by the Government of Kostroma on the north, Vyatka, Kazan, and Simbirsk on the east, Penza and Tambov on the south, and Vladimir on the west. Area, about 20,000 square miles (Map: Russia, F 3). The government is divided by the Volga and the Oka into two parts, of which the northern is low, marshy, and covered with thick forests, while the southern is more or less elevated and intersected by many river valleys. The district is watered by the Volga, the Oka, the Vetluga, and a number of smaller rivers, most of them navigable. The climate does not differ essentially from that of other parts of Central Russia. The mean annual temperature is about 40°. Of minerals Nizhni-Novgorod has iron, alabaster, and various kinds of clay. Agriculture is the foundation of the economic life of the region. Rye and oats are the chief agricultural products. The forests cover nearly 40 per cent. of the total area.

In the development of the house industry the Government of Nizhni-Novgorod is inferior only to few parts of Russia. In the northern section wooden articles are the chief manufactures, while in the southern part locks, knives, and other small articles of iron are manufactured. Leather and leather products are manufactured all over the district. Large numbers of the inhabitants are also engaged in navigation. The factory system is only slightly developed. The census of 1895 gives for the Government of Nizhni-Novgorod 361 establishments, employing over 20,000 persons and yielding an output of over $10,000,000. The chief products are flour, machinery, chemicals, leather, spirits, etc. The commerce is practically confined to the capital, Nizhni-Novgorod. Population, in 1897, 1,600,304, including a considerable number of Mordvins (q.v.) and Tatars.

NIZHNI-NOVGOROD. Capital of the government of the same name, and a great commercial centre of Russia, situated at the confluence of the Oka with the Volga, 273 miles east of Moscow (Map: Russia, F 3). It consists of the upper town with the Kremlin, the lower town along the Oka and the Volga, and the fairgrounds with the adjoining suburb on a sandy tongue formed by the confluence of the two rivers and connected by a bridge with the town proper. The upper town, situated on hilly ground, contains the principal buildings—the Kremlin, surrounded by a wall dating from the sixteenth century and inclosing two cathedrals, the ancient palace now occupied by the Governor, the arsenal, and the law courts. The town has about 60 Greek Orthodox churches, a number of monasteries, a mosque, and an Armenian church. Among the ecclesiastical edifices are the church in the Monastery of the Annunciation, containing a holy image of great antiquity (933), which attracts many pilgrims, the thirteenth-century Cathedral of the Archangel, with a fine treasury, and the

Cathedral of the Transfiguration, rebuilt in 1834 and holding the tombs of the princes and princesses of Nizhni-Novgorod. The chief secular buildings are the palace of the Governor, the Museum of Art, housed in one of the Kremlin towers, and the theatre. The educational institutions include a theological seminary, an institution for the sons of noblemen, a military academy, two gymnasia, a *Realschule*, and a number of special schools.

The fair to which the city chiefly owes its fame and importance was transferred to Nizhni-Novgorod from Makariev (about 55 miles below the city) in 1817. The value of the merchandise brought annually to the fair averaged somewhat over $16,000,000 for the decade of 1817-26, about $96,000,000 for 1877-86, and about $89,000,000 for 1887-96. The construction of railways and the general modernization of commercial methods in Russia during the last part of the nineteenth century have naturally detracted from the importance of the fair. It is still, however, a great factor in the economic life of the country, and derives additional interest from the fact that it is the most important representative of a commercial system which is rapidly disappearing from civilized countries. The central industrial governments of Russia are represented at the fair by their different manufactures, the regions of the Lower Volga by fish, and that of the Kama by salt. The Caucasus sends petroleum, wine, and native manufactures; the southwestern governments, sugar; and the region along the middle course of the Volga, grain and lumber. From Siberia come furs, tallow, and oil; from China, tea; from Central Asia, furs and raw cotton; from Persia, fruit; and from Western Europe manufactures and groceries. The fair, which opens in the last week of July and lasts till about the middle of September, attracts over 100,000 merchants from every part of the Empire.

There are thousands of shops, the material of construction being stone, and a splendid fair palace was erected in 1890. The grounds are lighted by electricity and traversed by an electric railway line. The industries of the city are comparatively unimportant. The chief products are beer, locomotives, machinery, and candles. There are a number of important financial institutions. Population, in 1897, 95,100, which is increased during the fair to about 200,000.

The town was founded by the Grand Prince of Suzdal, Yuri Vsevolodovitch, in 1221. It was attacked repeatedly by the Tatars and the neighboring princes and suffered much from famine and pests. It was annexed to the Principality of Moscow about the close of the fourteenth century.

NIZHNI-TAGILSK, tȧ-gilsk′. An important mining and iron manufacturing centre in the Government of Perm, Russia, situated in the Ural Mountains, 88 miles northwest of Ekaterinburg (Map: Russia, J 3). In the vicinity are extensive iron, copper, gold, and platinum deposits and large iron foundries and steel mills. The first iron mill in this region was founded by Nikita Demidoff in 1725. Population, in 1897, about 30,000.

NIZHNI-TCHIRSK, chīrsk. A town in the territory of the Don Cossacks, South Russia, situated on the Don, 210 miles northeast of Novo-Tcherkask. It lies in a vine-growing district and has an important annual fair lasting for ten days. Population, in 1897, 15,196.

NJÖRD, nyẽrd. In Scandinavian mythology, the father of Frey. See ÆSIR; FREY.

NOACK, nō′äk, AUGUST (1822—). A German historical painter, born at Darmstadt. A pupil of Sohn, Lessing, and Schadow at the Düsseldorf Academy in 1839-42, he studied afterwards in Munich and Antwerp. In 1855 he settled in his native city and was appointed grand ducal court painter, and in 1871 professor at the Polytechnicum. Besides a "Visit of Landgrave Philip the Magnanimous to Luther" (Rostock Gallery), and "The Disputation at Marburg" (Darmstadt Gallery), he painted several fine altarpieces.

NOAH, nō′ȧ (Heb. *Nō(a)ch*). According to the Book of Genesis, the son of Lamech, who appears in the Old Testament in a double capacity: (a) the chief survivor of the Deluge, which involved the destruction of all mankind (Gen. vi.-ix. 17), and hence the second father of mankind; and (b) the first agriculturist to plant vines (ib., ix. 20-27). According to critical scholars, in the biblical study of Noah two traditions have been connected with him and combined, the one a story of a destructive flood which came to the Hebrews from the Babylonians (see DELUGE), the other a tradition as to the beginnings of civilization, of which 'wine' is a general symbol in the Old Testament. This second tradition belongs to the same category as the tracing of the arts to Tubal Cain and Jubal (Gen. iv. 21-22) and of the building of cities to Cain (ib., 17); it is of a 'scholastic' character, whereas the other rests upon popular mythology and legendary lore. The attachment of various originally independent stories to one and the same personage is a common phenomenon in the process of myth and legend formation. The hero of the Babylonian deluge story bears two names—Pirnapishtim ('source of life') and Atra-hasis or Hasis-atra ('very clever' or 'very pious'). Both names are symbolical, and it is possible that a connection with Noah appears in the character of the latter as the father of the new mankind—in this sense the 'source of life'—and in the description of Noah (Gen. vi. 9) as *ṣaddīk tāmīm*, 'pious exceedingly,' which is almost a literal translation of *Hasis-atra*. It is not absolutely certain, however, that the name of the hero in the Hebrew story was Noah. Gen. v. 29 suggests that it was Naham or Nahman.

NOAH, BOOK OF. See APOCRYPHA, section on *Old Testament*.

NOAH, MORDECAI MANUEL (1785-1851). An American journalist and politician, born in Philadelphia. He was appointed Consul-General at Tunis in 1813, at a time when the second war with England offered the Barbary Powers almost irresistible inducements to prey on American commerce. After his return to the United States the following year he edited the *National Advertiser* (a Democratic paper) and the *Courier and Enquirer*. He established the *Evening Star* in 1834, but soon withdrew from connection with the daily press and became one of the founders of the weekly *Sunday Times*. He held at various times the offices of sheriff of New York County, surveyor of the port of New York, and a judge of the Court of Sessions. He was a Jew, and in 1820 attempted to found a Jewish colony on Grand Island in the Niagara River. He wrote a number of dramas and other works, including

Travels in England, France, Spain, and the Barbary States (1819); and a *Discourse on the Restoration of the Jews* (1845).

NOAILLES, nō'ä'y'. A noble French family of Limousin, which dates from the eleventh century. Adrien Maurice, Duke de Noailles (1678-1766). A Marshal of France, born in Paris, the eldest son of Anne Jules, Duc de Noailles (1650-1708), who was Marshal also. The son bore the title of Count d'Ayen, entered the Musketeers in 1692, and served in Catalonia in 1694-95 and in Flanders in 1696-97. In 1715 the Duke entered the council of regency and became president of the Conseil de Finance, a post which he lost three years afterwards by his opposition to Law. After fifteen years of retirement, he received a command under the Duke of Berwick in the war of the Polish Succession, and in 1734, after his chief's death, was made Marshal of France. In the same year he captured Philipsburg, and in the next, at the head of the Sardinian forces, drove the Imperial army out of Italy. His last campaign was in the War of the Austrian Succession, and at Dettingen, in 1743, he was defeated. Entering the Conseil d'Etat, he took control of France's foreign policy, went to Madrid in 1746, prepared the campaigns of 1747 and 1748, and retired in 1756. His two sons, Louis (1713-93) and Philippe (1715-94), were also Marshals of France.—Louis Marc Antoine, Viscount de Noailles (1756-1804), born in Paris, was associated with Lafayette (their wives were sisters) in the aid given to the American colonies in their struggle for independence. In 1789, at the opening of the French States-General, he was a Deputy among the nobles representing Nemours, and made the memorable proposition for the abolition of titles and feudal privileges of all kinds. During the excesses of the Jacobins he went to the United States, but returned to France as soon as the persecution of the old nobility ceased, and a few years later was made brigadier-general in Santo Domingo, where he died from wounds received in the capture of an English sloop of war near Havana by one of the most remarkable feats of naval daring on record.—Paul, Duke de Noailles (1802-85), joined the Court of Louis Philippe in 1830. He published a *Histoire de la maison royale de Saint-Louis établie à Saint-Cyr* (1843) and a *Histoire de Mme. de Maintenon* (1848-50), and became a member of the Academy in 1849. His son, Jules Charles Victurnien (1826-95), devoted himself to the study of economics and published *Cent ans de république aux Etats-Unis* (1886-89).

NO AM'MON. The name given to Thebes, the capital of Upper Egypt, in the Hebrew text of Nahum iii. 8. The shorter form No occurs in Jer. xlvi. 25 and Ezek. xxx. 14, 15, 16. The Greek version has *μέρος Ἀμμων*, 'part of Ammon,' in Nahum, and elsewhere *Διοσπόλις* (*Diospolis*), the common later designation of Thebes; Jerome translated *Alexandria populorum*, probably influenced by the description of the city in Nahum as "situated among the rivers having the waters round about her, whose strength was the sea and water her walls." As the Assyrians called the city *Ni*, and the Egyptians themselves after the Twenty-first Dynasty called it Nt (probably pronounced *Ne-t*, *Ne*, with the feminine ending *t*; cp. early Coptic *Nē*), it is probable that the Hebrew consonants were also pronounced *Nē*. *Net* means 'city.' The addition of Ammon renders the reference to Thebes certain. Nahum probably thought of the capture and sack of Thebes by Assurbanipal in B.C. 663. See Thebes.

NOBBE, nŏb'be, Friedrich (1830—). A German agricultural chemist and plant physiologist, born in Bremen. He studied at Jena and Berlin, in 1861 became a professor in the Industrial School at Chemnitz, and in 1868 in the Academy of Forestry and Agriculture at Tharandt. There he established, with the assistance of the Agricultural Union of Leipzig, an experiment station for plant physiology. In 1869 he inaugurated scientific seed-testing, and the publication of the results of his investigations in this subject led to the system of European seed control, with its numerous stations conducted both independently and as branches of the agricultural experiment stations. Among his publications are *Ueber die organische Leistung des Kalium in der Pflanze* (with Schröder and Erdmann, 1871), and *Wider den Handel mit Waldgrassamen für die Wiesenkultur* (1876).

NO'BEL, Alfred Bernard (1833-96). A Swedish inventor and philanthropist, born at Stockholm. As a child he went with his father to Saint Petersburg, where he was educated. In 1850-54 he studied mechanical engineering in the United States as a pupil of the distinguished John Ericsson, and in 1863 took out the first patent for the manufacture of an explosive composed of nitroglycerin and common gunpowder. In 1864 he was granted a second patent. The use of nitroglycerin was for a number of years attended by such serious accidents that the preparation was very widely discarded. In 1867, however, Nobel invented dynamite, or giant powder, composed of 75 per cent. of nitroglycerin and 25 per cent. of kieselguhr, a finely pulverized siliceous material derived from the shells of fossil infusorians. This compound could be handled with less risk than could gunpowder, and was not influenced by heat or damp. In 1876 the inventor patented an improvement known as explosive gelatin. Further inventions by Nobel—the total number reported filed in Great Britain is 129—include ballistite, a propellent which was among the earliest of modern smokeless powders, and artificial gutta-percha. In 1875, by his own statement, he controlled fifteen dynamite factories in various parts of the world, including those near San Francisco and New York City, in the United States. Much of his experimentation in his later years was conducted in his great laboratory at San Remo, near Nice. He subscribed half the amount necessary for the equipment of the aëronaut Salomon Andrée, and gave much to general charities, but is best known as the founder of the Nobel prize fund of $9,200,000 (reduced by taxation to about $8,400,000), the annual interest on which is yearly to be divided into five equal parts, to be distributed to the five most deserving persons in as many departments of human activity. Award is made for (a) the most important invention or discovery in physics; (b) the most important discovery or improvement in chemistry; (c) the most important discovery in physiology or medicine; (d) the most remarkable literary work of an idealistic nature; and (e) the most or best work done in the interests of universal peace. The first four prizes are awarded by the Academies of Sweden, the fifth by the Norwegian Storthing. The first awards were announced on December 10, 1901: In physics, to Wilhelm Röntgen, of Munich University, Germany, discoverer of the Röntgen rays; in chemistry, to J. H. Van 't Hoff, of Berlin University, founder of a new system of stereo-chemistry; in physiology and medicine, to Emil Behring, of Marburg University, discoverer of anti-toxin for diphtheria; in literature, to Armand Sully-Prudhomme, of the French Academy, author of *Justice* (1878) and other poems, and *De l'expression dans les beaux-arts* (1884) and other prose works; in peace work, divided between Henri Dunant, prime mover of the Geneva Convention, and Frédéric Passy, founder of the Universal Peace Union.

NOBILITY (OF. *nobilite*, *nobilited*, Fr. *nobilité*, from Lat. *nobilitas*, nobility, from *nobilis*, noble, from *noscere*, to know; connected with Gk. *γιγνώσκειν*, *gignōskein*, Skt. *jñā*, to know, and ultimately with Eng. *know*). A class possessing by hereditary transmission social rank and privileges, and often political privileges as well, greater than those belonging to the mass of the people, and aristocracy of birth or privilege. In the most primitive societies, when the stronger and abler men became chiefs of tribes or clans there was frequently a body of supporters who acquired prestige from the power of their leader. The ancient empires—Egypt, Babylonia, Assyria—which had developed out of earlier tribal conditions, had a noble class, priests and warriors, surrounding and upholding the throne, except when the aristocracy became too strong and ambitious and overthrew the despot who trampled on its privileges. In the empires acquired by conquest the warriors who had shared success for the conqueror became through his gratitude or his necessity a special caste, above the conquered, and handed down to their descendants the privileges they had won. In more advanced stages of society wealth or political influence have often purchased rank for their possessors, and in the highest civilization intellectual ability has been rewarded by hereditary rank. There was another type of nobility in ancient Athens and Rome, where a population early in possession retained privileges above all other comers, forming at once parties and privileged orders in the State—the eupatrids and the patricians. Among the ancient Germanic tribes class distinctions went back to the beginnings of the race, for at our first knowledge of them they were divided into nobles, freemen, and slaves. The constant warfare of centuries had effaced these distinctions to a considerable extent at the time of the Germanic invasions. The nobility of the nations of modern Europe has its origin in the feudal aristocracy. See FEUDALISM.

The Frankish Kingdom in Gaul was divided into governments, each under the authority of a chieftain called a count or *comes*—a designation derived from the *comes* of the Roman Empire—whose Teutonic equivalent was *graf*, an official of the Crown in the time of Charles the Great, but acquiring in the later confusion hereditary rights. (See COUNT; GRAF.) A higher dignity and more extensive jurisprudence was conferred on the *dux* or duke (q.v.), a term also of Roman origin, and implying the duty of leading the armies of the country. In the Lombard Kingdom of Italy the same term was applied to the great officers who were intrusted with the military and civil administration of cities and their surrounding provinces. The marquis (q.v.) was the guardian of the frontier marches. (See MARCH.) In the subinfeudations of the greater nobility originated a secondary sort of nobility, under the name of vavasours, castellans, and lesser barons; and a third order below them comprised vassals, whose tenure, by the military obligation known in England as a knight's service, admitted them within the ranks of the aristocracy. In France the allegiance of the lesser nobles to their intermediary lord long continued a reality; in England, on the other hand, William the Conqueror obliged not only his barons, who held in fief of the Crown, but their vassals also, to take an oath of fealty to himself; and his successors altogether abolished subinfeudation. (See BARON; KNIGHT.) In Continental Europe, the nobles, after the tenth century, assumed territorial names from their castles or the principal town or village on their demesne; hence the prefix *de*, or its German equivalent *von*, still considered over a great part of the Continent as the criterion of nobility or gentility. In England, on the contrary, many of the most distinguished family names of the aristocracy had no territorial origin. In the later Carolingian Empire the powerful nobles encroached more and more on the royal authority; and in course of time many of them openly asserted an independence and sovereignty with little more than a nominal reservation of superiority to the King. By the end of the ninth century the Empire had been parceled into separate and independent principalities, under the dominion of powerful nobles. During the entire history of the Holy Roman Empire the Crown never succeeded in vindicating its power against the feudal princes. In France the royal authority gradually revived under the Capetians, the great fiefs of the higher nobility being one by one absorbed by the Crown. In England the resistance of the nobles to royal encroachments was the means of rearing the great fabric of constitutional liberty. All those who, after the Conquest, held *in capite* from William belonged to the nobility. Such of them as held by barony (the highest form of tenure) are enumerated in Domesday. Their dignity was territorial, not personal, having no existence apart from baronial possession. The *comes* was a baron of superior dignity and greater estates; and these were in England the only names of dignity till the time of Henry III. The rest of the landholders, who held by other tenures than barony, also belonged to the nobility or gentry.

After the introduction of heraldry, and its reduction to a system, the possession of a coat of arms was a recognized distinction between the noble and the plebeian. On the Continent the term noble still generally refers to those to whom or their ancestors arms have been granted. In England it is now more common to restrict the words noble and nobility to the five ranks of the peerage constituting the greater nobility, and to the head of the family, to whom alone the title belongs. Gentility, in its more strict sense, corresponds to the nobility of Continental countries.

The higher nobility, or nobility in the exclusive sense, of England, consists of the five temporal ranks of the peerage—duke, marquis, earl, viscount, and baron (in the restricted signification of the word), who are members of the Upper House of Parliament. See PARLIAMENT.

The once powerful feudal nobility of France had been reduced in the time of Louis XIV. to a mere aristocracy of courtiers through the steady growth of the royal power. Immediately before the Revolution 80,000 families claimed nobility, many of them of obscure station, and less than 3000 of ancient lineage. The Revolution overthrew all distinction of rank. On June 18, 1790, the National Assembly decreed that hereditary nobility was an institution incompatible with a free State, and that titles, arms, and liveries should be abolished. Two years later the records of the nobility were burned. A new nobility was created by the Emperor Napoleon I. in 1808, with titles descending to the eldest son. The old nobility was revived at the Restoration. All marquises and viscounts are of pre-Revolution titles, none having been created in later times.

Commercial pursuits have in different countries been considered more or less incompatible with nobility. In England this was less the case than in France and Germany, where for long a gentleman could not engage in any trade without losing his rank. A sort of commercial 'Bürger-Adel,' or half-gentleman class, was constituted out of the patrician families of some of the great German cities, particularly Augsburg, Nüremberg, and Frankfort, on whom the emperors bestowed coats of arms. (See FUGGER; WELSER.) In semi-feudal Italy there was on the whole less antagonism between nobility and trade than north of the Alps. The aristocracy of Venice had its origin in commerce; and though untitled, they were among the most distinguished class of nobles in Europe. On the other hand, in Florence, in the fourteenth century, under a constitution purely mercantile, nobility became a disqualification from holding any office of the State. In order to be admitted to the enjoyment of political honors the nobleman had to be struck off the rolls of nobility; and an unpopular plebeian was sometimes ennobled in order to disfranchise him. A little later there grew up, side by side with the old nobility, a race of plebeian nobles—as the Ricci, the Medici—whose pretensions were originally derived from wealth, and who eventually came to be regarded as aristocrats by the democratic party.

In Spain the term *hidalgo* (*hijo d'algo*, son of somebody, not *filius nullius*) indicates nobility. The hidalgo alone has in strictness a right to the title *don*, which, like *sir* of the British knights and baronets, requires the adjunct of the Christian name. When the Christian name is omitted the title *señor* instead is prefixed with the addition of *de*. Members of the higher nobility bear the title of grandee (q.v.); formerly the title was *rico-hombre*, and the ceremonial of creation consisted in granting the right of assuming the pennon and caldron (*peñón y caldera*)—the one the rallying ensign of command, the other of maintenance of followers. In contradistinction to the grandees, the class of nobility below them are called *los titulados de Castilla*.

In Russia what nobility existed before Peter the Great was of a partriarchal, not a feudal, kind (see BOYAR), but, in his anxiety to assimilate everything to a Western standard, the Czar took the existing aristocracies of States quite differently situated as the model to which to approximate the fortunate of his own subjects. Consult: Ménestrier, *Les diverses espèces de la noblesse* (Paris, 1683); id., *Le blason de la noblesse* (ib., 1683); Escherny, *Essai sur la noblesse* (ib., 1814); Duvergier, *Mémorial historique de la noblesse* (ib., 1839-40); Magny, *Le nobiliaire des maisons nobles de l'Europe* (ib., 1854-94); Kotzebue, *Vom Adel* (Leipzig, 1792); Laine, *Noblesse de France* (Paris, 1825-50); Langlois, *Les origines de la noblesse en France* (ib., 1902); Cerini, *La noblesse allemande et ses origines* (ib., 1899); Stranz, *Geschichte des deutschen Adels* (new ed., Waldenburg, 1851); Rose, *Der Adel Deutschlands* (Berlin, 1883); Vehse, *Geschichte des österreichischen Hofs und Adels* (Hamburg, 1851); Gneist, *Adel und Ritterschaft in England* (Berlin, 1853); Lawrence, *On the Nobility of the British Gentry* (London, 1824; 4th ed. 1840).

NOBLE, nō'b'l, ALFRED (1844—). An American civil engineer, born at Livonia, Wayne County, Mich. He served during the Civil War in the Army of the Potomac (1862-65), graduated at the University of Michigan in 1870, and in that year began practice as a civil engineer. From 1882 he devoted his attention to bridge engineering. He was resident engineer of the Washington Bridge, New York City, the Cairo (Ill.) Bridge over the Ohio, and the Memphis (Tenn.) Bridge over the Mississippi; and assistant chief engineer of the bridges over the Missouri at West Alton (Mo.), and Leavenworth (Kan.), and over the Mississippi at Alton (Ill.). In 1895 he was appointed a member of the Nicaragua Canal Board, from 1897 to 1899 was a member of the United States Board of Engineers of deep waterways, to make surveys and prepare plans and estimates in connection with a ship-canal route from the Great Lakes to the Atlantic seaboard, and from 1899 to 1901 was on the Isthmian Canal Commission. He became president of the Western Society of Civil Engineers in 1898. His writings include papers contributed to the *Proceedings* of the Chicago Academy of Sciences, and of the Western and American Societies of Civil Engineers.

NOBLE, Sir ANDREW (1832—). A Scottish physicist and artillerist, born at Greenock and educated at the Edinburgh Academy and the Royal Military Academy, Woolwich. In 1858 he was appointed secretary to the Committee on Rifled Cannon, and to the Plates and Guns Committee in 1859, when he was also made assistant inspector of artillery. In 1860 he left the public service to enter that of Sir W. G. Armstrong at the Elswick Arsenal. There he had wider opportunities for experimental research, and his invention of the chronoscope in 1862, which made possible the measurement of the initial velocity produced by various powders, led to an increase in the substitution of rifles for smooth-bores. In 1900 Captain Noble was a member of the committee appointed by the Government to inquire into the properties of smokeless powder. Besides foreign honors, he received the Royal Society medal in 1880, was knighted in 1893, and made a baronet in 1902.

NOBLE, FREDERICK ALPHONSO (1832—). An American Congregational clergyman, born in Baldwin, Me. He graduated at Yale in 1858 and at Andover Theological Seminary in 1861. His first pastoral charge was in Saint Paul, Minn., where he remained for six years. After occupying churches in Pittsburg, Pa., and New Haven, Conn., he was called to the Union Park Church, Chicago, in 1879, and preached there until his resignation in 1901. His publications include: *Divine Life in Man* (1896); *Discourses on Philippians* (1897); and *Our Redemption* (1898).

NOBLE, John Willock (1831—). An American lawyer and Cabinet officer, born at Lancaster, Ohio. After a year at Miami University, he entered Yale, where he graduated in 1851. He then studied law at Columbus and Cincinnati, removed to Saint Louis in 1855, and a year later settled in the practice of his profession at Keokuk, Iowa. There he took a prominent part in politics, and in 1859-60 was city attorney. In 1861 he enlisted in the Third Iowa Volunteer Cavalry as a private, gradually rose to the rank of colonel, and was brevetted brigadier-general at the close of the war. Settling again at Saint Louis after the war, he was United States District Attorney for the eastern district of Missouri from 1867 to 1870. He was Secretary of the Interior in the Cabinet of President Harrison from 1889 to 1893, after which he resumed his law practice in Saint Louis.

NOBLESVILLE, nō′b'lz-vĭl. A city and the county-seat of Hamilton County, Ind., 22 miles north by east of Indianapolis; on the White River, and on the Chicago and Southeastern and the Lake Erie and Western railroads (Map: Indiana, C 2). It is the centre of an agricultural section, and has a valuable supply of natural gas. Among its industrial establishments are a strawboard mill, foundries, enameling works, carbon works, flouring mills, grain elevators, etc. Settled in 1824, Noblesville was incorporated first in 1839. The government is administered under a charter of 1890, which provides for a mayor, elected every four years, and a unicameral council. Population, in 1890, 3054; in 1900, 4792.

NO-BODY CRAB, or Sea-spider. See Pantopoda.

NOBUNAGA, nō′bōō-nä′gȧ (1533-82). A Japanese soldier and ruler, who brought order out of anarchy in the latter half of the sixteenth century. Born of an humble family, he was free from the hatreds and jealousies of the nobles, and won his way by his own powers as an intrepid and skillful soldier. He was victorious in many contests, and, notably, he humbled the militant Buddhist priests, destroying two strongly fortified monasteries and putting the monks to the sword. Buddhism never regained its political power. As an aid in the contest with Buddhism he welcomed the Jesuit missionaries, his own son becoming a Christian. But his favor was wholly for political purposes. Nobunaga was a jovial, pleasure-loving man, a patron of the fine arts and of wrestling. His private life was stained not only by the vices common to the military men of his age, but by treachery. In consequence of his failure to respect a pledge given by one of his lieutenants he was assassinated, his murder being speedily avenged. In a desperate age Nobunaga began the work which was carried to its completion by his greater successors, Hideyoshi (q.v.) and Iyeyasu (q.v.). Consult: Brinkley, *Japan* (Boston, 1901); Griffis, *The Mikado's Empire*, new ed. (New York, 1883).

NOCERA DE' PAGANI, nō-chā′rȧ dā pȧ-gä′nē. A city in Italy. See Nocera Inferiore.

NOCERA INFERIORE, ĕn′fȧ-rē-ō′rȧ, or Nocera de' Pagani. A city in the Province of Salerno, Italy, 20 miles east by south of Naples by rail (Map: Italy, F 11). It is the see of a bishop, has a cathedral, ruins of a castle, formerly an Angevine stronghold, and large modern factories of linen and woolen goods. The town was the ancient Nuceria Alfaterna, destroyed by Hannibal in 216 B.C., but rebuilt by Augustus. Population (commune), in 1881, 15,858; in 1891, 19,796.

NOC'TES AM'BROSIA'NÆ (Lat., ambrosial nights). The name of a long series of critical, political, and poetical disquisitions in dialogue published in *Blackwood's Magazine* from 1822 to 1835, purporting to be the word-for-word report of the meetings at Ambrose's Tavern, Edinburgh, and elsewhere, of several of the literary celebrities of the day. For the first three years they were the work of many hands, but after 1825 they were mostly by 'Christopher North,' John Wilson (q.v.). The scheme was evidently taken from the symposia of the ancients. The *Noctes* had an immense vogue, but they are now little read. Their great creation is the character of the Ettrick Shepherd, an idealized portrait of James Hogg (q.v.).

NOCTILUCA (Lat., that which shines by night). An enormous monad-like form representing the order Cystoflagellata, of the class Mastigophora (q.v.). It is a highly phosphorescent organism, so small as to be scarcely seen with the naked eye, being from ¼ to 1 mm. (.01 to .04 inch) in diameter, and occurs in great numbers on the surface of the sea, including American harbors. It has a nearly spherical, jelly-like body, with a groove on one side, from which issues a curved filament or flagellum, used in locomotion. Near the base of this flagellum is the mouth, having on one side a tooth-like projection. Connecting with the mouth is a short œsophagus or gullet, which passes into the digestive cavity, in front of which lies a nucleus. Beneath the outer skin or firm membrane surrounding the body is a gelatinous layer, containing numerous granules. The young result from a division or segmentation of the entire mass of the protoplasm of the body, forming small oval bodies with a long lash. The germs or zoöspores are somewhat like those of other flagellate infusoria, but very unlike the adult.

The only other representative of this order is *Leptodiscus medusoides*, which darts through the water by the contractions of its umbrella-shaped body. It was discovered at Messina, but has not yet been detected in American waters.

NOCTU'IDÆ (Neo-Lat. nom. pl., from Lat. *noctua*, night-owl, from *nox*, night). A large and important family of moths, containing all of those forms known as owlet moths (q.v.). Their larvæ include the cutworms (q.v.).

NOCTURNE, nŏk-tûrn′ (Fr., night piece). The name given by John Field (q.v.) to a composition of a soft, dreamy character somewhat free in form. The greatest master of the nocturne is Chopin, who has filled this form with the loftiest contents.

NODDY (probably from *nod*, OHG. *hnoton*, *nuoton*, dialectic Ger. *notteln*, to shake). A brownish black tern (*Anous stolidus*) widely diffused in both hemispheres, and familiar to sailors, as it not infrequently alights on vessels, and suffers itself to be taken by the hand. At its breeding-places also, where not accustomed to the visits of man, it scarcely gets out of the way, and the female sits undisturbed on the nest; hence it commonly shares with the booby the reputation of unusual stupidity. The noddy is rare in the North Atlantic, but very abundant in warmer latitudes, and on some of the keys of the West Indies breeds in immense numbers, and the eggs are collected as food.

NODE (from Fr. *node*, from Lat. *nodus*, knot). A small, circumscribed swelling which occurs upon the surfaces of the bones of the head and extremities. Nodes are nearly always due to syphilis.

Another variety of node occurs in one form of arthritis deformans, and is called Heberden's *nodosities*. These bony tubercles appear upon the dorsal and lateral surfaces of the terminal phalanges of the fingers, and are incurable. They are most common in women and neurotic persons.

NODE. An astronomical term used in connection with planetary orbits. If we disregard certain small perturbations (q.v.) of planetary motion, we may say that each planet moves in an elliptic curve, having the sun in one of its foci. This curve lies in a plane called the plane of the orbit; and in the case of the earth this orbital plane is called the plane of the ecliptic. Now, if these orbital planes are imagined extended to the celestial sphere, they will cut out upon it great circles, one corresponding to each orbital plane. Such a great circle cut out by the plane of the earth's orbit is called the ecliptic (q.v.). If we consider the ecliptic and the corresponding great circle belonging to any other planet, we shall find that they intersect at two points on opposite sides of the celestial sphere. These two points, in the case of any planet other than the earth, are called the *nodes* of its orbit.

Thus all the planetary nodes lie on the ecliptic circle; and the position of any node is given by stating its celestial longitude. (See LATITUDE AND LONGITUDE.) This longitude of the node is one of the elements (q.v.) of a planet's orbit. Since the two nodes are directly opposite one another, their longitudes must differ by exactly 180°, so that the longitude of the one being given, that of the other is known also. By common consent, astronomers select that one of the nodes whose longitude is to be given as an element of the orbit as the *ascending* node. This is the node corresponding to the passage of the planet from the south side of the ecliptic to the north side in the course of its orbital revolution around the sun. The other node is called the *descending* node.

The effect of planetary perturbations (q.v.) is to cause the nodes to move backward on the ecliptic. The rate of motion is very slow, the most rapid being in the case of Uranus, whose node will travel once around the ecliptic in 37,000 years, while that of Mercury will consume 166,000 years in a single revolution.

NODE, NODAL POINTS. When a string or metallic cord, under strong tension, is made to vibrate, there are heard besides the principal sound secondary and shriller sounds, which are denominated overtones or harmonic sounds, and are produced by a certain portion of the cord vibrating independently. Investigation shows that every vibrating string is divided into a number of segments vibrating independently, and that the points which separate these portions from each other are at rest. These points are known as *nodal points*, and their situation may be found by placing small pieces of paper on a stretched string, and causing it to vibrate. When a string vibrating to its fundamental note, that is as a unit, is touched at its middle point with a feather, it will immediately resolve itself into segments of equal length vibrating twice as rapidly. The point where the string is touched with the feather being at rest would accordingly form a node, while the vibrating portions would be known as ventral segments. Chladni discovered that if a plate of glass or metal be clamped at the centre and then be touched by the finger at some middle point on one of the sides, and a well-resined fiddle bow be drawn across the edge, particles of fine dust or sand previously placed on the plate will arrange themselves in lines, showing that along these lines no vibration has taken place; these lines are *nodal lines*, and are found in most cases to group themselves together into geometrical figures, and occasionally to present the most beautiful designs. (See CHLADNI FIGURES.) The arrangement of the nodal lines depends on the point at which the plate is touched, and on the form of the plate itself. Similarly, a column of air vibrating in an open or closed organ pipe will divide itself into portions each in a state of vibration, and separated from one another by transverse sectional portions in which the air is at rest; these latter sections are known as *nodal sections*. In the open pipe the node is at the centre of the pipe, while in the closed pipe the node is at the end. See ACOUSTICS.

NO'DIAK (Papuan name). The Papuan spiny ant-eater. See ECHIDNA.

NODIER, nŏ'dyâ', CHARLES (1780-1844). A French philologist, novelist, poet, and critic, born at Besançon, April 29, 1780. He studied at Strassburg. In 1802 he published *Stella ou les proscrits*, a novel after the manner of Rousseau, and in 1803 *Le peintre de Salzbourg*, inspired by Goethe's *Werther*. In 1804 appeared *Essais d'un jeune barde;* in 1815 the *Histoire des sociétés secrètes de l'armée. Trilby ou le Lutin d'Argail* came out in 1822, and the Romantic School began to gather about Nodier in the salon of the Arsenal toward 1823. Nodier, like most of the romantic writers, is in love with the sensational, exotic, and fantastic, and is fond of turning history into romance. In 1830 he put forth the *Roi de Bohême et ses sept châteaux*, and in 1832 *La fée aux miettes*, a fairy tale. In 1834 he became an Academician, ten years after he had been made director of the Library of the Arsenal. He died in Paris, January 26, 1844. Nodier outgrew his sentimentalism, and became through his *Jean Sbogar* (1818), *Rutwen* (1820), *Smarra* (1821), and *Trilby*, the herald of romantic fiction in France. *Bertram ou le château de Saint-Aldebrand*, a tragedy, shows English influence, particularly that of Sir Walter Scott. His versatility is shown by his publication in 1808 of a *Dictionnaire raisonné des onomatopées* (2d ed. 1828) and by his *Dictionnaire universel de la langue française* (1823). An edition in twelve volumes of his *Œuvres* appeared in 1832-34. Consult Mme. Menessier-Nodier, *Charles Nodier, épisodes et souvenirs de sa vie* (Paris, 1867).

NODULAR DISEASE (from Lat. *nodulus*, diminutive of *nodus*, joint). A disease due to the presence of a roundworm (*Œsophagostoma columbianum*) in the intestinal walls of sheep, which has often been mistaken for tuberculosis of the intestines. Positive diagnosis can be made only after death. Affected animals become anæmic and debilitated, the wool becomes dry, and there may be profuse diarrhœa. The larger tumors will be found to contain the small nematode worm, surrounded by a greenish, cheesy mass. The adult worm is found free in the large intestine.

NOÉ, nô'ā', AMADÉE DE. A French caricaturist. See his pseudonym, CHAM.

NOEL, nō'ĕl, BAPTIST WRIOTHESLEY (1798-1873). An English clergyman. He was born at Leightmount, Scotland, and educated at Westminster and Trinity College, Cambridge. He studied first for the bar, but abandoned this profession for the Church of England. In 1827 he became minister of Saint John's Chapel, Bedford Row, London, where his eloquence won for him a large congregation from the upper classes, and he assumed a place of leadership among the preachers of evangelical tendencies. In 1846 he assisted in organizing the Evangelical Alliance. During the Gorham controversy (q.v.) of 1848-50, Noel withdrew from the Established Church and entered the Baptist denomination, at the same time publishing his grounds for so doing in an *Essay on the Union of Church and State* (1848). Later he published an *Essay on the Act of Baptism* (1850). A permanent contribution to the subject of American affairs was *Freedom and Slavery in the United States of America* (1863).

NOETIANS, nô-ē'shans. See PATRIPASSIANISM.

NOET'IC CONSCIOUSNESS (Gk. νοητικός, *noētikos*, relating to perception, from νόησις, *noēsis*, perception, from νοεῖν, *noein*, to perceive, from νόος, *noos*, νοῦς, *nous*, perception, mind; probably connected with γιγνώσκειν, *gignōskein*, to know, and ultimately with Eng. *know*). It is affirmed by many psychologists that the essential characteristic of mental process is its reference, beyond itself, to some object; so that the only possible criterion of the ultimateness and irreducibility of a mental function is the irreducibility of the mode in which it thus refers to its object. Brentano distinguishes between ideation (or noetic consciousness), judgment or belief, and interest or liking. Stout, however, has recently raised the question whether it is possible for a sentient being to exist entirely devoid of thought, i.e. to possess an anoetic consciousness. To such a consciousness the antithesis of subject and object would be meaningless; while there would seem to be no road from mere sentience to thought by any process of differentiation or complication. Stout leaves the question unanswered, except in so far as the two difficulties just raised appear to prevent, for him, any genetic passage from an anoetic to a noetic mind. The problems raised are of special interest to the epistemologist and the student of the evolution of mind. The term noetic has had a long history in psychology. Plato distinguishes between a noetic or incorporeal world of concepts, and an æsthetic or corporeal world of perceptions, the latter being but an image of the reality of the former. Aristotle uses the word in the sense of 'capable or rational apprehension.' Hamilton employs it to "express all those cognitions that originate in the mind itself," while "dianoetic denotes the operations of the discursive, elaborative, or comparative faculty." Stout restricts the phrase 'noetic synthesis' to "that union of presentational elements which is involved in their reference to a single object; or, in other words, to their combination as specifying constituents of the same thought." Consult: Stout, *Analytic Psychology* (London, 1896); Brentano, *Psychologie vom empirischen Standpunkte* (Leipzig), 1874); Sir W. Hamilton, *Lectures on Metaphysics*, vol. ii. (London, 1859).

NOGALES, nô-gä'lås. A frontier town of Mexico, situated on the boundary of Arizona and on the Santa Cruz River (Map: Mexico, D 2). It is a station on the Sonora Railroad, and is the seat of a United States consul. Population, in 1901, 2738.

NOGENT-SUR-MARNE, nô'zhäɴ'sur-märn'. A town of France, in the Department of Seine, situated on a bend of the Marne, three miles east of Paris, to the east of the Forest of Vincennes. The Eastern Railroad from Paris here crosses the valley of the Marne on a long, curving viaduct. The town contains numerous fine villas, and has manufactures of pottery and chemicals. Population, in 1901, 10,391.

NOHL, nōl, LUDWIG (1831-85). A German musical lecturer, scholar, and writer. He was educated for the law, but subsequently followed the profession of music. He studied under Dehn and Kiel, and in 1860 became lecturer at Heidelberg. He held several other important university and conservatory appointments, and toward the close of his life settled in Heidelberg as a lecturer at the university. His writings are standard, and have been translated into both French and English. They include: *Beethovens Leben* (1864-77); *Briefe Beethovens* (1865); *Mozarts Briefe* (1865); *Beethoven, Liszt, Wagner* (1874); and *Beethoven nach den Schilderungen seiner Zeitgenossen* (1880).

NOILS (OF. *noiel*, *nuiel*, button, buckle, *newel*, stone of a fruit, Fr. *noyau*, kernel, from Lat. *nux*, nut, or possibly a diminutive of OF. *nou*, knot, from Lat *nodus*, knot). The short and broken hairs which are removed from wool in the process of combing and preparing it for worsted manufactures. The noils are used for making inferior yarns, and are valuable for felting purposes, in which they are largely employed.

NOIRÉ, nwä'rā', LUDWIG (1829-89). A German philosophical writer, born at Alzey, in Hesse. From 1846 to 1848 he pursued his studies at Giessen, after which he became a teacher at the gymnasium in Mainz. His study of the works of Spinoza, Schopenhauer, Lazarus Geiger, and the modern naturalists led him to the effort to construct a system of monistic philosophy according to which the universe is a single reality of which sensation and motion are the two aspects. In 1874 he published *Die Welt als Entwickelung des Geistes.* This was followed by *Der monistische Gedanke. Eine Konkordanz der Philosophie Schopenhauers, Darwins, Robert Mayers,* *und L. Geigers* (1875). He also wrote the preface to Max Müller's English translation of Kant's *Kritik der reinen Vernunft,* which is a sketch of the history of philosophy; *Der Ursprung der Sprache* (1877); *Die Doppelnatur der Kausalität* (1876); and *Einleitung und Begründung einer monistischen Erkenntnistheorie* (1877).

NOISSEVILLE, nwäs'vêl'. A village of Lorraine, about 4 miles east of Metz, noted as the scene of a battle fought between the French under Bazaine, numbering about 120,000 men, and an army of 40,000 Germans, August 31-September 1, 1870. Hoping to break the German cordon around Metz and effect a junction with the army of MacMahon, Bazaine transported his forces to the right bank of the Moselle, and by a fierce attack succeeded in taking the villages of Montoy, Courcy, and Servigny. The Germans rallied toward the evening and recaptured Servigny. Fighting was resumed on the following day, and resulted in the retreat of the French across the river.

NOLA, nō'lȧ. A city in the Province of Caserta, Italy, 15 miles east-northeast of Naples by rail (Map: Italy, J 7). It is the see of a bishop. The cathedral, dating from the fifteenth century, was partly destroyed by fire in 1870. The seminary near by has interesting antique inscriptions. The ancient Nola fell into the hands of the Romans in the Samnite war, B.C. 313. The town held out against Hannibal in the Second Punic War. Augustus died at Nola A.D. 14. The first bells for Christian churches are said to have been cast here in the fifth century. Numerous coins, and beautiful vases which anciently were made here, and other antiquities have been found in the vicinity. Population (commune), in 1881, 11,931; in 1901, 14,622.

NÖLDEKE, nēl'de-ke, Theodor (1836—). A distinguished German Orientalist. He was born in Harburg and pursued his university studies chiefly at Göttingen, where in 1861 he became privat-docent. In 1864 he was made extraordinary professor at Kiel and in 1868 full professor. In 1872 he became professor of Semitic philology in Strassburg. Nöldeke is the leading authority in general Semitic philology. Among his works may be mentioned *Geschichte des Korans* (1860); *Das Leben Mohammeds* (1863); *Die alttestamentliche Litteratur* (1868); *Grammatik der neusyrischen Sprache* (1868); *Untersuchungen zur Kritik des alten Testaments* (1869); *Die Inschrift des Königs Mesa von Moab* (1870); *Mandäische Grammatik* (1874); *Geschichte der Perser und Araber zur Zeit der Sasaniden* (1879); *Kurzgefasste syrische Grammatik* (1880); *Die semitischen Sprachen* (1887); *Aufsätze zur persischen Geschichte* (1887); *Delectus Veterum Carminum Arabicorum* (with A. Müller, 1890); *Orientalische Skizzen* (1892). He wrote besides several hundred contributions to encyclopædias and magazines and many valuable reviews, chiefly in the organ of the *Deutsche morgenländische Gesellschaft* and *Litterarisches Centralblatt.*

NOLHAC, nō'läk', Pierre de (1859—). A French historian, born at Ambert, Puy-de-Dôme. He received his early education in Paris, and was a student at the French school in Rome (1882-85). On his return he received the degree of doctor of letters and studied at the Bibliothèque Nationale for a year, when he was made professor at the Ecole des Hautes Etudes. His contributions to the history of Italian literature and of the French Renaissance are specially valuable. His works include: *Le dernier amour de Ronsard* (1882), an edition of the *Lettres de Joachim du Bellay* (1883); *Le "Canzoniere" autographe de Pétrarque* (1886); *La bibliothèque de Fulvio Orsini* (1887); poems entitled *Paysages d'Auvergne* (1888); *Erasme en Italie* (1888); *Marie-Antoinette* (1890); *Le château de Versailles sous Louis XV.* (1898); and *Histoire du château de Versailles* (1899). In 1892 M. Nolhac was made director of the National Museum at Versailles.

NO'LI ME TAN'GERE (Lat., Touch me not). The words spoken by the risen Christ to Mary Magdalene, used as the title of a number of paintings, including those by Titian in the National Gallery, London, and by Rembrandt in Buckingham Palace.

NOLL. A popular name for Oliver Cromwell.

NOL'LEKENS, Joseph (1737-1823). An English sculptor. He was born in London, August 11, 1737, the son of a painter. In 1750 he studied sculpture with Peter Scheemakers, and as the winner of several prizes offered by the Society of Arts, was enabled in 1760 to start for Rome. A portrait bust of Garrick was followed by a bust of Sterne and others. While at Rome he supported himself by taking active part in the traffic and restoration of antiquities. In 1770 he settled in London, where he was made a member of the Royal Academy in 1772. His portrait busts are good likenesses, and he displayed skill in the treatment of his draperies. His portraits include busts of George III., Prince and Princess of Wales, Duke and Duchess of York, Oliver Goldsmith, Dr. Johnson, and Warren Hastings, the statue of Pitt in Cambridge, the sepulchral monument of the "Three Captains," Westminster Abbey, and of Mrs. Howard, Corby Church, Cumberland. Of his ideal statues the most popular are the so-called "Venuses," the best of which are "Venus Chiding Cupid," "Venus Anointing Her Hero," and the "Seated Venus," now at Petworth. Nollekens died in London, April 23, 1823.

NOL'LE PROS'EQUI (Lat., will not prosecute). An entry on the records of a court by the public prosecutor in a criminal case, or the plaintiff in a civil action, to the effect that the proceedings against the defendant shall be discontinued. This method of terminating legal proceedings originated in England during the reign of Charles II., and seems to have been devised as a convenient means of nullifying certain obnoxious statutes, by thus ending any prosecution under them. The practice was subsequently adopted into the civil procedure in England to enable a plaintiff to discontinue his action, but it was later superseded by the common-law nonsuit.

In the United States to-day the practice of entering a *nolle prosequi*, or *nol. pros.*, as it is usually called, is confined almost exclusively to criminal proceedings. The right to thus discontinue a criminal prosecution is a prerogative of the State, and it generally rests in the discretion of the prosecuting officer whether to exercise it or not; but where the case has proceeded to trial, by the general rule he should make a motion to the court for leave to do so. A *nol. pros.* entered after the jury has been sworn and trial commenced will operate as an acquittal and a bar to any future prosecution for the same offense. (See JEOPARDY.) Under modern codes of civil procedure, the method of abandoning legal proceedings is by discontinuance, or by allowing a nonsuit; but in a few jurisdictions, where common-law pleading and practice still obtains, a *nolle prosequi* seems to be a permissible way of ending an action on the part of the plaintiff. See NONSUIT; PLEADING; PRACTICE.

NOMA. See CANCRUM ORIS.

NOM'AD (from Lat. *nomas*, from Gk. *νομάς*, roaming, from *νέμειν*, *nemein*, to pasture, distribute). A term primarily applied to those peoples whose resources were chiefly flocks and herds. All the industries and conveniences of nomadic life grow out of this one fact. Grass and water are the chief essentials, hence nomads dwell always in regions where pasture is the best and water is not far to seek. Their habitations must admit of being transported from place to place, and hence consist of tents; their furniture is largely of skins; they clothe themselves in hides and woolen cloth. The saddle and harness, sleds and wagons, roads and land commerce, all spring out of the taming of horses, asses, cattle, sheep, goats, camels, and reindeer—the characteristic wealth of nomadic peoples.

NOMA'DA (Neo-Lat., from Gk. *νομάς*, *nomas*, roaming). A genus of bees typical of the family Nomadidæ, including species which live parasitically in the nests of other bees and are called 'cuckoo-bees.' Often there is enough food both for the larvæ of the cell-maker and the larvæ of the cuckoo-bee, and both thrive and issue simultaneously as adults. The larva is smooth, tapering toward each end, and has a small head. The pupa has three conspicuous spines on the upper and posterior edge of the orbit, which seem to aid in locomotion. See CUCKOO-BEE.

NO MAN'S LAND. (1) A region 170 miles in length and about 35 in width, north of Texas, ceded to the United States in 1850 and made a part of Oklahoma in 1890. Between those years the district was under no form of government, and became a resort of outlaws.

(2) A narrow district on the line between Delaware and Pennsylvania. Although it is held to belong to Pennsylvania, some of the inhabitants perform their legal obligations in Delaware, while others do not recognize their citizenship in either State.

NOMARCHY, or **NOME.** The largest administrative division of Greece. Since 1899 the nomarchies have numbered twenty-six. They are subdivided into eparchies, which in turn are made up of demarchies. The administration of the nomarchy is in the hands of a nomarch, appointed by the Government for an indefinite term. His duties are much like those of the French prefect. Like him, he is assisted by a council elected by universal suffrage, but for a fixed term. The eparchy corresponds to the French arrondissement and the demarchy to the commune.

NOME (Lat. *nomus*, from Gk. *νόμος*, *nomos*, province, district, from *νέμειν*, *nemein*, to pasture, distribute). The name given by the Greeks to the provinces or districts into which Egypt was divided, from the earliest historical period down to the time of the Roman dominion. It is probable that the nomes were the remains of small independent States, which in very early times were united under a single monarchy. Each nome possessed its own god or group of gods, worshiped in the local temple, as also its own myths and religious traditions. The government of the nome was a copy, in miniature, of that of the State. At the head stood the nomarch, or governor, and under him was a regular gradation of officials, each responsible to his immediate superior. In the earlier period, each nome had its own treasury, its own courts of justice, and its own military establishment. Under the feudal system of the Middle Empire, the nomarchs were the heads of ancient noble families, and were prompt to take advantage of any weakness in the Central Government to make themselves practically independent princes. The old nobility was, however, extinguished in the Hyksos wars, and from the time of the New Empire the nomes were purely administrative districts ruled by royal governors, who still bore the title of nomarchs. In the time of the Ptolemies the chief officer of the nome was the strategos, under whom the nomarch was a subordinate official charged with supervising the collection of taxes and other financial matters. In general there were some 42 nomes, 22 in Upper and 20 in Lower Egypt, but the number was not invariable. So far as is at present known, the number of the nomes never fell below 36, nor exceeded 47. Consult: Duemichen, *Geschichte des alten Aegyptens* (Berlin, 1878); Budge, *A History of Egypt* (New York, 1902); Brugsch, *Geographie des alten Aegyptens* (Leipzig, 1857); *Dictionnaire géographique de l'ancienne Egypte* (Leipzig, 1879-80); Egypt Exploration Fund, *An Atlas of Ancient Egypt* (2d ed., London, 1894).

NOME. A term used in the ancient Greek music to denote any melody determined by inviolable rules.

NOME, nōm. The largest city of Alaska, in the Northern District; situated at the mouth of the Snake River, 13 miles west of Cape Nome, on the north shore of Norton Sound, Bering Sea (Map: Alaska, C 3). It is the centre of the productive Cape Nome gold-mining district, which extends west along the coast for about 20 miles from Cape Nome. In the fall of 1898 the small streams in the vicinity were prospected with promising results, and in the following summer the creek diggings were being actively operated when the news of the rich beach deposits, first discovered in January, 1899, though their importance remained unrecognized until July, caused a rush to the beach, where about 2000 men were working by October. The output of the district for 1900 was more than $5,000,000, and in 1901 it was estimated at $7,000,000. During this period a 'mushroom' settlement of tents, first called Anvil City, had sprung up. This town was gradually replaced by a permanent city of frame structures after the arrival in June, 1899, of the first consignment of lumber. In the early days the matter of food and fuel supplies was a source of great anxiety; and the unsanitary conditions due to the level and undrained site of the town, its scanty water-supply, and the climatic changes resulted in considerable sickness. There now exists a fully organized city, compactly built over half of its length along the beach, with a municipal government, fire and police departments, sewerage, water, and electric-light systems, telephone service, etc.; and with a number of substantial commercial buildings, banks, commercial organizations, a court house, and a post office, hospitals, clubs, etc. A railroad extends from the coast to the mining claims at the foot-hills of the mountains. Population, in 1900, 12,488.

NOME, Cape. See Cape Nome.

NOMENCLATURE, Scientific. See Classification of Animals.

NOMINALISM (from *nominal,* from Lat. *nominalis,* relating to names, from *nomen,* name; connected with Gk. ὄνομα, *onoma,* Skt. *nâman,* OChurch Slav. *ime,* OIr. *ainm,* Goth. *namô,* OHG. *namo,* Ger. *Name,* AS. *nama,* Eng. *name*). The philosophical theory that only individual objects have real existence, and that so-called universals (see Judgment) are nothing but names given in common to actually different and incommunicable objects. These names were considered as nothing but so much breath (*flatus vocis*), without indicating any real identity in the objects sharing in identical names. This view was an extreme development of the Aristotelian doctrine that all reality is individual, and that universals have existence only in individual objects; and it was called forth by the extreme Neo-Platonism of Erigena, who maintained that universals have an existence prior to particulars and individuals, and that the process of creation is only the progressive, logical differentiation of the universal. This Neo-Platonic view of the relation of the universal and the particular is called *realism,* and was advocated by Bernard of Chartres, Guillaume de Champeaux (q.v.), and Walter of Mortagne. Nominalism, on the contrary, was maintained by Roscelinus (q.v.). Abélard represented a modified nominalism in maintaining that the universal is not a real objective existence, nor, on the contrary, a mere word (*vox*), but the meaning of the word. This view, which is called sermonism (from *sermo,* which in scholastic Latin meant 'predicate'), is a type of conceptualism (q.v.) peculiar to Abélard, and is to be distinguished from other forms of conceptualistic doctrine in that it did not point expressly to the fact that meanings are mental facts. With Abélard meanings seemed to reside in words, not as *words,* but as predicates of propositions. The Arabian philosophers, and especially Avicenna (q.v.), succeeded in mediating between nominalism and realism by maintaining that universals are before individuals (realism) in the mind of God, in individuals (Aristotelianism) as their developed essence, and after individuals (nominalism) in human minds (conceptualism). This was the view adopted by Thomas Aquinas (q.v.) in his system and so incorporated in the received philosophy of the Roman Church. Nominalism received its last strong support in the teaching of William of Occam (q.v.) in the fourteenth century; but the influence of this revival was transitory, coming as it did upon the eve of the Renaissance and the general decline of interest in scholastic problems. See Löwe, *Der Kampf zwischen Nominalismus und Realismus im Mittelalter: sein Ursprung und sein Verlauf* (Prague, 1876); also the histories of philosophy by Ueberweg-Heinze, Windelband, Erdmann.

NOMINATION (Lat. *nominatio,* from *nominare,* to name, from *nomen,* name). In politics, the formal selection and presentation of a candidate for an elective office. In the United States, before the development of political parties, candidates for office were frequently nominated at private conferences or caucuses of the leading citizens of the community. Sometimes no formal nominations were made, and candidates were self-announced. By 1800 parties were fairly well organized, and the necessity arose of devising some means of selecting the candidates for offices. In national elections this was supplied by the Congressional caucus, which assumed the right of choosing Presidential and Vice-Presidential candidates, and of determining the policy of the party. (See Caucus; Convention.) This method lasted until 1824. With the commencement of the revolt against the Congressional caucus several other temporary methods of nomination sprang into existence. These were nomination by the State legislatures as a whole, nomination by party caucuses of the State legislatures, nomination by State conventions, and nomination by public meetings. All these proved to be ineffectual and were superseded by the method of national convention, which came permanently into existence between 1830 and 1840, the first such convention being that of the Anti-Masonic Party in 1832. This has continued to be the accepted method of nominating candidates for President and Vice-President. Generally the choice of the convention is determined by the votes of a majority of the delegates; but in the case of the Democratic Party a two-thirds vote is necessary for a choice. In the nomination of State and local officers the convention has also come to be the recognized method, although in case of some of the minor offices nominations are frequently made directly by the party voters in the so-called primary elections. The national nominating convention consists of a certain number of delegates from each State, while local conventions are made up of delegates representing the several local units of the electoral district, the principle of representation according to the total population prevailing in both cases. Exceptions to the general rule that candidates for public office are nominated by delegate convention are, first, the old English method of self-announcement, which exists in communities like some of the Southern States, where practically only one political party exists, and where the success of the party is not endangered by a multiplicity of candidates; second, the method of nomination by primary election, where the individual voters directly select the candidate without the intervention of a convention; and, third, the method of nomination by petition, according to which the candidate may be put forward by filing with the proper officer a paper signed by a certain specified number of qualified voters. In those parts of the country where the New England town meeting exists, local candidates are frequently put in nomination by that assembly. In the cities local elective officers are almost invariably nominated by primary caucus or delegate conventions. Consult Dallinger, *Nominations for Elective Office in the United States* (New York, 1897); Bryce, *American Commonwealth,* vol. ii., chap. lxix.

NOMINATIVE CASE. See Declension.

NOMOCANON (Gk. νομοκάνων, *nomokanôn,* from νόμος, *nomos,* law + κανών, *kanôn,* rule, canon). In the Greek Church, the collection of ecclesiastical laws, both those proceeding from the Church (*canones*) and those from the State (*nomoi*). The first collection was made in the sixth century, but the most important in the fourteenth, the so-called *Syntagma*.

NO NAME. A novel by Wilkie Collins (1862). It is the story of a prosperous English family, but it turns out that the parents have not been married. That having been finally done, before a new will can be drawn up, the father is killed by accident, the mother dies, and the illegitimate daughters are left destitute, in spite of their father's wealth. The purpose is to show the evils resulting from the English law on such cases.

NON-COMBATANTS (in War). Officers and men charged with the administrative duties of the military or naval services, who do not fight except in self-defense.

NON-COMMISSIONED OFFICER. A soldier holding a rank intermediate between that of the enlisted man or private soldier and the commissioned officer. The following classification gives the various non-commissioned grades of the United States Army in the order of their precedence: (1) Sergeant-major, regimental, and sergeant-major, senior grade, artillery corps; (2) quartermaster-sergeant, regimental; (3) commissary-sergeant, regimental; (4) ordnance sergeant, post-commissary-sergeant, post-quartermaster-sergeant, electrician sergeant, hospital steward, first-class sergeant signal corps, chief musician, chief trumpeter, and principal musician; (5) squadron and battalion sergeant-major, and sergeant-major, junior grade, artillery corps; (6) first sergeant and drum-major; (7) sergeant and acting hospital steward; (8) corporal. In each grade, date of appointment determines the order of precedence. See CORPORAL; SERGEANT; STAFF.

The non-commissioned officer of to-day must possess the ability to assume executive command in any emergency demanding prompt action and tactical ability; consequently only the most intelligent of the enlisted men are selected for promotion. United States Army regulations permit a certain proportion of non-commissioned officers to obtain commissions annually, and in other ways make the rank very desirable. In the English army, except in rare instances, social conditions preclude the possibility of any non-commissioned officer of humble birth attaining the commissioned rank as a combatant officer; for although commissions are granted as quartermasters, riding masters, and occasionally as officers in certain divisions of the artillery and in the engineers, they are only given after a lifetime of service, and are to all intents and purposes honorary positions. During the Boer War of 1899-1902 the heavy casualties among officers made it necessary in many instances to admit qualified non-commissioned officers to the commissioned ranks, apart from any family or social consideration—and it is expected that this initiative will lead to an order of things similar to that of the United States Army. In Italy nearly one-third of the officers of each arm of the service are taken from the non-commissioned ranks. (See MILITARY EDUCATION.) The German army system, as also that of France, makes special provision for the training of non-commissioned officers.

NON COMPOS MENTIS (Lat., not having power over the mind). A legal term for lunacy. See INSANITY.

NONCONFORMISTS (from *non-*, not + *conformist*, from Lat. *conformis*, similar, from *com-*, together + *forma*, form). A name given generally to those who do not conform to the religion of an established Church. The most frequent use of the word, however, is in relation to those who at any period in English history since the Reformation have refused to conform to the doctrines and practices of the Church of England; though even here, in ordinary usage, it designates only Protestant dissenters. The unification of the English Nonconformists, in spite of their varying beliefs, as one body over against the Established Church practically dates from the repressive measures enacted soon after the Restoration in the first flush of reactionary zeal. The Act of Uniformity, requiring assent from all clergymen to everything contained in the Prayer-Book, drove out nearly 2000 of them, or about one-fifth of the whole number of clergy; these were the first to be formally known as Nonconformists. In the place of Puritanism, now extinct, came political nonconformity, which has since had its seat principally in the middle or lower-middle classes of England, and whose incessant efforts have by this time succeeded in depriving the Church of England of most of its exclusive privileges. The Act of Uniformity was followed by the Corporation Act, which attacked the dissenters in one of their strongholds; the Conventicle Act, which prevented their gathering in any number; and the Five Mile Act, whose result was in many places to deprive them of religious teaching of their own sort.

The next epoch-making date is that of the Toleration Act of 1689, which, while it only relaxed and did not repeal the penal statutes, was at the time regarded as a great charter of religious liberty. Nonconformists acquired legal security for their chapels and funds, with something approaching a clerical status for their ministers. But its policy of grudging and partial indulgence perpetuated the division of the nation into two more or less hostile bodies of Churchmen and Dissenters. Niggardly as it was, it recognized dissent, and shook the belief that the State was bound to provide all its members with a religion and to force it, if necessary, upon their acceptance.

The history of the nineteenth century, or at least the last two-thirds of it, is that of a pertinacious struggle for further recognition on the part of the Nonconformists, crowned with considerable success—though the great object of political nonconformity, the disestablishment of the Church of England, seems further off than it was. In 1836 Dissenters were allowed to be married by their own ministers and rites; the commutation of tithes (q.v.) into a rent-charge rendered their collection less odious; registration of births, deaths, and marriages was transferred from the Church to the State; and a charter was given to the free University of London, which imposed no religious tests. Perhaps the most important of the later gains of nonconformity have been in the department of education—the great universities having been thrown open to its young men in 1871, and a system of State schools rendering them independent of the Church for primary education. The Burials Act of 1880, allowing their ministers access to the churchyards for funerals, was another concession that had been loudly demanded by them. Generally of an aggressive liberal type in politics, and still smarting under a sense of social inferiority, they form a compact body of no small political power. See ESTABLISHMENTS, ECCLESIASTICAL; LIBERTY, RELIGIOUS.

NON-EFFECTIVE. This term in its military sense applies to all officers or men not available for effective service. Retired or half-pay officers, pensioners, deserters, sick or wounded, and those held prisoner by an enemy are reported as non-effectives.

NONES. See KALENDS.

NON-EUCLIDEAN GEOMETRY. See GEOMETRY.

NONFEASANCE (from *non-*, not + *feasance*, deed, from Fr. *faisant*, pres. part. of *faire*, from Lat. *facere*, to do, make). The omission to do an act which one is under a legal obligation to do. It is the view of some writers that nonfeasance never amounts to a tort (q.v.); that to avoid committing a tort one need only to forbear to act. But this is clearly erroneous; as, if an owner of a factory fails to comply with a law requiring him to equip it with fire-escapes, in case of fire he is liable in damages to the person burned. His nonfeasance is a tort.

The term is frequently used in connection with the liability of an agent or servant to third persons. The owner of property employs an agent to manage it and keep it in proper repair. The agent omits to make repairs. Clearly he has violated his contract with his principal, who may call him to account therefor; but the weight of judicial authority in this country holds there is no privity between the agent and a third person, and that in such a case there must be misfeasance or malfeasance by the agent to render him liable. On the other hand, it has been held by a number of courts that the agent is liable to the injured person. His liability should be determined by the rules applicable to negligence (q.v.), not by a dictum of two hundred years, although its author was the distinguished Lord Chief Justice Holt (q.v.), that "a servant or deputy cannot be charged for nonfeasance, but for a misfeasance an action will lie against him." Consult: Jaggard, *Hand-Book of the Law of Torts* (Saint Paul, 1895); Huffcut, *The Law of Agency* (Boston, 1901).

NO'NIUS. See VERNIER.

NO'NIUS MARCEL'LUS. A Latin grammarian, born at Thubursicum Numidarum, in Africa, at the beginning of the fourth century A.D. His work entitled *De Compendiosa Doctrina* consisted originally of twenty books, of which the sixteenth is now lost, and was intended as a book of reference on points of lexicography, grammar, and antiquities. Though it shows little critical sagacity, the work is valued for its citations from the lost authors, particularly of the archaic period. There are editions by Mercier (Paris, 1583; reprinted 1826), by Quicherat (Paris, 1871), and by L. Müller (Leipzig, 1888). Consult also Nettleship, *Essays in Latin Literature* (London, 1885).

NON-JUROR, THE. A comedy by Colley Cibber, produced in 1717. It was adapted from Molière's *Tartufe*. Tartufe, transformed into an English Catholic priest, tampers with the loyalty of an English gentleman. It gained for Cibber much favor from the Hanoverian party.

NONJURORS (from *non-*, not + *juror*, from Lat. *jurator*, swearer, from *jurare*, to swear, from *jus*, law, right). The name given to those clergy of the Church of England who refused to take the oath of allegiance to William and Mary, believing themselves still bound by their allegiance to James II. They had been avowed champions of the doctrine of passive obedience on the part of subjects toward kings; indeed, Lake, Bishop of Chichester, said on his deathbed that he looked on the doctrine as the distinguishing character of the Church of England, for which he would lay down his life. The House of Commons allowed the clergy six months longer than the laity to take the oath. Sancroft, Archbishop of Canterbury, with seven bishops and about 400 other clergy, refused it, and were deprived of their sees and benefices. The most distinguished of the Nonjurors was the saintly Bishop Ken; the scholars Hickes and Dodwell were also Nonjurors. They treated all who took the oath as schismatics, and themselves and their adherents as the only true members of the Church of England, and even went so far as to draw up a new liturgy of their own. Their organization, unsubstantial as it was, lingered for over a century, its last bishop dying in 1805. Two of the early missionaries in America, Welton and Talbot, were said to have received episcopal consecration from them, and there is evidence that the latter occasionally exercised episcopal functions in the United States half a century before Bishop Seabury's consecration. Consult Lathbury, *History of the Nonjurors* (London, 1845), a careful work, as far as it goes, supplemented rather than superseded by the most recent authority, Overton, *The Nonjurors* (ib., 1902).

NON'NUS (Lat., from Gk. Νόννος, *Nonnos*). A Greek poet of Panopolis, in Egypt, probably of the fifth century A.D. While a pagan he wrote a vast epic, preserved under the name of *Dionysiaca* (*Διονυσιακά*) in forty-eight books. Though somewhat bombastic in style, the work is not without poetic spirit, and is one of the chief sources of information on the growth and development of the Dionysiac cycle of myths. After adopting Christianity, he made a paraphrase of the Gospel of Saint John in Greek hexameters. The best editions of the *Dionysiaca* are those of Graefe (Leipzig, 1819-26) and Köchly (ib., 1858). The paraphrase has been edited by Passow (Leipzig, 1834). Consult: Köhler, *Ueber die Dionysiaka des Nonnus* (Halle, 1853); and Ludwich, *Beiträge zur Kritik des Nonnus* (Königsberg, 1873).

NONPAREIL. See PRINTING.

NONSUIT. The termination of an action by entry of judgment against the plaintiff upon his failure to appear or prosecute the action, or because of his inability to sustain his case at the trial, in consequence of which the action is ended without a determination of the merits. Under the early system of common-law practice a nonsuit was entered only on motion of the defendant when the plaintiff was in default in prosecuting his action, and if the latter wished to end the suit, he was obliged to resort to the procedure known as *nolle prosequi* or *retraxit*. However, in modern common-law procedure, a plaintiff is sometimes allowed to end his action by nonsuit, in the discretion of the court, and usually upon payment of costs. Under the various codes of procedure at the present time, the same result is effected by a discontinuance. Where the plaintiff fails to introduce sufficient evidence to make out a *prima facie* case, in many jurisdictions a nonsuit may be ordered by the court before the defendant has introduced any testimony whatever. But where the plaintiff does make out a *prima facie* case, even though the defendant's evidence appears to the court to disprove conclusively the truth of the testimony introduced by the plaintiff, the court cannot allow a nonsuit, against the objection of the plaintiff, as the latter is entitled to have the facts of his case determined by a jury.

A nonsuit differs from a "dismissal" of the complaint or declaration, only in that the latter is a broader term and may involve a determination of the merits of the action. A direction of verdict is also distinguishable from a nonsuit because it involves the merits of the controversy. It is, therefore, important whether an action is terminated by dismissal on the merits, verdict, or direction of verdict, in which cases the party against whom the court decides must appeal if he thinks the judgment erroneous; or whether a nonsuit is entered, as in the latter case the plaintiff can immediately commence a new action on the same state of facts. See Action; Judgment; Appeal; Nolle Prosequi; Verdict. Consult the authorities referred to under Practice.

NOOTKA, nōōt′kȧ. A name sometimes applied to a group of closely related tribes of Wakashan stock (q.v.), occupying the west coast of Vancouver Island, southern British Columbia, and including also the Makaw (q.v.), who have conquered for themselves a territory upon the opposite coast of Washington. From their frequent repetition of the word *wakash*, 'good,' Vancouver in 1792 called them Wakash Indians, whence their stock-name *Wakashan* is derived. They are also frequently known as *Aht*, from the termination of the tribal names. The official Canadian report distinguishes eighteen tribes, but Boas counts twenty-two, including the Makaw. Those under Canadian jurisdiction have decreased from 3160 in 1888 to about 2600 at present, of whom 1600 are professedly Christians of various denominations, the others retaining their ancient forms. For general characteristics and customs, see Wakashan Stock.

NOOTKA SOUND. An inlet on the west coast of Vancouver Island, British North America, in latitude 49° 35′ N., longitude 126° 34′ W. (Map: British Columbia, D 5). Its entrance is protected by an island of the same name, and the Sound can be entered on both sides of the island. It extends inland for ten miles in a north-northeast direction, and affords good anchorage. According to some writers, the Sound was discovered by the Spaniard Don Juan Perez, in 1774; according to others, by the English navigator Capt. James Cook, in 1778. In 1788 Capt. John Meares established an English settlement on the coast, which, however, in the following year was broken up by the Spaniards, who at the same time captured several British vessels in the Sound. War for a time seemed imminent, but Spain finally agreed in 1790 to restore the property of British citizens and make due restitution.

NOR′BERT, Saint. See Premonstratensians.

NORD, nŏr. The most northerly department of France. It is conterminous with the former Province of Flandre (French Flanders), and stretches along the Belgian frontier, with a shore line on the North Sea (Map: France, J 1). Area, 2228 square miles. It is well watered, exceedingly fertile, and well cultivated, being one of the most densely populated departments of France. The chief agricultural products are wheat, oats, potatoes, and sugar beets. Stock-raising and fisheries are important, and the department is very rich in coal deposits. The Nord is also one of the foremost industrial departments, producing machinery, textiles, porcelain, glass, chemicals, and sugar. The chief of its many large cities are Lille, the capital, Dunkirk, Roubaix, and Valenciennes. Population, in 1891, 1,736,341; in 1901, 1,866,994.

NORDAU, nŏr′dou, Max Simon (1849—). A German author, pathological critic of literature and of morals, and a prominent leader in the Zionist movement in Europe. He was born in Budapest of an educated Jewish family; studied medicine in the university of that city, getting his degree in 1872, and after six years of travel throughout Europe practiced in his native town for two years. His earlier writings, chiefly for newspapers and showing something of his later censorious manner, were reprinted under the titles, *Aus dem wahren Milliardenland* (1878); *Vom Kreml zur Alhambra* (1880); and *Paris unter der dritten Republik* (1881). Two years (1880-82) were spent in further medical study in Paris, where Nordau established himself in practice. In France and Germany his literary reputation began with *Konventionelle Lügen der Kulturmenschkheit* (1884; French trans. 1886; Eng., 2d ed. 1895), a bold attack on the ethics of modern civilization in general, with particular treatment of the 'religious lie,' or false reverence for the Bible; of the 'governmental lie,' or the falsity of monarchy and aristocracy; of the 'economic lie,' or the untruth of our social system; of the 'social lie,' urging the falsity of conventional marriage laws, and not, as some of his critics have urged, a frenzied treatise against the white lies of society. In the same spirit was *Paradoxe* (1885; 7th ed. 1901; French trans. 1896; and in English, 1895), ironic rather than pessimistic in tone. Nordau's fame in England and America rests almost entirely (unfortunately) on the third of his satiric works, *Degeneration* (1893), from the German *Entartung*, a vigorous polemic against vice or abnormality, and a eulogium of decency in literature and art, at times approaching prudery. The work was dedicated to Cesare Lombroso, and, like the studies of that alienist, has for its theme the relation between genius and degeneracy. Nordau approaches the question from the artistic and moral side; examines the work of art produced, and if it be immoral and foul argues that the artist is, ergo, degenerate, and no genius. The manner of treatment is large and loose, and the chief value of the work is ethical. Nordau's other writings include the novels, *Die Krankheit des Jahrhunderts* (1889), *Gefühlskomödie* (1891), and *Drohnenschlacht* (1897); the plays, *Neue Journalisten* (1880, with Ferdinand Gross), *Krieg der Millionen* (1882), *Das Recht zu lieben* (1893); *Die Kugel* (1894), and *Dr. Kohn* (1898); and a volume of essays, *Zeitgenössische Franzosen* (1901).

NORDEN, nôr′den, EDUARD (1868—). A German classical philologist, born at Emden; professor in the University of Breslau. His most important publication is a brilliant and comprehensive history of ancient prose style from the sixth century B.C. to the time of the Renaissance, entitled *Die antike Kunstprosa* (2 vols., Leipzig, 1898).

NORDENBERG, nôr′den-bâr-y′, BENGT (1822-1902). A Swedish genre painter, born at Kompinkulla, Province of Blekinge. For seven years employed as a house painter, he went in 1841 to Stockholm, and while still following his trade, frequented the Academy until 1851, when he proceeded to Düsseldorf. There he studied under Theodor Hildebrandt and in Paris (1857-58) under Couture. Then he visited Italy and finally settled at Düsseldorf. Much influenced by Tidemand, he chose his subjects almost exclusively from Swedish peasant life, which he depicted with a keen sense of observation and deep feeling. Prominent among such popular scenes are: "Communion in a Village Church" (1856, National Gallery, Christiania); "The Organist" (1861, Leipzig Museum); "Levying the Tithe in Schonen" (1862) and "Wedding Procession in Vårend" (1873), both in the Stockholm Museum.

NOR′DENFELT MACHINE GUN. See MACHINE GUNS.

NORDENSKJÖLD, nôr′den-shĕld, NILS ADOLF ERIC, Baron (1832-1901). A famous geographer and explorer. He was born at Helsingfors, Finland. He entered the university of his native town in 1849, where he devoted himself especially to chemistry and mineralogy. In 1853 he accompanied his father to the Urals and studied particularly the iron and copper mines at Tagilsk. Returning home, he published his first papers, dealing with the minerals and mollusca of Finland, and received an appointment as curator of the mathematico-physical faculty. He was suddenly dismissed, however, because he offered a toast at a banquet to which the Governor gave an obnoxious political significance. Visiting Berlin, he engaged in researches in mineral analysis at Rose's laboratory, and in 1857 returned to Finland, obtained the Alexander traveling stipend from his university, together with his degree as master and doctor, and prepared for a geological expedition to Siberia and Kamtchatka. Another unlucky toast gave offense to the Russian Governor-General, and he drove the offender from the country, following him up with a dispatch depriving him of the right of ever holding office in the university. This disqualification lasted until a new Governor-General was appointed in 1862. Nordenskjöld settled in Stockholm in the winter of 1857-58, and Sweden became his adopted country. During 1858 he made his first voyage to Arctic seas as companion to the Swedish geologist Torell, and made valuable discoveries of the remains of Tertiary plants. After his return he was appointed professor and director of the Royal Museum, Stockholm. In 1861 he made a second expedition to Spitzbergen with Torell, and surveyed the northern part of the archipelago. Upon invitation of the Royal Academy of Sciences of Sweden, Nordenskjöld led an expedition to Spitzbergen in 1864, completing a preliminary survey for the arc of the meridian, mapping the southern part of Spitzbergen, and collecting new data as to fauna and flora. His next expedition was in 1868, when in the *Sofia* he penetrated to latitude 81° 42′ N. A visit to Greenland had important scientific results in that he was enabled to formulate a theory as to the nature of the ice-sheet that once covered the greater part of Europe by his examinations of similar formations upon the Greenland ice-cap. The expedition of 1873 accomplished the discovery of what he supposed to be cosmic dust on polar ice and the survey of part of Northwest Land. Crossing the Kara Sea in 1875, he penetrated to the Yenisei and returned home overland, believing that a northeast passage could be made from Europe to the eastern shore of Asia. The opinion was put to the test in 1878-79. He left Tromsö on July 21, 1878, in the *Vega*, and continued his journey eastward till the end of September, when he became ice-bound in latitude 67° 7′ N. and longitude 173° 23′ W., not far from Bering Strait. Here he remained imprisoned until July 18, 1879, when the expedition was released. He then passed through Bering Strait and sailed to Japan. For this achievement the King of Sweden and Norway conferred upon Nordenskjöld the rank of a baron in the Swedish peerage, and he was appointed commander of the Order of the North Star. In 1883 he made his last expedition to Greenland. Nordenskjöld was a liberal in politics and sat in 1870-72 in the Lower House of the Swedish Diet. He discovered uranium in many varieties of coal, and showed that fresh water could be found anywhere in Sweden at a depth of 100 feet through the Archæan rocks. Besides scientific reports and monographs, his principal works are: *The Voyage of the Vega Around Asia* (1881); *The Second Swedish Expedition to Greenland* (1885); *Facsimile Atlas to the Early History of Cartography* (1889); and *Periplus* (1897). Consult the autobiographical sketch in Bejèr's *Swedish Biographical Lexicon*, a translation of parts of which may be found in *The Arctic Voyages of Adolf Erik Nordenskjöld*, edited by Alexander Leslie (London, 1879); also articles and bibliography in *Ymer*, vol. xxii. (Stockholm, 1902).

NORDERNEY, nôr′der-nī. The most important of the East Frisian Islands, lying off the northwest coast of Germany, and belonging to the Prussian Province of Hanover (Map: Prussia, B 2). It is eight miles long, about a mile wide, and covered with dunes 50 to 75 feet high. The island is the most popular German sea-bathing resort, visited annually by over 14,000 persons. The village at the western end is protected by a large sea-wall. It has a handsome Konversationshaus with a museum, and a national hospital for children. A large lighthouse stands in the centre of the island. The permanent population is about 4000.

NORDHAUSEN, nôrt-hou′zen. A city in the Province of Saxony, Prussia, on the Zorge, 38 miles north-northwest of Erfurt (Map: Prussia, D 3). The Church of Saint Blasius with paintings by Lucas Cranach, the Roman Catholic late-

Gothic Cathedral, and the museum of antiquities, are worthy of note. The town is the centre of a large general trade, especially in grain and cattle. It has extensive distilleries and breweries, and considerable manufactures of tobacco, chemicals, leather, cloth, sugar, and machinery. Population, in 1890, 26,847; in 1900, 28,500. Nordhausen is mentioned in the tenth century, and was made a free Imperial city in 1253.

NORDHOFF, nôrd′hôf, Charles (1830-1901). An American journalist, descriptive and miscellaneous writer, born in Erwitte, Westphalia. He came to America in 1835, was educated in Cincinnati, and was for nine years at sea, in the navy and merchant service; from 1853 to 1857 in various newspaper offices; was then employed editorially by the Harpers (1861), and for the next ten years on the staff of the New York *Evening Post*. From 1871 to 1873 Nordhoff traveled in California and visited Hawaii. He then became Washington correspondent of the New York *Herald*. The more noteworthy of his books are: *Man-of-War Life*, largely autobiographical (1855); *The Merchant Vessel* (1855); *Whaling and Fishing* (1856), both the result of personal experience, as was also *Nine Years a Sailor* (1857); then for ten years politics and sociology were his themes in *Secession Is Rebellion* (1860); *The Freedmen of South Carolina* (1863); *America for the Working Men* (1865). To sociology he contributed: *Politics for Young Americans* (1875), perhaps the best known and most useful of his books; *The Communistic Societies of the United States* (1875). Later volumes are *God and the Future Life* (1881) and *Peninsular California* (1888). Nordhoff died in California in July, 1901.

NOR′DICA, Lillian, born Norton, (1859—). An American soprano, born at Farmington, Me. She was pupil of the New England Conservatory and of J. O'Neill, making her début in 1876. Then followed two years of successful concert work, on the conclusion of which she accompanied Gilmore's band to Europe, and later took up the study of opera with San Giovanni. She was an earnest student, and possessed of considerable stage aptitude, which, together with her magnificent voice and pleasing presence, won her an immediate success. After touring Germany and Russia, she appeared in 1881 in Paris, where her success was absolute. Her marriage with Frederick A. Gower in 1882 turned out to be unfortunate, and three years later she sued for a separation, the proceedings in which were brought to a close by the disappearance of Gower, supposedly in a balloon accident. In 1887 she appeared in London, and in 1895 made her first appearance in opera in her native land, at the Metropolitan Opera House, New York. Two years later she married Döme, an Hungarian singer. She achieved her greatest successes in *Aïda*, *Les Huguenots*, and the soprano parts in the Wagnerian operas, and came to be regarded as one of the greatest prima donnas of her day, being especially noted for her coloratura work.

NÖRDLINGEN, nẽrd′lĭng-*en*. A town in the western part of Bavaria, Germany, on the Eger, 39 miles northwest of Augsburg (Map: Germany, D 4). It is an ancient town with walls and towers. The Gothic Saint George's Church, and the late-Gothic Rathaus, with a collection of old German pictures and fine mural paintings, are worthy of mention. The town has a Realschule and a fine library. Among the manufactures of Nördlingen are furniture, linen, woolen, and leather goods, carpets, and agricultural implements. Population, in 1890, 8004; in 1900, 8299. Nördlingen is mentioned for the first time about 900, and became an Imperial city under the Emperor Frederick II. The town is best known for the two battles of which it was the scene during the Thirty Years' War. In the first, fought on August 27 (new style, September 16), 1634, the Protestant army of Bernhard of Weimar and the Swedes under General Horn were overwhelmed by a superior force of Imperial troops under Ferdinand, the King of the Romans. This was the first defeat of the Swedes on German soil, and its effect was the delivery of South Germany from the foreigner. The second battle, fought on August 3 (13), 1645, between the French and the Imperial troops, resulted in the defeat of the latter and the death of their commander, General Mercy.

NORDMANN, nôrt′män, Johannes (1820-87). An Austrian author, whose family name was Rumpelmaier. He was born at Landersdorf, and studied at Vienna, whither he returned in 1848, after several years in Dresden and Leipzig, and where as a member of the Academic Legion he played a prominent part in the Revolution. From 1859 to 1869 he edited the *Wanderer*, and subsequently wrote for the *Neue Freie Presse* and other papers. *Gedichte* (1847), a volume of lyrics, contains the best of his poetical works. A posthumous volume of poems appeared in 1889. He also wrote the epic *Eine Römerfahrt* (1875-77); various novels and tales, *Zwei Frauen* (1850), *Frühlingsnächte in Salamanca* (1857; 3d ed. 1880), *Ein Wiener Bürger* (1860; 2d ed. 1882), and *Der zerbrochene Spiegel* (1870); and books of travel.

NOREEN, nô-rān′, Adolf Gotthard (1854—). A Swedish philologist. He was born at Oestra Emtervik, Sweden. After graduating from the University of Upsala in 1877, he became a privat-docent there and in 1887 professor of the Scandinavian languages. Among his principal publications are: *Aeldre Västgötalagen* (1876); *Altisländische und altnorwegische Grammatik* (2d ed. 1892); *Abriss der urgermanischen Lautlehre* (Strassburg, 1894); *Altschwedische Grammatik mit Einschlus des Altgutnischen* (1898). Noreen contributed the article on the Scandinavian language to Paul's *Grundriss der Germanischen Philologie*, and is the author of a number of articles published in the *Arkiv för Nordisk Filologi*, of which he is one of the editors. He holds a very high place among European philologists.

NORFOLK, nôr′fạk. A maritime county of England, bounded north and northeast by the North Sea, and south by the county of Suffolk (Map: England, G 4). Area, 2037 square miles, mostly level ground. The soil, consisting chiefly of light sands and loams, is not naturally of a productive character, but has been made so by systematic treatment, and Norfolk is chiefly an agricultural, stock and poultry raising county. The principal rivers are the Ouse, Yare, and Bure. Capital, Norwich. Population, in 1891, 454,500; in 1901, 460,000. Consult: Mason, *History of Norfolk* (London, 1882-85); Rye, *History of the County of Norfolk* (London, 1885).

NORFOLK. The second largest city of Virginia, and a port of entry, in Norfolk County, 88 miles in a direct line, and 116 by water, southeast of Richmond; on the Elizabeth River, an arm of Chesapeake Bay, opposite Portsmouth and Berkley, the three cities practically forming one municipality, having a population, within a radius of three miles, of more than 115,000 (Map: Virginia, H 5). Norfolk is the terminus of many steamship lines, including transatlantic, coastwise, and interior lines, the Albemarle and Chesapeake and the Dismal Swamp canals affording additional means of communication with inland towns. The railroad facilities comprise the Atlantic Coast Line, the Seaboard Air Line, the Chesapeake and Ohio, the Norfolk and Western, the Norfolk and Southern, the New York, Philadelphia and Norfolk, and the Southern. Norfolk has an area of about 3¾ square miles, and is irregularly laid out on level ground. The more prominent buildings include the custom-house, the city hall, Saint Vincent's Hospital, the Norfolk Protestant Hospital, the post-office, and the Citizens' Bank. Saint Paul's Church is of historic interest, having been built in 1737. The city maintains a public library (10,500 volumes), and has several private secondary schools, among which is the Norfolk Mission College (United Presbyterian), an institution for colored students. There is a public park of 95 acres. The Norfolk Navy Yard is at Portsmouth (q.v.).

Norfolk is one of the most important Southern ports, its excellent transportation facilities contributing largely to its commercial prominence. The harbor is commodious, accessible for the largest ships, has a channel 30 feet deep, and is well protected, the defenses including Fort Monroe (q.v.). Norfolk and Portsmouth together constitute a Federal customs district, the foreign trade of which in 1901 comprised exports valued at $10,308,000 and imports aggregating $594,000. The commerce of the port is principally in lumber, coal, grain, cotton, peanuts, oysters, vegetables, and fruit. One of the largest coaling stations in the world is here—Lambert's Point coal piers, which handle annually some 2,500,000 tons. Norfolk is developing rapidly also as an industrial centre, a number of large plants having been established since 1900, when its manufactures, according to the census, represented capital to the amount of $6,425,000, and had a production valued at $9,397,000, a notable gain in output over that of 1890 ($5,100,000). The most important industrial establishments are fertilizer works, lumber mills, hosiery and knitting mills, cotton and silk mills, oil mills, carriage and wagon shops, foundries and machine shops, a steel shutter and blind manufactory, ship and boat building yards, creosoting works, agricultural implement works, tobacco and cigar factories, a large pickling establishment, etc. Under the charter of 1884, as subsequently amended, the government is vested in a mayor, elected every two years, and a council consisting of two bodies, the members of the select council being chosen by all the councilmen from among their own number. The council controls appointments of all administrative officers, excepting those elected by popular vote—school trustees, treasurer, attorney, street inspector, commissioner of revenue, collector of taxes, health officer, and minor officials. Norfolk spends annually in maintenance and operation about $845,000, the principal items being: for interest on debt, $250,000; for streets, $80,000; for water, $65,000; for the police department, $60,000; for schools, $60,000; for the fire department, $45,000. There are municipal water-works, built in 1872, and acquired by the city in the following year; the system cost $1,235,000 and has about 59 miles of mains. Population, in 1860, 14,620; in 1880, 21,966; in 1890, 34,871; in 1900, 46,624.

Organized as a town in 1682, Norfolk was incorporated as a borough in 1736, and was chartered as a city in 1845. On January 1, 1776, it was bombarded and set on fire by the English under Lord Dunmore, and nine-tenths of the buildings were destroyed. In 1855 the city suffered severely from the ravages of yellow fever. In April, 1861, General Taliaferro, at the head of a body of Virginia troops, entered the city, and soon afterwards the navy yard was fired by order of the Federal commandant, but comparatively little damage was done. Until May, 1862, when the Federal forces took possession, the city was the chief naval station of the Confederacy. Consult: Forrest, *Historical and Descriptive Sketches of Norfolk and Vicinity* (Philadelphia, 1853); Burton, *The History of Norfolk, Virginia* (Norfolk, 1877); Lamb, *Our Twin Cities of the Nineteenth Century* (ib., 1887-88).

NORFOLK, DUKES OF. See HOWARD.

NORFOLK ISLAND. An isolated island in the Pacific Ocean, 500 miles northwest of New Zealand, and 1200 miles northeast of Sydney; latitude 29° 3′ S., longitude 167° 58′ E. (Map: Australasia, J 5). Its area is 10 square miles. The coasts are high and steep, and the interior is mountainous, rising in Mount Pitt to a height of 1040 feet. In its forests the most conspicuous tree is the magnificent Norfolk Island pine (*Araucaria excelsa*). The soil is fertile and the climate is healthful. The inhabitants in 1901 numbered 870, most of whom are the descendants of the mutineers of the *Bounty*, who in 1856 were transferred hither by the British Government from Pitcairn Island (q.v.). Others are pupils in the Melanesian mission school established here. The island is governed by a resident magistrate and council under the administration of New South Wales. It was discovered by Cook in 1774, and was used by New South Wales as a penal settlement down to 1851.

NORFOLK ISLAND PINE. See ARAUCARIA.

NORFOLK SPANIEL. See SPANIEL.

NOR'ICUM. A province of the Roman Empire, corresponding to Styria, Carinthia, parts of Upper and Lower Austria and Bavaria, and Salzburg. It was bounded on the north by the Danube, on the east and south by Pannonia; also south by Illyricum and Cisalpine Gaul; on the west by Rhætia. The region is mountainous, the Noric Alps stretching through the centre of the province; the chief rivers were the Œnus (modern Inn), Dravus (Drave), and Murius (Mur). The chief town was Noreia, mentioned by Cæsar in his *Commentaries*. The province was subdued by the generals of Augustus (c.13 B.C.). The Romans obtained iron and salt from the region, and, it is said, gold.

NOR'MA. An opera by Bellini (q.v.), produced at La Scala, Milan (1832). The libretto by Romain was based on Saumet's tragedy *Norma*, which appeared in 1831. Norma, a high priestess of the Druids, secretly married Pollio, the Roman general. He, faithless to her, urges the virgin Adelgiza to fly with him. She confesses to Norma, who in fury calls the Druids, and Pollio is condemned. Norma, confessing her broken vows, dies with him.

NOR'MAL. A town in McLean County, Ill., 61 miles northeast of Springfield; on the Illinois Central and the Chicago and Alton railroads (Map: Illinois, C 3). It is the seat of the Illinois State Normal University, and of the State Soldiers' Orphans' Home. Nursery stock, fruit, and vegetables are extensively cultivated in this vicinity; and Normal is also an important horse market. There are municipal water-works. Population, in 1890, 3459; in 1900, 3795.

NORMAL (Lat. *normalis*, according to rule, from *norma*, rule, carpenter's square). In mathematics, a straight line perpendicular to a tangent at the point of its contact with the given curved line or surface. The evolute (q.v.) of a curve may be considered as the envelope of the normals to the given curve. This relation is evident since the centres of curvature of which the evolute is the locus are the intersections of normals at adjacent points of the curve; e.g. the semicubical parabola, an evolute of the common parabola, is an envelope of the normals to this curve. See PARABOLA.

The *subnormal* corresponding to any curve is the segment of the axis intercepted by the normal and the ordinate of the point of contact.

NORMAL COLLEGE. An institution for the training of teachers, in New York City, founded in 1869 and having its inception in the growing demand for professionally trained teachers in the public schools of New York. Previous to its foundation the secondary education of women in New York was supplied by private schools and the supplementary classes of the public grammar schools. The inadequacy of this method was, however, soon felt, and as early as 1847 the State Legislature contemplated an institution similar to the City College. (See NEW YORK, COLLEGE OF THE CITY OF.) In 1856 a Daily Normal School was actually established, but it ceased to exist after a precarious career of about three years. The Saturday Normal School was then organized for the training of teachers. While these makeshifts were being resorted to in New York, the State at large was rapidly increasing its number of normal schools, and otherwise multiplying the facilities for the training of teachers. This educational awakening throughout the State had the effect of hastening the establishment of a normal institution in New York City. In 1869 the Board of Education was empowered to establish a female institution similar to the City College, and the same year the Normal and High School was established. The name was changed in the following year to Normal College. The pupils of the various supplementary classes were admitted to advanced standing and a three years' course was organized. The task of arranging the work of the new institution fell to Dr. Thomas Hunter, the president since its inception. Under his vigorous administration the college grew rapidly. A building erected on the block bounded by Lexington and Park Avenues and Sixty-eighth and Sixty-ninth streets, at a cost of over $350,000, was opened in 1873. A model primary school was opened for practice teaching at an additional cost of $80,000, and the first free public kindergarten in the United States was established at the Normal College in 1871. The Board of Education and the president of the college have since its organization constituted an ex officio board of trustees. The attendance, which in 1870 numbered 969, with a graduating class of 97, increased by 1902 to 2844. In the same year the staff of instructors, including those in the training department, numbered 101. The total number of graduates since the foundation of the college was, in 1902, over 9000. There has been a constant tendency to raise the requirements for graduation; the course was extended to four years in 1879, to five, for students taking a degree, in 1888, and in 1902 a professional course of six and a collegiate course of seven years were organized, the institution thus being raised to the standard required by the University of the State of New York for degree-conferring institutions. The college includes five fully equipped laboratories and the Alumnæ library. High school graduates are admitted to advanced standing.

NORMAL SCHOOL. In general, any institution for the professional training of teachers. In a special sense, the term is used to designate a school for the training of elementary school teachers, carried on usually by the State, sometimes by private enterprise, which receives students who have had more or less high school training, and gives them academic and professional courses. Normal schools in some form are now found throughout the civilized world, usually as integral parts of the systems of public education in the several countries or States. The earliest successful normal school appears to have been that established by La Salle in 1685 at Rheims, France. Not until early in the nineteenth century, however, were public normal schools established in France. In Germany the first attempt to provide professional training for teachers is attributed to August Hermann Francke, who in 1704 founded the normal school at Halle, which still bears his name. During the reign of Frederick the Great, and especially during the period after the French Revolution, many normal schools (or teachers' seminaries, as they are called) were founded, especially in Prussia. There are to-day in Prussia alone no fewer than 116 normal schools. In Great Britain there is a well-developed system of public normal schools (called also teachers' training colleges), the growth chiefly of the last fifty years. The British system has been successfully extended to Canada, Australia, and South Africa. In America the first normal schools were founded in Massachusetts in 1839 and 1840 at Lexington, Barre, and Bridgewater. They were the result, in particular, of the combined efforts of the following men toward securing higher qualifications among teachers: Charles Brooks, who visited Prussian normal schools in 1834, and disseminated the ideas he had gained during the following two years; of Henry Barnard, the distinguished pioneer in educational journalism and educational progress; of Edmund Dwight, who offered the Legislature $10,000 on condition that it should appropriate an equal amount to promote the preparation of teachers for the common schools; and especially of Horace Mann, who as secretary of the State Board of Education did more than any other man to develop the normal school idea and to make it effective. The course in these early normal schools included (1) the science and art of teaching the common school branches; together with (2) the subject matter of these branches, and, if possible, of such higher studies also as algebra, geometry, general history, natural philosophy, and astronomy; and (3) practice teaching in a model school. In the thirty years following the establishment of these schools, no fewer than fifteen leading normal schools of the highest type were established in as many different States; and many more of inferior quality. In 1898-99 there were in the United States 166 public and 165 private normal schools, with a total enrollment of 68,380 students.

In standards and courses of study the normal schools of the United States vary widely. The minimum entrance requirements are indicated by the subjects in which examinations are required for admission, viz. arithmetic, geography, grammar, composition, orthography, American history, civil government, physiology and hygiene, and penmanship. Students presenting these qualifications may be graduated on completion of a two-year course, including one year devoted to the theory and practice of teaching. The more advanced courses include high school subjects, methods in elementary subjects, psychology, the science of education, history of education, child study, and practice teaching. Many normal schools offer special courses for the training of kindergarten teachers.

The name Normal College has been given to certain institutions, like the Albany State Normal College, and the Michigan State Normal College, which require a full high-school course for admission, and which, in addition to more extended professional courses than are usually offered by normal schools, undertake the preparation of teachers for secondary schools. Such institutions are empowered to grant pedagogical degrees.

The establishment of university chairs and departments of education, a movement of the greatest significance for education, has been the growth of the past fifty years. Its beginnings were weak and tentative. In America the honor of the earliest attempts is due to President Francis Wayland at Brown University (in 1850), to Horace Mann, at Antioch College (in 1853), and to President Barnard, at Columbia College (in 1858). The first chair of education to be established on a solid basis in an American college or university was that at the University of Michigan under President Angell in 1879, since which time such departments have been established in large numbers throughout the country.

The rapid growth of large cities has created a demand for trained teachers, which all the agencies thus far mentioned have proved entirely inadequate to supply. This need has been met in part by the establishment of city training schools. The Brooklyn Training School, organized by Superintendent William H. Maxwell, is a type of the best of such schools. It receives on examination the graduates of public high schools, and prepares them to be teachers in elementary schools by a course in the history of education, pedagogy, methods of teaching elementary subjects, etc. A half year is also spent in substituting for pay in the public schools.

For the benefit of teachers in the service, particularly those who have had little or no professional training, teachers' institutes have been organized, and have been a feature of American education for the past sixty years. The teachers' institute is a short-time school, whose aim is to give stimulus and guidance to teachers in personal knowledge and skill, and in personal culture. Its curriculum usually includes methods of teaching and school management, the subject matter of some branch or branches of literature, science, or art, together with general lectures for culture or recreation. The method of instruction is usually by lectures; but sometimes lessons are assigned and recitations held—the best institutes having modified the formal lecture system. The instruction is given either by a regular institute corps, as in the State of New York, or by a special corps organized for each institute, as in Pennsylvania. See NATIONAL EDUCATION, SYSTEMS OF; NORMAL COLLEGE; PEABODY NORMAL COLLEGE; SUMMER SCHOOL; TEACHERS COLLEGE.

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NOR'MAN. A city and the county-seat of Cleveland County, Okla., 50 miles south of Guthrie; on the Atchison, Topeka and Santa Fe Railroad (Map: Oklahoma, F 3). It is the seat of the University of Oklahoma, which was opened in 1892, and of the Territorial Insane Asylum. There are manufactures of cottonseed oil, flour, etc., and some trade with the fertile agricultural section adjacent. The water-works are owned by the municipality. Population, in 1890, 787; in 1900, 2225.

NORMAN, HENRY (1858—). An English traveler and author, born in Leicester, September 19, 1858. He graduated from Harvard and studied at Leipzig University. For some years he was on the *Pall Mall Gazette*, and later he became assistant editor of the *Daily Chronicle*, from which he withdrew in 1899. His voyages include the United States and Canada, Japan, China, Siberia, Korea, India, Siam, the Malay Peninsula, and Egypt. We may mention these works: *An Account of the Harvard Greek Play* (1881); *The Real Japan* (1892); *The Peoples and Politics of the Far East* (1895); *The Near East* (1899); *All the Russias* (1902); and *Delhi: An Account of the Great Mutiny in India* (1902). The work of this writer is characterized by keen insight, fairness, and brilliant sobriety of tone.

NORMAN ARCHITECTURE. A style originated and chiefly used by the Normans, and a subdivision of Romanesque (q.v.) architecture, under which its principal monuments are described. Soon after their conquest of the north of France, during which they had indulged in wholesale burning of churches and monasteries, the Normans began to rebuild religious structures on a larger scale, as a consequence of their conversion. They accordingly expanded the dimensions, while to a great extent at first retaining the style of the buildings they found in France. They seem also to have borrowed some of their ideas from the Rhine, and from Lombardy, especially the use of vaulting. They carried the architecture of their province and of France with them to England with the Conquest, and even to South Italy, where they established a great kingdom in the eleventh century. The leading characteristics of their style were great size, simplicity, and massiveness. They adopted the old Basilical plan of central and side aisles and semicircular apse, though the square apse was sometimes used in England toward the close of the style. They seized on the tower as a distinguishing feature, and developed it as their style progressed, placing one usually on each side of the façade. The ornaments are simple and of great variety; but the most common and distinctive are the zigzag, billet, chevron, nail-head, etc. The windows and doors are simple, with semicircular arched heads—the former without tracery. The tympanum of the door-arch is occasionally filled with sculpture. The nave arches are carried sometimes on heavy single pillars in English examples, but more frequently, especially as the style advanced, on piers with shafts. Owing to the great size of the buildings, the architects were unable at first to vault the main aisle, which, accordingly, had usually a wooden roof, the side aisles only being vaulted. In France, however, vaulting of the nave became common after 1100, though not in England.

The masonry was at first rude, the joints being large, and the stones hewn with the axe; but in the twelfth century the technique improved with the use of the chisel. The style prevailed from about the beginning of the eleventh century until the rise of Gothic in the thirteenth. There are many examples in Normandy, the churches at Caen being well-known buildings of the date of William the Conqueror. The chapel in the white tower of the Tower of London is the earliest example of pure Norman work in England. The development of vaulting in the French section of the Norman school furnished the models for the development of the Gothic method of ribbed vaulting, while the English section remained stationary and maintained itself longer than in France, until early in the thirteenth century. The Normans, while good builders, did little in sculpture, painting, or the minor arts.

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NOR'MANBY, CONSTANTINE HENRY PHIPPS, Marquis of (1797-1863). An English statesman and author. He was the eldest son of the first Earl Mulgrave. He was educated at Harrow and Cambridge, and became member of Parliament for Scarborough in 1818. Although of a Tory family, he acted with the Liberals; his first speech was in favor of the political claims of the Roman Catholics, and his second advocated Lord John Russell's proposals for Parliamentary reform. He succeeded to the title in 1831, and soon after was made Governor of Jamaica, where he successfully executed the act for the emancipation of the slaves, and suppressed without loss of life a mutiny of the soldiers. Returning to England, he succeeded the Earl of Carlisle as Lord Privy Seal in 1834. He was Lord Lieutenant of Ireland (1835-39), and displayed an impartiality which won the approbation of O'Connell. He was made a marquis at the coronation of Victoria, and was Colonial Secretary for a short time in 1839, but was soon transferred to the home department, where he remained till 1841. From 1846 to 1852 he was Ambassador at Paris, and from 1854 to 1858 at Florence. He published *A Year of Revolution* (1857), containing his personal observations at Paris, and a number of novels, including: *Matilda* (1825), *Yes and No* (1828), and *The Contrast* (1832).

NOR'MANDY (Fr. *Normandie*). A former province of France, bordering on the English Channel. Its capital was Rouen. It is comprised in the modern departments of Seine-Inférieure, Eure, Orne, Calvados, and La Manche. In the northeastern part of Normandy (formerly Upper Normandy) are the towns of Rouen, Dieppe, Havre, Harfleur, Honfleur, Lisieux, Evreux, Yvetot; in the southern and western parts (Lower Normandy) are Caen, the chief town, Falaise, Saint-Lô, Bayeux, Coutances, Avranches, Granville, Alençon, and Cherbourg.

In the time of the Romans the region was included in *Gallia Lugdunensis Secunda.* Under the Frankish monarchs it formed a part of Neustria, and came to be known as Normandy after Charles the Simple, in 911 (912?), had given it to Hrolf or Rollo, the leader of a band of Norse rovers (see NORMANS), as a fief of the French Crown. From Hrolf (baptized under the name of Robert) and Gisela, the daughter of Charles the Simple, sprang the dukes of Normandy, of whom Richard I. (grandson of Hrolf) vigorously maintained his authority against his liege lords, Louis IV. and Lothaire. William II., son of Robert II., *le Diable,* became Duke of Normandy in 1035, and in 1066 established a Norman dynasty on the throne of England (see WILLIAM I.), thereby politically uniting Normandy with the latter country. In 1077 his eldest son, Robert, wrested Normandy from him, but it was again united to England under Henry I. in 1106. With this monarch the direct male line became extinct. Henry II., the son of Henry I.'s daughter, Matilda, after the death of Stephen of Blois, obtained in 1154 the government of England and Normandy; but in the reign of his son, John, Normandy was conquered by Philip Augustus of France (1202-04). It remained a portion of the French monarchy for over two centuries, save when conquered by Edward III. in 1346; but after the battle of Agincourt (1415) it was reconquered by the English, who held it till 1449, when it was finally wrested from them by Charles VII. The Channel Islands, which were once a part of Normandy, have remained in possession of England. Consult: Dumoulin, *Histoire générale de Normandie* (Rouen, 1631); Goube, *Histoire du duché de Normandie* (Rouen and Paris, 1815); Barthélemy, *Histoire de la Normandie ancienne et moderne* (Tours, 1857).

NORMAN FRENCH. A French dialect which originated in Normandy after the Scandinavian invaders, under Rollo, had settled there about 911. (See NORMANDY and NORMANS.) At a very early date these Scandinavians adopted the French language, together with French religion and culture. The Normans in adopting French as a medium of communication and for purposes of literary expression retained many Scandinavian words, which are still, though in a greatly changed form, characteristic of this French dialect. It is not always possible, however, to distinguish these elements, because the Norman French has been influenced, though undoubtedly to a much less extent, by another Germanic tongue, the Saxon. The largest class of Scandinavian derivatives in Norman French is that of proper names of persons and places. Among the first of these, occurring in early works, may be mentioned *Boudre*, from *Baldr; Hérault*, from *Haraldr; Turquetil*, from *Thorketill; Sigvard*, from *Sigwarth*. In place names suggestions of a Danish origin are numerous, as in *Danneval, La Dennerie, Danemarche, Dancourt*. Many Northern suffixes occur in Norman place names, as *dalle* in *Brecquedalle*, *bec* in *Caudebec, Houlbec*, etc., *torp*, familiar in English words of Northern origin, in *Torgistorp*, and *stein*, in *Crestein* and *Gouestain*. Among other words of possible Scandinavian origin the following may be noted: *bruman*, a newly married man; *vin huet*, white wine; *raguer*, to shave or rake; *tang*, seaweed, Old Icelandic *thang*. Several nautical terms in use in Norman French seem to be of Norse origin, as *brant*, the bow of a ship, Old Norse *brandr*, *escuif*, a ship; *hune*, top of a mast, Old Icelandic *hunn*. A few of these words have passed into standard French, but most of them are used only dialectically. Norman French is also distinguished by its sounds, prominent among which is the pronunciation of initial *h*, which in the other French dialects is silent. During the early period Norman French played an important part in French literature, some of the most important monuments being written in this dialect.

Of greater interest to English readers than the peculiarities of Norman French at home is its development in England after the Conquest. In order to distinguish between the French used on the Continent and that used in England, the latter is often called Anglo-Norman or Anglo-French, of which terms the second is now the more generally used. One of the most obvious of these influences in the case of Anglo-French was the introduction of English words, especially those that expressed specifically English ideas, for which no French word existed. The pronunciation, too, was influenced by the English, especially in connection with the accent. The influence of French had begun before the Conquest, as a result of the strong French sympathies of Edward the Confessor, and for several centuries after the Conquest French continued to be the Court language. A considerable French literature was produced in England, both in poetry and prose, and many works of a non-literary character, such as law codes, wills, etc., have been preserved. Many French words were borrowed, forming the first period of the French element.

The best popular account of the Anglo-French is found in Skeat, *Principles of English Etymology*, second series (Oxford, 1891). The best technical treatment is by D. Behrens, in Paul's *Grundriss der germanischen Philologie* (2d ed. 1897). There is no complete dictionary of Anglo-French, though a number of texts have been edited. Useful lists of English words found in Anglo-French have been published by Skeat (1882-89). The question of the influence of Scandinavian culture on the Normans has been discussed from opposite sides by Le Héricher, *Les Scandinaves en Normandie* (Paris, 1877), and A. Fabricius, *Danske Minder i Normandiet* (Copenhagen, 1897).

NORMAN LAW. When, about 911, Charles the Simple ceded to the Scandinavian pirate Hrolf, or Rollo, that portion of Neustria which was thenceforth known as the Duchy of Normandy, the institutions and customs of the country were Frankish. These institutions and customs the conquerors apparently accepted, for there is little trace in the later Norman law of Scandinavian influences. Some at least of the Frankish imperial institutions were more fully preserved under the Norman dukes than in other parts of France. Our knowledge, however, of Norman law in the tenth and eleventh centuries is very imperfect; it is based largely on inferences from earlier Frankish and later Anglo-Norman sources.

For the period from the Norman conquest of England in 1066 to the French conquest of Normandy in 1202-04 we have considerable material; we have twelfth century documents (printed by Bigelow as an appendix to his *History of Procedure in England*, 1880) and more or less complete Exchequer Rolls of various dates from 1180 to 1203 (published by Stapleton, with valuable observations, 1840, 1844). That the organization of the exchequer was originally Norman and not English is shown by its existence in the Norman Kingdom of Sicily in the first half of the twelfth century. As later in England, exchequer was a judicial as well as an administrative authority, and from the time of Henry I. it included trained lawyers. Like the Frankish emperors, the Norman dukes sent out *missi*, or itinerant justices, who held court in various parts of the duchy. In the ducal court and in the circuit courts procedure was initiated by ducal writ (*breve*), and proof by wager of battle was supplanted by an inquest of the vicinage. This was a further development of the Frankish *inquisitio;* and the Norman 'jury of proof,' as Brunner calls it, was transferred to England and became the jury of judgment. That in other respects the influence of Norman law upon English law was very great is universally admitted; but there is as yet no agreement as to the extent to which it superseded the older Saxon law.

When Philip Augustus conquered Normandy he promised that the duchy should preserve its privileges. Shortly before, about 1200, a private compilation had been made, known as the *Statuta et Consuetudines Normanniæ*. To this was added, about 1218, a *Tractatus de Brevibus et Recognitionibus*. Later in the same century appeared compilations of judgments rendered in the exchequer and of judgments rendered in assize. The most complete statement of Norman law, however, is the *Grand Coutumier de Normandie*, described in the oldest Latin texts as the *Summa de Legibus Normanniæ* or *Jura et Consuetudines Normanniæ*. See GRAND COUTUMIER OF NORMANDY.

Gradually, by judicial interpretation, the law of Normandy was assimilated to that of Paris and of Northern France generally. Not only were the courts filled with French judges, but cases were carried to the Parliament in Paris. The notes or glosses which accompany the fifteenth century copies of the *Grand Coutumier* misinterpret some passages and declare that others are no longer in force. About the middle of the sixteenth century Guillaume Terrien wrote a commentary on the laws of Normandy, which was printed in 1574. This work and the original *Grand Coutumier* still constitute the basis of the law of the English Channel Islands.

In 1577 Henry III. ordered that a new *coutume* be drawn up for Normandy. The royal commissioners stated in their report that the old *coutume* was largely unintelligible and for the most part no longer in use; and in their revision they omitted some of the most important institutions, which give to the Norman law its historical importance, including the incompletely developed jury. The new *coutume* remained in force until the Code Napoléon gave France a common law.

Bibliography. Brunner, *Das anglonormannische Erbfolgesystem* (Leipzig, 1869); id., *Die Entstehung der Schwurgerichte* (Berlin, 1871); id., "Die Quellen des normannischen Rechts," in Holtzendorff, *Encyklopädie der Rechtswissenschaft* (5th ed., Leipzig, 1890); and "Die Quellen des anglonormannischen Rechts" (ibid.); Pollock and Maitland, *History of English Law* (2d ed., Boston, 1899). Both in Brunner's encyclopædia articles and in Pollock and Maitland full references are given to the sources and the older literature.

NORMANN, nôr′mån, Eilert Adelsten (1848—). A Norwegian landscape painter, born at Bodö. He studied (1869-73) under Eugen Dücker at the Academy in Düsseldorf, whence he afterwards made annual trips to his native country. The Norwegian fjords and their majestic surroundings furnished the themes for most of his works, executed with truly poetic conception and luminous in color. In 1887 he removed to Berlin, where his style gradually changed to a more realistic treatment. His best known views include: "Harbor of Bodö" (Düsseldorf Gallery), "Midnight in Lofoten Islands" (Cologne Museum), "Romsdals Fjord" (Stockholm Museum), "Summer Night in Lofoten Islands" (National Gallery, Berlin), "Narö Fjord" (Dresden Gallery and Museo Civico, Turin), "Sogne Fjord" (Rudolphinum, Prague, and National Museum, Budapest).

NORMANS (OF. *Norman, Normand*, from Dan. *Normand*, Icel. *Norþmaþr*, Northman, from Icel., AS. *norþ*, OHG. *nord*, Ger. *Nord*, north, probably connected with Umbrian *nertro*, to the left, Gk. *νέρτερος*, *nerteros*, lower + *maþr*, Goth. *manna*, AS., OHG. *man*, Ger. *Mann*, man). A name generally restricted in its application to those sea rovers who established themselves in the part of France called, after them, Normandy; but sometimes embracing also the early inhabitants of Norway. During the Middle Ages the name Northmen, or Norsemen, was often used in a broader sense, to denote the entire population of Scandinavia. The Germans and French called the piratical hordes who ravaged their shores Normans or Northmen; the Saxons, usually Danes or Eastmen. They were also distinguished by the latter as *Mark* (or March) men (from Den*mark*), as *Ash*-men (i.e. men of the *ashen*-ships), and as the *Heathen*. The primary cause of the plundering expeditions southward and westward across the seas, undertaken by the Norse Vikings, 'Sea-Kings,' was doubtless the over-population and consequent scarcity of food in their native homes; besides, the relish for a life of warlike adventure, conjoined with the hope of rich booty, strongly attracted them. Finally, discontent with the ever-increasing power of the greater chiefs or kings induced many of the nobles with their followers to seek new homes.

The first Danish Norsemen made their appearance on the eastern and southern coasts of England about 787. In 795 they settled in some of the towns on the coast of Ireland. After 832 their invasions of England were repeated almost every year. In 851 they wintered for the first time in the island, and after 866 obtained firm footing there. The Anglo-Saxon Ethelred I. fought valiantly against them. His brother, Alfred the Great (q.v.), after a long and doubtful struggle, partially reduced them to subjection; nevertheless, he was compelled to leave them in possession of Northumbria and East Anglia, and had not only to defend himself against a new and fierce invasion led by the famous rover Hastings (q.v.), but to contend against the revolts of his Dano-Norman subjects, which continued to trouble his immediate successors. A period of external peace ensued; but in 991 the invasions of the Danes and Norwegians began anew. The Saxon King, Ethelred II., at first sought to buy them off by paying a sort of tribute money, called Danegeld (q.v.); but the massacre of the Danes living in England, by command of that monarch, November 13, 1002, was avenged by four expeditions under the Danish King, Sweyn, who frightfully wasted the country, and finally conquered it in 1013, dying the following year. His son, Knut, or Canute (q.v.), after carrying on a struggle for the supreme power with Ethelred and his successor Edmund Ironside (q.v.), at length, on the death of the latter, became sole monarch of England, which now remained under Danish or Norse rulers till 1042. The government of the country then reverted into the Saxon hands of Edward the Confessor (q.v.), who was succeeded in 1066 by Harold II. (q.v.), son of the powerful Godwin (q.v.), Earl of Wessex; but in October of the same year Harold lost his life and crown at the battle of Hastings, and William the Conqueror, a descendant of a Norwegian chief who had settled in Normandy, once more established a Norse dynasty on the throne of England.

It was also Danish Norsemen, in particular, who ravaged the western coasts of the European mainland, from the Elbe to the Garonne. As early as 810 the Danish King, Gottfried, had overrun Friesland; but the power of Charles the Great was too much for these undisciplined barbarians, and they were overawed and subdued for a time. Soon after his death, however, they recommenced (c.820) their piratical expeditions, and, favored by the weakness and dissensions of the Carolingian rulers, became, during the ninth century, the terror and scourge of Northwestern Germany and France. They plundered Hamburg several times, ravaged the coasts of the Frisians (whose country then extended as far as the Scheldt), and in 843 firmly planted themselves at the mouth of the Loire. Ere long they swarmed up the great rivers into the interior of the country, which they devastated far and wide. In 842 they were at Rouen. In 845 they ascended the Seine and plundered Paris—an exploit which was frequently repeated. In 885 not less than 40,000 of these Vikings, in 700 vessels, are said to have ascended the river from Rouen, under the leadership of one Siegfried, and besieged the capital for ten months. It was only saved at the expense of Burgundy, which was abandoned to their ravages. In 881 Louis III., King of the West Franks, inflicted a severe defeat on the invaders at Vineu, near Abbeville, in Picardy; but neither that nor the repulse which they sustained from the brave German monarch Arnulf near Louvain in 891 could hinder them from making fresh irruptions. In 892 they appeared before Bonn, and tradition says that bands of Danish rovers penetrated even into Switzerland, and established themselves in the Canton of Schwyz and the Vale of Hasli. From their settlements in Aquitania they proceeded at an early period to Spain, plundered the coasts of Galicia in 844, and subsequently landed in Andalusia, but were defeated near Seville by the Arab prince Abd-ur-Rahman. In 859-860 they forced their way into the Mediterranean, plundered the shores of Spain, Africa, and the Balearic Isles, and penetrated up the Rhone as far as Valence; then, turning their piratical prows in the direction of Italy, entered the Tyrrhenian Sea, burned Pisa and Lucca, and actually touched distant Greece before their passion for destruction was satiated.

Doubtless Norwegian rovers also took part in these so-called Danish expeditions. We know that as early as the beginning of the ninth century they made voyages to the north of Ireland, Scotland, the Hebrides, the Orkney and Shetland Isles; and the increasing power of Harald Haarfagr (q.v.), in the ninth and tenth centuries, exciting great discontent among the smaller chiefs, great emigrations took place, and these islands became the new homes of these Norwegian Vikings. About the same period colonies were settled in the Faroë Isles and Iceland, from which some Vikings proceeded westward across the North Atlantic to Greenland about 983, and thence about 20 years later southward to a region which they called *Vinland*, believed by some to be the coast of Canada or of New England, thus probably anticipating the discovery of America by Columbus by nearly 500 years. From Norway also issued the last and most important expedition against the coast of France. It was led by Hrolf or Rollo (q.v.). Hrolf forced Charles the Simple to grant him possession of all the land in the valley of the Seine, from the Epte and Eure to the sea (911 or 912). The invaders firmly planted themselves in the country, which henceforth went by the name of Normandy (q.v.). They and their descendants are, strictly speaking, the Normans of history. They rapidly adopted the more civilized form of life that prevailed in the Frankish kingdom—its religion, language, and manners. At a later period, the twelfth century, they even developed a great school of narrative poetry, whose cultivators, the *Trouveurs*, or *Trouvères*, rivaled in celebrity the lyrical troubadours of Southern France. But though the Normans had acquired comparatively settled habits in France, the old passion for adventure was still strong in their blood; and in the course of the eleventh century many nobles with their followers betook themselves to Southern Italy, where the strifes of the native princes, Greek and Arab, opened up a fine prospect for ambitious designs. In 1059 Robert Guiscard (q.v.), one of the ten sons of the Norman Count Tancred de Hauteville, all of whom had gone thither, was recognized by Pope Nicholas II. as Duke of Apulia and Calabria. His brother and liegeman, Roger, conquered Sicily. Roger II. of Sicily united the two dominions in 1127 and in 1130 assumed the title of King of Sicily; but in the person of his grandson, William II., the Norman dynasty became extinct, and the kingdom passed into the hands of the Hohenstauffen family. These Normans of Italy played also a considerable rôle in the Crusades, especially in the first, of which Bohemund I. (q.v.) and Tancred (q.v.) were among the principal leaders. See CRUSADE.

The Swedish Norsemen directed their expeditions chiefly against the eastern coasts of the Baltic—Courland, Esthonia, and Finland—where they made their appearance in the ninth century, at the very time when their Danish and Norwegian brethren were roving over the North Sea, the English Channel, and the Bay of Biscay, and were establishing themselves on the shores of England and France. According to the narrative of the Russian annalist Nestor, they appear to have penetrated into the interior as far as Novgorod, whence they were quickly banished by the native Slavic and Finnish inhabitants, but were as quickly solicited to return and assume the reins of government. Rurik (q.v.) founded one kingdom at Novgorod (862), which stretched northward as far as the White Sea. His successor, Oleg, united with that a second, established by other Swedish adventurers at Kiev. (See RUSSIA.) For a long period these Norsemen, who, it appears, became completely identified with their Slavic-speaking subjects in the tenth century, were dangerous enemies of the Byzantine Empire, whose coasts they reached by way of the Black Sea, and whose capital, Constantinople, they frequently menaced, as, for instance, when Igor is said to have appeared before the city with upward of 1000 ships or boats, about the middle of the tenth century. Earlier in the same century these warriors had found their way into the Caspian Sea, and actually penetrated as far as Persia. Partly from them and partly from native Scandinavians came those soldiers who from the ninth to the twelfth century formed the bodyguard of the Byzantine emperors, the celebrated Varangians (q.v.). Consult: Depping, *Histoire des expéditions maritimes des Normands* (2d ed., Paris, 1843); Freeman, *History of the Norman Conquest* (Oxford, 1867-76); Delarc, *Les Normands en Italie* (Paris, 1883); Keary, *Vikings in Western Christendom* (London, 1891); Du Chaillu, *Viking Age* (New York, 1890); Oman, *History of the Art of War* (London, 1898).

NORMANTON, nôr′man-ton. A town in the West Riding of Yorkshire, England, near the Calder, eight miles southeast of Leeds (Map: England, E 3). It is an important railway junction, and has coal-mining industries and iron works. Population, in 1891, 10,200; in 1901, 12,350.

NORNS (Icel. *Nornir*, Fates). The Fates of the Scandinavian mythology. They were three young women, by name Urd, Verdandi, and

Skuld—i.e. past, present, and future. They sit by the Urdarwell under the world-tree Yggdrasil, and there determine the fate both of gods and men. Every day they draw water from the spring, and with it and the clay that lies around the wells sprinkle the ash-tree Yggdrasil, that its branches may not rot and wither away. Besides these three great norns, there are also many inferior ones, both good and bad; for, says the prose Edda, when a man is born there is a norn to determine his fate; and the same authority tells us that the unequal destinies of men in the world are attributable to the different dispositions of the norns. These lesser norns corresponded to the *genii* of classic mythology. Women who possessed the power of prediction or magic also bore this name.

NOROÑA, nô-rō′nyȧ, Gaspar Maria de Nava Alvarez, Conde de (1760-1815). A Spanish poet and soldier, born at Castellón de la Plana. He served with distinction at the siege of Gibraltar and afterwards was made lieutenant-general. He had meanwhile been Ambassador to Russia. At the time of the French invasion he was Governor of Cadiz. His works include: *Madama Gonzalez*, a tragedy; *El hombre marcial* and *El cortejo enredador*, comedies; *Poesias* (1799); and *Ommiada* (1816), an epic poem of 15,000 verses, pronounced very dull reading. A selection of his works is found in *Biblioteca de autores españoles*, vol. lxiii. (Madrid, 1871).

NOR′RIDGEWOCK (properly *Nañrantswak*, where the river falls again). A tribe of Algonquian stock (q.v.), the leading member of the Abnaki (q.v.) confederacy. Their principal village, which bore the tribal name, was on the left bank of the Kennebec River, just below the rapids at Indian Old Point, near the present Norridgewock, Maine. Their territory embraced the whole Kennebec River region nearly to the coast, whence they were frequently called Kennebec Indians. The French established a mission at Norridgewock in 1688, and in 1695 the Jesuit Rasle took up his residence there, where he remained for the rest of his life, and succeeded in attaching the tribe so warmly to the French cause that they came to be regarded as the most dangerous enemies of the English colonists. In 1724 an expedition was sent against the settlement, which resulted in the destruction of the village and the dispersion of the tribe, Rasle himself being shot. A part of the fugitive Norridgewock afterwards returned and rebuilt their village, but on a second attack by the English in 1749 they retired to Canada, most of them joining the other New England refugees at Saint Francis.

NOR′RIS, Edwin (1795-1872). An English Orientalist, born in Taunton, Somerset. He was one of the first to decipher the Assyrian cuneiform inscriptions, was intimately associated with Rawlinson at various times, and published three parts of an *Assyrian Dictionary* (1868-72). His other works include studies of African dialects, an *Ethnographical Library*, of which, under his editorship, there appeared two volumes, and *The Ancient Cornish Drama* (1859), with an essay on Cornish grammar.

NORRIS, Frank (1870-1902). An American novelist, born in Chicago, Ill. He studied art in Paris from 1887 to 1889, and pursued literary courses at the University of California and at Harvard. *Yberville*, a story of Spanish life in old California, appeared in 1891. He was correspondent in South Africa for the San Francisco *Chronicle* at the time of the Jameson Raid, in 1896 and 1897 edited the San Francisco *Wave*, and in 1898 was a war correspondent in Cuba. *McTeague* (1899), a realistic story, was his first novel to attract attention. *Moran of the Lady Letty* (1900) is a story of adventure off the California coast. *The Octopus*, the first novel of a trilogy embodying an 'epic of the wheat,' was published in 1901. It concerns the growing of the wheat and arraigns the oppressive methods of railroad monopoly as existing in California. *The Pit* (1903) deals with the battles over the exchange of the wheat. The last part, *The Wolf*, as planned, was to depict the struggle for the wheat in a famine-stricken community in Europe. At the time of his death he held a position as literary adviser in a publishing house in New York City.

NORRIS, Henry (?-1536). An English courtier, son of Sir Edward Norris of Norreys. As a young man he became a favorite with Henry VIII., and was an opponent of Wolsey, to whose fall he contributed. Norris's attempts to advance Anne Boleyn were entirely successful, but his intimacy with her gave his enemies at court a means of attack. He was accused of an intrigue with her, quite unjustly it would seem, and was executed in 1536. His son became Baron Norris of Rycote.

NORRIS, William Edward (1847—). An English novelist, born in London. After going through Eton he went to the Continent to study languages, with the intention of entering the diplomatic service, but, changing his plans, he studied law, and was admitted to the bar in 1874, though he has never practiced. His short stories, contributed to the *Cornhill Magazine*, attracted the especial notice of the editor, Leslie Stephen, by whom he was encouraged to attempt the longer novel. *Heaps of Money* (1877) was followed by *Mademoiselle de Mersac*, a serial in *Cornhill* for 1879, and *Matrimony* (1880), a novel showing fine discrimination in character-drawing. Among his other novels are: *No New Thing* (1882); *Thirlby Hall* (1883); *Adrian Vidal* (1884); *A Bachelor's Blunder* (1885); *My Friend Jim* (1886); *Major and Minor* (1887); *The Rogue* (1888); *Miss Shafto* (1889); *Mrs. Fenton* (1889); *Marcia* (1890); *Mr. Chaine's Sons* (1891); *His Grace* (1892); *A Deplorable Affair* (1893); *The Dancer in Yellow* (1896); *Clarissa Furiosa* (1897); *The Widower* (1898); *Giles Ingilby* (1899); *An Octave* (1900); *Lord Leonard the Luckless* (1903).

NOR′RISTOWN. A borough and the county-seat of Montgomery County, Pa., 18 miles west by north of Philadelphia; on the Schuylkill River, the Schuylkill Canal, and the Pennsylvania and the Philadelphia and Reading railroads (Map: Pennsylvania, F 3). It is beautifully situated among hills and on the Schuylkill and two tributaries, and is popular as a place of residence. Among the institutions here are the county prison, the Norristown Hospital for the Insane (State), Charity Hospital, the Agnes Stinson Home for Aged Ladies, Friends' Home, Saint Joseph's Protectory (Roman Catholic) for girls, McCann Library (public), and Montgomery County Historical Society. Other prominent buildings and places of interest are the county court house, municipal building, high school, Masonic Temple, Montgomery Cemetery, with a tomb of Gen. W. S. Hancock and a shaft to Gen. John F. Hartranft, the Schuylkill Bridge (1829), and Valley Forge, but six miles distant. Norristown is in a rich agricultural and mining region, and has extensive manufactures of glass, wire, screws, iron, hosiery, knitting machines, shirts, etc. The government is administered by a burgess, elected every three years, and a unicameral council, which controls elections of subordinate municipal departments. The borough owns and operates its electric light plant. Founded in 1785 and named in honor of Isaac Norris, who had formerly owned a large part of the land in this vicinity, Norristown was incorporated as a borough in 1812, its population then being about 500. It was enlarged in 1853. It is claimed that the earliest settlement here was in 1688 by Friends from Wales. Population, in 1890, 19,791; in 1900, 22,265.

NORRKÖPING, nôr′chē-pĭng. A seaport on the east coast of Sweden, situated at the head of the Bråvik, 75 miles southwest of Stockholm (Map: Sweden, G 7). It is regularly laid out with streets crossing at right angles, and has several beautiful parks, squares, and promenades. There are many fine modern buildings, among the best of which are the almost palatial public schools, the new Church of Saint Matthew, the city hall, and the labor lyceum. The Motala, which flows through the town, is extensively utilized for water power, and Norrköping is one of the foremost manufacturing towns of Sweden. In 1900 there were 175 factories, whose products for the year were valued at $9,650,000. The most important manufactures are woolen and cotton textiles, paper, tapestries, and sugar. Norrköping is also one of the most important commercial ports in the country. Its harbor admits the largest vessels. The shipping in 1899 amounted to nearly 375,000 tons. The chief exports are manufactured goods, grain, wood, and dairy products. Population, in 1890, 32,826; in 1900, 41,008.

NORRLAND, nôr′lånt. The northernmost and largest, but least populous, of the three historical divisions of Sweden. It extends south as far as Gefle, and has an area of 80,785 square miles, with a population in 1901 of 860,254.

NORSEMEN, or NORTHMEN. See NORMANS.

NORSE MYTHOLOGY. See ÆSIR; SCANDINAVIAN MYTHOLOGY.

NORTH, CHRISTOPHER. The pseudonym of the part author of the *Noctes Ambrosianæ*, John Wilson (q.v.).

NORTH, FRANCIS, Baron Guilford (1637-85). A celebrated English jurist. He was born November 2, 1637, the third son of the fourth Lord North. Prejudiced against Presbyterians by the sternness of his early teachers, North was confirmed in this feeling by Dr. Stevens, a sturdy Royalist, head of the school at Bury Saint Edmund, where he finished his preparation for college. Matriculated at Saint John's College, Cambridge, he withdrew in two years to become a student of law in the Middle Temple. He was admitted to its practice in 1661, and as he had always been a student of great application, he soon gained a high rank at the bar. Indeed, his rise in favor at the Court was so rapid that he has been accused of using unworthy means to gain his end. He became Solicitor-General in 1671, Attorney-General in 1673, and Lord Chief Justice of the Common Pleas in 1675. In 1682 he was made Lord Keeper of the Great Seal. With other members of the Court party he was hostile to Titus Oates, and as judge ruled in such a manner against Stephen College that it aided in securing a death sentence. This act constitutes the most serious blot on his fame as a judge, for in most cases his decisions were marked by their ability and justice. He was a Royalist, true to Charles II. at all times. In 1683 he entered the House of Lords as Baron Guilford, but took little part in its proceedings. He was a man of vast knowledge and wide culture, an excellent musician, a patron of artists, and a friend of natural sciences, yet withal too complaisant to the corruptions of his day. As a lawyer his ability and learning were undoubted, and his decisions did much to increase the jurisdiction of the Court of Common Pleas. Consult Roger North, *The Lives of the Norths* (London, 1890).

NORTH, FREDERICK, Lord, Earl of Guilford (1732-92). An English statesman. He was a son of Baron Guilford. After a course at Eton and Trinity College, Oxford, and a period of Continental travel, North was at the age of twenty-two sent to the House of Commons as member from Banbury, a borough controlled by his father. From 1759 until the fall of the Rockingham Ministry in 1765 he held the position of a junior lord of the treasury. In December, 1766, after a short tenure of the office of paymaster, he was admitted as a member of the Privy Council. His ability won for him, in March, 1767, an offer of the chancellorship of the exchequer, which he at first declined, but upon the death of Townshend in September finally accepted. With this post went the leadership of the House of Commons, for which he was well qualified by his eloquence, good humor, wit, and readiness of resource. His attitude on the Townshend tea tax, however, was one of the immediate causes of the American war. It was North's own boast that as a member of the Commons he had "voted against all popular and in favor of all unpopular measures." In 1770 he succeeded the Duke of Grafton as Prime Minister. He was called by Horace Walpole the ostensible Minister; for the real Minister was King George III. It has since been proved that North as early as 1776 believed that the unyielding policy he was pursuing with regard to the American colonies would end in ruin to the King and to the country; yet in the face of the powerful opposition of Fox and Burke, he allowed his own convictions to be overborne by the obstinacy of King George's ultra-Tory purpose. In 1778 he was forced to a renunciation of the right to tax the colonies; but the concession came too late, and in 1782, finding it impossible to carry on the war any longer, he resigned. With North's retirement came to an end George III.'s scheme of governing the country by his own will, and of ruling the House of Commons. Soon, however, Fox entered into a coalition with North, against whom he had for so many years inveighed. North and Fox took office under the

Duke of Portland in 1783, but the coalition lasted only a few months. He succeeded his father as Earl of Guilford in 1790. During the last five years of his life North was totally blind. He bore his afflictions with great cheerfulness. He died August 5, 1792. North was an amiable man, possessed of considerable wit and talent, but lacking those powers necessary to carry a country well through a crisis like that which England experienced during his administration. Consult Donne, *Correspondence of George III. with Lord North* (London, 1867).

NORTH, Sir THOMAS (1535?-1602?). An Elizabethan translator, the son of Edward, first Baron North, and younger brother of Roger North (1530-1600), the courtier and soldier. He was probably educated at Peterhouse, Cambridge, and certainly studied at Lincoln's Inn (1557). In 1588 he was captain of three hundred men at Ely; was styled a man of courage; and was knighted in 1591. In 1601 he received a pension of £40 for his 'good and faithful service.' North, a master of clear and robust English, performed still greater service to literature. Under the title *The Diall of Princes* (1557), he Englished the Spaniard Guevara's *Libro aureo.* North's version was exceedingly popular. From the Italian of Antonio Francesco Doni he published the *Morall Philosophie of Doni* (1570; reprint by J. Jacobs, London, 1891), a collection of Eastern fables. Better known now is his version of Plutarch's *Lives* (1579; 2d edition 1595; enlarged 1603), made from the French of Amyot. It was the source of Shakespeare's Roman tragedies. Consult the reprint of the first edition of North's Plutarch, ed. by Wyndham (Tudor Library, London, 1895).

NORTH, WILLIAM (1752-1836). An American soldier, born at Fort Frederick, Maine. He entered the Revolutionary army in 1775, and in 1778 was a captain at the battle of Monmouth. The next year he was transferred to the staff of Baron Steuben and remained with him until the surrender of Cornwallis. He left the army with the brevet rank of brigadier-general, and went to live with Steuben, whose favorite he had become. A zealous Federalist, he took an active interest in politics, and was a member of the United States Senate in 1798-99. During the trouble with France in 1798 he was appointed adjutant-general of the army with the rank of brigadier-general. He wrote a valuable memoir of Baron Steuben.

NORTH AD'AMS. A city, including several villages within its corporate limits, in Berkshire County, Mass., 21 miles north of Pittsfield; on the Hoosac River, and on the Boston and Albany and the Boston and Maine railroads (Map: Massachusetts, A 2). An attractive feature of the city is its beautiful location, amid mountain scenery, at the foot of Greylock, the highest mountain in the State. It is near the western end of the famous Hoosac Tunnel, and the natural bridge which spans Hudson Brook at a height of 50 feet is in North Adams. The more prominent institutions are a State normal school, North Adams Library, and North Adams Hospital. The principal industries include the manufacture of cotton, woolen, and print goods, boots and shoes, machinery, etc. North Adams was one of the first places in the United States east of the Pacific slope where Chinamen were employed. The government is administered, under the charter of 1895, by a mayor, annually elected, and a unicameral council, elected on a general ticket. The majority of subordinate municipal officials are appointed, either absolutely or with the consent of the council, by the executive, but with these exceptions: city clerk and auditor of accounts, elected by the council, and assessors, trustees of public library, and school committee, chosen by popular vote. The water-works are owned and operated by the municipality. Population, in 1890, 16,074; in 1900, 24,200. Settled about 1765, North Adams was separated from Adams and incorporated as a town in 1878. In 1895 it became a city. The site of Fort Massachusetts, which was captured by the French and Indians under Vaudreuil in 1746, is in the western part of the city. Consult Spear, *History of North Adams* (North Adams, 1885).

NORTHAL'LERTON. A market-town in the North Riding of Yorkshire, England, 30 miles northwest of York (Map: England, E 2). It has a large number of public schools and other institutions, manufactures of linen and leather, brick-making, and malting. It is famous as the place where the battle of the 'Standard,' so called from a high standard erected on a car by the English, was fought, August 22, 1138, between the English under the earls of Albemarle and Ferrers and the Scotch under King David. The latter were defeated. Population, in 1891, 3802; in 1901, 4009. For the history, consult Ingledew (London, 1858) and Saywell (Northallerton, 1886).

NORTH AMERICA. See AMERICA.

NORTHAMP'TON. The capital of Northamptonshire, England, a market-town, Parliamentary and municipal borough, on rising ground on the Nen, 67 miles northwest of London (Map: England, E 4). The principal edifices are the shire hall, the handsome town-hall, the corn exchange, the numerous churches, several of which are unusually interesting, as Saint Peter's, a restored specimen of enriched Norman, and Saint Sepulchre's, one of the four round churches in the Kingdom, and dating from the twelfth century. Northampton has numerous endowed charitable and educational establishments. It is a horse-racing centre, and two meetings annually are held on a fine course in the suburbs. The town owns the water supply, markets, and a sewage farm; maintains a free library, museum, cemetery, fire brigade, and police force; and provides technical instruction. Northampton is the centre of the English shoemaking industry, and has currying works, iron foundries, maltings, breweries, flour and paper mills, and brick and tile works. Of early English origin, in the *Saxon Chronicle* it is called Mamptune. It was long in the possession of the Danes, who burned it in 1010. It was walled and strongly fortified by Simon de Saint Liz in 1075. During the Civil War it was held for Parliament. The meadows below the town witnessed the defeat of Henry VI. by the Yorkists in 1460. Population, in 1891, 75,075; in 1901, 87,021. Consult: *Liber Custumarum: the Ancient Customes of the Town of Northampton* (Northampton, 1895); Adkins, *Northampton in English History* (London, 1898).

NORTHAMPTON. A city, including several villages, and the county-seat of Hampshire County, Mass., 17 miles north of Springfield; on the Connecticut River, and on the Boston and Maine and the New York, New Haven and Hartford railroads (Map: Massachusetts, B 3). The city, which occupies elevated ground and is noted for its beautiful scenery, has become widely popular as a summer resort. It has, among noteworthy institutions, Smith College (q.v.), the Clarke Institute for Deaf Mutes, richly endowed by John Clarke, Northampton Insane Hospital (State), Smith Charities, Cooley Dickinson Hospital, Home for Aged and Invalid Women, the Burnham Classical School, Public, Forbes, and Lilly libraries, Memorial Hall, and Academy of Music. Among the conspicuous edifices are the court house and high school building. In the immediate vicinity of Northampton are Mount Tom and Mount Holyoke, both ascended by mountain railways and commanding magnificent views. The principal industries are the manufactures of silk, cutlery, brushes, lumber products, furniture, hosiery, wood pulp, emery wheels, boxes, foundry products, baskets, sewing machines, pocketbooks, etc. The government is administered, under the charter of 1883, by a mayor, annually elected, and a bicameral council, which controls appointments of the subordinate departments, excepting those of schools and the Forbes Library, chosen by popular vote. The water-works are owned and operated by the municipality. Population, in 1890, 14,990; in 1900, 18,643. Northampton was first settled in 1654 by a small company from Springfield, and was named (in 1655) after Northampton, England. In 1676, during King Philip's War, it was attacked by Indians. Jonathan Edwards was minister here from 1729 until dismissed in 1750. Northampton was chartered as a city in 1883. Consult Trumbull; *History of Northampton* (Northampton, 1898).

NORTHAMPTON, Assize of. A royal decree issued in January, 1176, by Henry II. of England. Like the Assize of Clarendon (q.v.), it is in the form of instructions to the itinerant justices. The penalties are severer than they were in the earlier document, and there are special orders in regard to difficulties due to the rebellion of 1173 against Henry II. (q.v.), which had centred about Henry's eldest son and namesake. Consult: Stubbs, *Constitutional History of England*, vol. i. (6th ed., Oxford, 1897); id., *Select Charters* (8th ed., Oxford, 1895), for the Latin text; Adams and Stephens, *Select Documents of English Constitutional History* (New York, 1901), for an English translation of the document.

NORTHAMPT′ONSHIRE, or North′ants. A southern midland county of England, bounded on the north by Lincoln, Rutland, and Leicester, on the east by Bedford, Huntingdon, and Cambridge, on the south by Oxford and Buckingham, and on the west by Warwick and Oxford (Map: England, F 4). Area, 998 square miles. The surface generally is undulating and well wooded; the northeast belongs to the Bedford Level (q.v.). The chief rivers are the Nen, Welland, and Avon. Stock-raising and the cultivation of pasture land are the chief branches of agriculture, but Northamptonshire is principally an iron-producing and manufacturing county. Northampton (the capital), Peterborough, Wellingborough, Daventry, and Kettering are the principal towns. Population, in 1891, 302,183; in 1901, 338,064. Consult Baker, *History and Antiquities of the County of Northamptonshire* (London, 1841).

NORTH AN′DOVER. A town in Essex County, Mass., 28 miles north of Boston and two miles southeast of Lawrence; on the Boston and Maine Railroad (Map: Massachusetts, E 2). It is important both as a residential place and as a manufacturing centre. There are several large woolen mills and manufactories of woolen mill machinery. North Andover was set off from Andover and incorporated as a town in 1855, the original form of government, by town meeting, still prevailing. The town owns and operates the water-works. Population, in 1890, 3742; in 1900, 4243.

NORTHANGER (nôrth-ăn′jẽr) **ABBEY.** A novel by Jane Austen (1818). It is a picture of commonplace English life in the latter part of the eighteenth century at Bath and at the Abbey, the countryplace of friends of the heroine, Catherine Morland. It was written early in her career (though not published till after her death) with a view of showing that the every-day life of ordinary people could be made as interesting as the absurd romances, like the *Mysteries of Udolpho*, which were then popular.

NORTH AT′TLEBORO. A town, including several villages, in Bristol County, Mass., 32 miles south-southwest of Boston; on the New York, New Haven and Hartford Railroad (Map: Massachusetts, E 4). It has the Richards Memorial Library (public), with 6000 volumes. There are extensive manufactories of jewelry, also establishments producing jewelers' supplies, cotton yarn, silverware, rope, braid, boxes, buttons, etc. North Attleboro was incorporated in 1887; its government is administered by town meetings. The water-works and electric light plant are owned by the municipality. Population, in 1890, 6727; in 1900, 7253.

NORTH BAY. A town in Nipissing district, Ontario, Canada; on Lake Nipissing, and the Canadian Pacific and Grank Trunk railroads (Map: Ontario, D 1). Small steamers ply on the lake, and the place is much visited by tourists and fishing parties. There is a United States consular agent. Population, in 1901, 2530.

NORTH BERWICK, bĕr′wĭk. A seaport town in Haddingtonshire, Scotland, at the entrance to the Firth of Forth, 19 miles east-northeast of Edinburgh (Map: Scotland, F 3). Formerly a fishing-village, North Berwick has now become a watering-place, noted for its fine sandy beach, and its five-mile course golf links. Near by are Bass Rock, North Berwick Law, and the ruins of Tantallon Castle, graphically described in Scott's *Marmion*. Tantallon Castle is an irregular pile, two miles east of the town, on a high rock, surrounded by the sea on three sides, with a ditch on the land side, where there was formerly a drawbridge. North Berwick Law is a conical hill of an elevation of 612 feet, on the south, close to the town. Population, in 1891, 1500; in 1901, 2784.

NORTH BRABANT′. A province of the Netherlands, adjoining Belgium and occupying the northern part of Brabant (q.v.) (Map: Netherlands, D 3). Area, 1980 square miles. It has a low surface and belongs to the basin of the Meuse. Agriculture and the raising of domestic animals are the chief occupations, but the manufacturing industries are also well developed. The chief manufactures are cotton and woolen fabrics, linen, hats, leather, etc. Population, in 1889, 509,628; in 1899, 553,845.

NORTH BRAD'DOCK. A borough in Allegheny County, Pa., ten miles from Pittsburg, on the Pennsylvania Railroad (Map: Pennsylvania, B 3). It is mainly a residential and manufacturing place, and has a large plant, making chiefly steel rails, of the United States Steel Corporation. Organized from a part of Braddock Township, North Braddock was incorporated in 1897; its government is administered by a burgess, elected every three years, and a council. Population, in 1900, 6535.

NORTH'BRIDGE. A town, including several villages, in Worcester County, Mass., 13 miles southeast of Worcester; on the Blackstone and Mumford rivers, and on the New York, New Haven and Hartford Railroad (Map: Massachusetts, D 3). The town has a public library, and its industrial interests are represented by extensive manufactures of cotton mill machinery, cotton and woolen goods, etc. Settled in 1662, Northbridge was set off from Mendon and incorporated as a separate town in 1772. The government is administered by town meetings. The water-works are owned and operated by the Whitin Machine Works, one of the town's great manufacturing plants. Population, in 1890, 4603; in 1900, 7036.

NORTH'BROOK, EARL. See BARING, THOMAS GEORGE.

NORTH CAPE. A promontory projecting into the Arctic Ocean from the island of Magero (q.v.), off the north coast of Norway, in latitude 71° 11′ north (Map: Norway, L 1). It is generally considered as the northernmost point of Europe, though a little to the west of it a low point of land, the Knivskjoerodde, extends a few minutes farther north. The northernmost point of the European mainland is Cape Nordkyn, 44 miles east of North Cape, in latitude 71° 7′. North Cape is a precipitous rocky headland, rising 968 feet above the sea. Its summit is crowned by a granite monument; in summer it is visited by numerous tourists.

NORTH CAR'OLI'NA (popularly called the 'Old North State,' also the 'Turpentine State'). A South Atlantic State of the United States. It lies between 33° 50′ and 36° 33′ north latitude, and between 75° 27′ and 84° 20′ west longitude. It is bounded on the north by Virginia, on the east and southeast by the Atlantic Ocean, on the south by South Carolina and Georgia, and on the west by Tennessee. Its extreme length from east to west is 503¼ miles, and its extreme breadth 187½ miles, the average breadth being about 100 miles. Its area is 52,250 square miles, including the large coast lagoons, the land surface covering 48,580 square miles, or 31,091,200 acres. Its gross area is, according to the latest official figures, exactly equal to that of Alabama, and is exceeded by 23 of the other States. In land area North Carolina ranks 25th.

TOPOGRAPHY. The State may be divided into three distinct topographical belts, the Appalachian mountain region in the west, the Piedmont plain in the middle, and the coastal plain in the east, the dividing lines between these running obliquely across the State from southwest to northeast. The mountain belt, taken as a whole, consists of a high plateau covering about 6000 square miles and lying at an average elevation of 2000 to 5000 feet. It is bounded on the east by the Blue Ridge, which rises in a steep and rugged escarpment from the Piedmont plain to a height of nearly 4000 feet above sea level in the north, becoming lower southward. On the west the plateau is bounded by the Great Smoky Mountains, whose crest separates North Carolina from Tennessee. Between these ridges the plateau itself is much dissected by river valleys running in all directions, and broken up into cross ranges and irregular mountain groups. These are generally rounded, forest-covered heights, but there are several pointed peaks, and some precipitous slopes and rocky cliffs. More than twenty-five peaks are over 6000 feet high. Their summits are generally bare. The highest is Mount Mitchell, in the group known as the Black Mountains, the culminating point of the Appalachian system and the highest peak in the eastern half of the continent. It rises from the centre of the plateau in North Carolina to a height of 6711 feet above the sea.

The portion of the State east of the mountain belt is about equally divided between the Piedmont and the coastal plains. The former reaches its widest development in this State, of whose area it includes nearly one-half. It slopes gradually from an elevation of 1000 feet at the foot of the Blue Ridge to less than 500 feet where it merges into the coastal plain. Its surface is undulating, rugged, and hilly near the mountains, but gradually levels toward the east. It is partly forested, but consists largely of cultivated land, being the most populous and best developed region of the State. The coastal plain occupies the eastern belt stretching from 100 to 150 miles from the coast. It is level and sandy, consisting in parts of pine barrens, and everywhere is less than 500 feet in elevation. It merges through low swamps into the shallow coast lagoons, of which Pamlico and Albemarle sounds are the largest. They are bounded on the ocean front by narrow sand beaches.

HYDROGRAPHY. The greater part of the State belongs to the Atlantic slope, but the western mountain region beyond the Blue Ridge belongs to the Mississippi basin, being drained by the headstreams of the Tennessee River, chief among which are the Little Tennessee and the French Broad River. The eastern slope of the Blue Ridge in this State is the watershed for nearly all the Atlantic rivers of both North and South Carolina, all of them having a generally southeast course. In the northern half of the State the Roanoke, the Tar, and the Neuse enter Albemarle and Pamlico sounds, through deep and wide estuaries. The southern portion is drained by the Cape Fear River, and the western part of the Piedmont plain by the Yadkin or Great Pedee and the Catawba, both of which flow into South Carolina. The large rivers of the coastal plain, especially their magnificent estuaries, offer facilities for communication, and on the Piedmont plain they furnish a vast amount of water-power.

CLIMATE. North Carolina lies in the warmer part of the temperate zone. The climate becomes almost sub-tropical in the southeastern corner. The mean temperature near the coast is 61°, and in the mountains 56°; the mean summer temperatures for the two regions are 77° and 72°, and the winter temperatures 45° and 40°. The normal maximum is about 100°, and the minimum for the central part of the State 10°, though such cold is rare. In the mountains the winters are more severe, but the Blue Ridge protects the rest of the State from the cold northwest waves. The rainfall is abundant and very evenly distributed, both in regard to seasons and localities, though the central region receives somewhat less rain than the coast and mountain regions, and the summer somewhat more than the other seasons. The annual average for the State is 53.3 inches. The average snowfall is about five inches, but snow rarely remains on the ground more than one or two days. The prevailing winds are from the northeast and southwest. The State lies outside the path of the cyclonic storms, and tornadoes are extremely rare; but the sub-tropical storms from the southwest sometimes endanger navigation along the coast.

Flora. North Carolina, being the meeting ground of the temperate and sub-tropical floras, and having all varieties of climate from sub-tropical to sub-arctic, is unrivaled by any State east of the Mississippi in the variety of its plant life, and is probably surpassed by no region of similar area elsewhere. In the swamps along the coast the prevailing tree is the bald cypress, with the white cedar and live oak. Here also are numerous bulrushes and several species of carnivorous plants (*Sarracenia* and *Drosera*). In the sandy parts of the coastal plain the long-leaf pine (*Pinus Australis*) is predominant, together with the loblolly-pine (*Pinus tæda*) and scrub oak. Composite and leguminous plants are here abundant, as well as blueberries, sumacs, alders, a profusion of wild grapes and other vines, and, in the south, palmettos. In the Piedmont plain the indigenous species have been largely supplanted by those introduced by settlers. Oaks, hickories, and elms are predominant in the forests of this plain. In the mountains the forest of the common northern trees covers a remarkable and typical northern undergrowth of gorgeous shrubbery, magnolias, rhododendrons, and similar species.

For Fauna, see that section under United States.

Geology and Mineralogy. The main geological surface formations are coincident with the topographical belts described above; in fact, the latter are a result of the former, and the coastal plain is a geological rather than a topographical division. It consists of Cretaceous and Tertiary sands, gravels, clays, and marls covering the underlying bed-rock of granites and limestones. The remainder of the State, the Piedmont plain and the mountains, has as its principal feature an immense belt of granites and gneisses running across the State from southwest to northeast, and flanked on the east by a narrower belt of crystalline schists and other slates. Between the latter and the coastal plain deposits is a still narrower belt of more recent formation—the Triassic red sandstone. The Great Smoky Mountains in the extreme west and the southern portion of the Blue Ridge consist of rocks of the Ocoee formation. The red sandstone formation contains coal deposits, and also yields the most valuable building stones. The crystalline rocks, which are much folded, tilted, and broken, are penetrated in many places by quartz veins, some of which are auriferous. Other veins are impregnated with copper ores, and valuable iron deposits are also found both in the granite and slate belts, while ores of silver, lead, and zinc are also found, sometimes associated with gold.

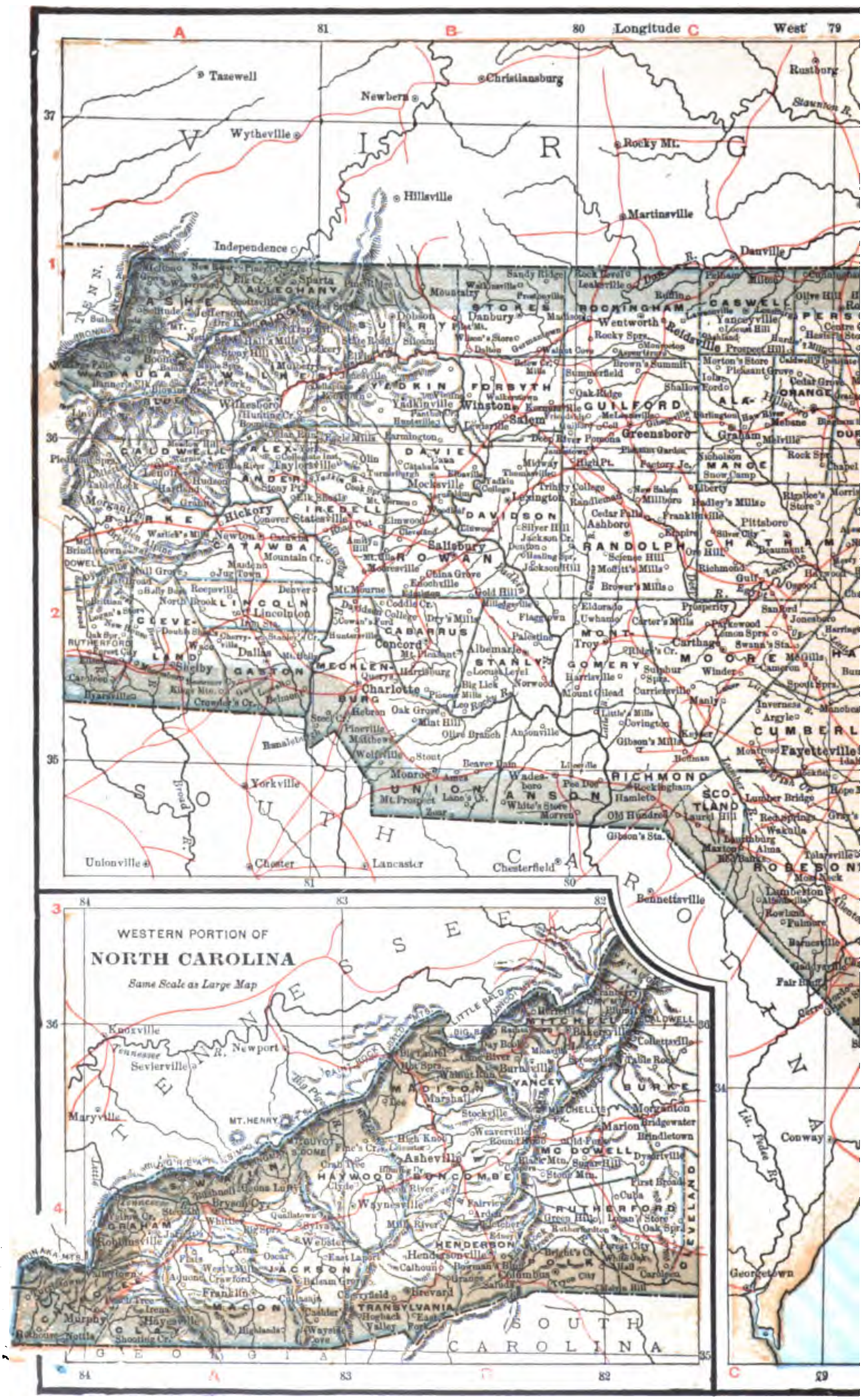
Mining. Gold-mining began early in the nineteenth century, yet the industry shows little signs of extensive development, and the annual output remains small. The State is noteworthy for its production of corundum and mica, there being few other regions in the country where these are found. In 1900 the corundum mined for the year was valued at $102,715, and represented all that was mined in the United States during that year. Both corundum and mica are found in the counties west of the Blue Ridge. In 1900 the ores mined included the red and brown hematite and the magnetite varieties of iron ore, their respective outputs being 55,844 tons, 259,863 tons, and 20,479 tons. Coal-mining has been carried on in Chatham County since 1889, but the output is small. Granite quarried in 1900 was valued at $257,962—much in excess of any other year between 1890 and 1900. The production of talc and soapstone is rapidly increasing, the value in 1900 being $75,308. Some sandstone and phosphate rock are also obtained. In 1900 the value of brick and tile was estimated at $797,112. A little pottery is also produced.

Fisheries. Fishing is the most important industry in the eastern part of the State. North Carolina is naturally adapted for this pursuit by its sounds and other coastal bodies of water, fresh and salt. The annual catch is more than twice that of South Carolina, Georgia, and Florida (Atlantic Coast side) combined. In 1897, the last year in which fishery statistics were compiled, there were 12,045 men engaged in the industry. The value of the product reported was $1,316,017. Shad and oysters are by far the most prominent, the value of the former being $362,811. Of the many other varieties the more important are squeteague, alewife, mullet, striped bass, clams, and bluefish. The seine fisheries of the Albemarle Sound section are the most important in the State. Vessel fishing is not yet extensive.

Agriculture. Agriculture is the leading industry. Yet the largest part of the swampy coast land is unreclaimed, and there is also much waste land in the mountainous area of the west. In 1900, 73.2 per cent. of the land surface was included in farms—the largest per cent. recorded since 1860. While the per cent. of improved land is still small, being in 1900 only 36.6 of the farm land, there was a large gain from 1850 to 1900, the corresponding figures for 1850 being 26.0. The most remarkable agricultural development of that half century was the change from large to small farms, the average size having decreased steadily from 368.6 acres in 1850 to 101.3 acres in 1900. This decrease is a part of the general process which the overthrow of slavery precipitated. Negroes who were formerly slaves on large plantations became renters or owners of small holdings. Also the holding of the white farmer was reduced more nearly to an area which it was possible to cultivate by his own efforts. In 1900, 24.4 per cent. of the farms were operated by colored farmers, the average size of the farms being 53.6 acres, or less than half

AREA AND POPULATION OF NORTH CAROLINA BY COUNTIES.

County.	Map Index.	County Seat.	Area in square miles.	Population.	
				1890.	1900.
Alamance	C 1	Graham	494	18.271	25,665
Alexander.	A 2	Taylorsville	297	9,430	10,960
Alleghany	A 1	Sparta	223	6,523	7.759
Anson	B 3	Wadesboro	551	20,027	21,870
Ashe	A 1	Jefferson	399	15,628	19,581
Beaufort	F 2	Washington	810	21,072	26 404
Bertie	E 1	Windsor	712	19,176	20,538
Bladen	D 3	Elizabethtown	1,013	16,763	17,677
Brunswick	D 3	Southport	812	10,900	12.657
Buncombe	B 4	Asheville	624	35,266	44,288
Burke	C 4	Morganton	534	14,939	17,699
Cabarrus	B 2	Concord	387	18,142	22 456
Caldwell	C 1	Lenoir	507	12,298	15,694
Camden	F 1	Camden	218	5,667	5,474
Carteret	F 3	Beaufort	538	10,825	11,811
Caswell	C 1	Yanceyville	396	16,028	15.028
Catawba	A 2	Newton	408	18,689	22,133
Chatham	C 2	Pittsboro	785	25.413	23,912
Cherokee	A 4	Murphy	451	9.976	11.860
Chowan	F 1	Edenton	161	9,167	10.258
Clay	A 4	Hayesville	185	4,197	4.532
Cleveland	A 2	Shelby	485	20,394	25.078
Columbus	D 3	Whiteville	937	17,856	21,274
Craven	E 2	Newbern	685	20.533	24,160
Cumberland	C 2	Fayetteville	1,008	27,321	29,249
Currituck	F 1	Currituck	273	6,747	6,529
Dare	G 2	Manteo	405	3,768	4,757
Davidson	B 2	Lexington	563	21,702	23.403
Davie	B 2	Mocksville	264	11,621	12,115
Duplin	E 3	Kenansville	830	18,690	22,405
Durham	D 1	Durham	284	18.041	26.233
Edgecombe	E 2	Tarboro	515	24.113	26,491
Forsyth	B 1	Winston-Salem	369	28.434	35,261
Franklin	D 1	Louisburg	471	21.090	25 116
Gaston	A 2	Dallas	359	17,764	27,903
Gates	F 1	Gatesville	356	10,252	10,418
Graham	A 4	Robbinsville	302	3,313	4.343
Granville	D 1	Oxford	504	24,484	23,263
Greene	E 2	Snowhill	258	10,039	12.038
Guilford	C 1	Greensboro	674	28,052	39,074
Halifax	E 1	Halifax	681	28,908	30,793
Harnett	D 2	Lillington	596	13,700	15,988
Haywood	A 4	Waynesville	541	13.346	16,222
Henderson	B 4	Hendersonville	362	12,589	14,104
Hertford	E 1	Winton	339	13,851	14,294
Hyde	F 2	Swanquarter	596	8,903	9,278
Iredell	B 2	Statesville	592	25,462	29,064
Jackson	A 4	Webster	494	9,512	11,853
Johnston	D 2	Smithfield	688	27,239	32,250
Jones	E 3	Trenton	403	7,403	8,226



A
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B
80
Longitude
C
West
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37
36
35
1
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4
VIRGINIA
Tazewell
Christiansburg
Newbern
Wytheville
Rocky Mt.
Hillsville
Martinsville
Independence
Danville
Rustburg
Staunton R.
TENN.
ASHE
ALLEGHANY
Sparta
Jefferson
SURRY
Dobson
Mount Airy
STOKES
Danbury
ROCKINGHAM
Wentworth
Reidsville
Leaksville
CASWELL
Yanceyville
PERSON
WATAUGA
Boone
WILKES
Wilkesboro
YADKIN
Yadkinville
FORSYTH
Winston
Salem
Kernersville
GUILFORD
Greensboro
High Pt.
ALAMANCE
Graham
ORANGE
Mebane
CALDWELL
Lenoir
ALEXANDER
Taylorsville
DAVIE
Mocksville
DAVIDSON
Lexington
RANDOLPH
Asheboro
CHATHAM
Pittsboro
BURKE
Morganton
Hickory
IREDELL
Statesville
CATAWBA
Newton
ROWAN
Salisbury
Mooresville
McDOWELL
Marion
LINCOLN
Lincolnton
CABARRUS
Concord
STANLY
Albemarle
MONTGOMERY
Troy
MOORE
Carthage
Sanford
CUMBERLAND
Fayetteville
CLEVELAND
Shelby
GASTON
Dallas
MECKLENBURG
Charlotte
RUTHERFORD
UNION
Monroe
ANSON
Wadesboro
RICHMOND
Rockingham
Hamlet
SCOTLAND
Laurinburg
ROBESON
Lumberton
SOUTH CAROLINA
Yorkville
Unionville
Chester
Lancaster
Chesterfield
Bennettsville
Conway
Georgetown
Broad R.
Lit. Pedee R.
Yadkin R.
Catawba R.
WESTERN PORTION OF
NORTH CAROLINA
Same Scale as Large Map
84
83
82
TENNESSEE
Knoxville
Newport
Sevierville
Maryville
MT. HENRY
MITCHELL
Bakersville
AVERY
CALDWELL
YANCEY
Burnsville
MADISON
Marshall
BUNCOMBE
Asheville
HAYWOOD
Waynesville
McDOWELL
Marion
BURKE
Morganton
RUTHERFORD
Rutherfordton
CLEVELAND
HENDERSON
Hendersonville
POLK
Columbus
TRANSYLVANIA
Brevard
JACKSON
Webster
SWAIN
Bryson City
GRAHAM
Robbinsville
MACON
Franklin
CLAY
Hayesville
CHEROKEE
Murphy
Highlands
SOUTH CAROLINA
GEORGIA
35
34
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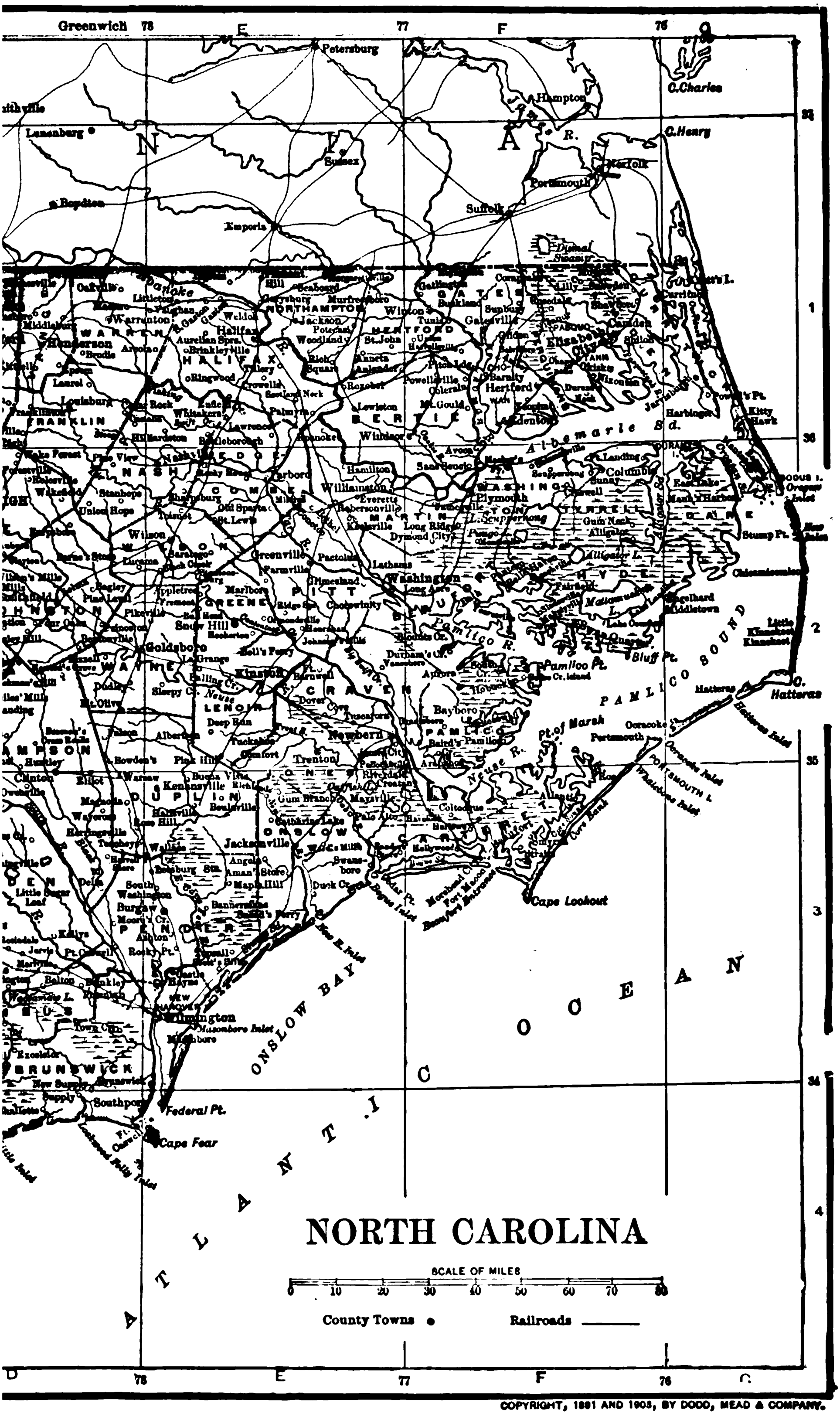
79



NORTH CAROLINA

SCALE OF MILES

0 10 20 30 40 50 60 70 80

County Towns ●

Railroads ———

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AREA AND POPULATION OF NORTH CAROLINA BY COUNTIES. *(Continued.)*

County.	Map Index.	County Seat.	Area in square miles.	Population.	
				1890.	1900.
Lenoir	E 2	Kinston	436	14,879	18,639
Lincoln	A 2	Lincolnton	296	12,586	15,498
McDowell	B 4	Marion	437	10,939	12,567
Macon	A 4	Franklin	531	10,102	12,104
Madison	B 4	Marshall	431	17,805	20,644
Martin	E 2	Williamston	438	15,221	15,383
Mecklenburg	B 2	Charlotte	590	42,673	55,268
Mitchell	B 3	Bakersville	332	12,807	15,221
Montgomery	C 2	Troy	489	11,239	14,197
Moore	C 2	Carthage	798	20,479	23,622
Nash	D 2	Nashville	584	20,707	25,478
New Hanover	E 3	Wilmington	190	24,026	25,785
Northampton	E 1	Jackson	523	21,242	21,150
Onslow	E 3	Jacksonville	645	10,303	11,940
Orange	C 1	Hillsboro	386	14,948	14,690
Pamlico	F 2	Bayboro	358	7,146	8,045
Pasquotank	F 1	Elizabeth City	231	10,748	13,660
Pender	D 3	Burgaw	883	12,514	13,381
Perquimans	F 1	Hertford	251	9,293	10,091
Person	C 1	Roxboro	386	15,151	16,685
Pitt	E 2	Greenville	644	25,519	30,889
Polk	B 4	Columbus	258	5,902	7,004
Randolph	C 2	Ashboro	795	25,195	28,232
Richmond	C 3	Rockingham	466	23,948	28,408
Robeson	C 3	Lumberton	1,043	31,483	40,371
Rockingham	C 1	Wentworth	573	25,363	33,163
Rowan	B 2	Salisbury	483	24,123	31,066
Rutherford	B 4	Rutherfordton	547	18,770	25,101
Sampson	D 2	Clinton	921	25,096	26,380
*Scotland	C 3	......	...	..	......
Stanly	B 2	Albemarle	413	12,136	15,220
Stokes	B 1	Danbury	472	17,199	19,866
Surry	B 1	Dobson	531	19,281	25,515
Swain	A 4	Bryson City	560	6,577	8,401
Transylvania	B 4	Brevard	371	5,881	6,620
Tyrell	F 2	Columbia	397	4,225	4,980
Union	B 3	Monroe	561	21,259	27,156
Vance	D C	Henderson	276	17,581	16,684
Wake	D 2	Raleigh	841	49,207	54,626
Warren	D 1	Warrenton	432	19,360	19,151
Washington	F 2	Plymouth	334	10,200	10,608
Watauga	A 1	Boone	330	10,611	13,417
Wayne	D 2	Goldsboro	597	26,100	31,356
Wilkes	A 1	Wilkesboro	718	22,675	26,872
Wilson	F 2	Wilson	392	18,644	23,596
Yadkin	B 1	Yadkinville	334	13,790	14,083
Yancey	B 4	Burnsville	302	9,490	11,464

* Established since the last census was taken..

that of the farms operated by white farmers. The per cent. of rented farms is high, having been 41.4 per cent. of the total number of farms in 1900. Renting is much more common among the negroes than among the whites, the percentage of renters among each being respectively 68.0 and 33.4. In the western counties, where nearly all the farmers are white, the share system of renting prevails. Among the colored farmers of the cotton-growing counties the cash and share tenants are about equal. The negro farmers usually mortgage their crops.

As may be inferred from the paragraphs under *Topography*, there is a great diversity of agricultural products, three agricultural sections being recognized. These are the eastern or coastal plain region, containing much sandy and barren soil; the middle or Piedmont section, more undulating, and with a soil more fertile and better adapted to diversified farming; the western or mountainous section, characterized by a fertile loam and best suited to grazing and the raising of temperate zone crops. The crop which stands out prominently as to acreage is corn, the acreage for 1900 exceeding 47 per cent. of the total crop area, and the receipts equaling 25.2 per cent. of the total crop receipts. Since the Civil War the corn acreage has steadily increased. Wheat, the next most prominent cereal, has only one-fourth as large an acreage. The acreage devoted to oats and rye each decreased one-half from 1890 to 1900. The yield per acre of all these crops is very low. The acreage of hay and forage crops is comparatively small. The two crops which yield the largest receipts from sales are cotton and tobacco. The acreage of each fluctuates greatly. An increase in one usually is accompanied by a decrease in the other, the respective acreages being determined by the rise or fall in the price of one or the other crop. The State ranks about eighth as a cotton State, and cotton does not hold the dominant position it maintains in the Commonwealths farther south. However, there was a very decided increase in production from 1850 to 1900, the crop for 1900—459,707 bales—being over three times that of 1850. The utilization of the seed has greatly increased the value of the cotton yield.

Likewise there has been a large increase in the attention given to tobacco-raising. From 1890 to 1900 the acreage was more than doubled, and North Carolina took rank next to Kentucky. The State holds third rank in the production of peanuts and second in the production of sweet potatoes. The former are grown most extensively in the northeastern counties. They are, however, put on the market bearing the Virginia label, being sold to Virginia factories. The area of production increased enormously during 1890-1900. Garden farming has become a prominent industrial feature. The climate enables gardeners to produce for the early Northern market, and cheap transportation is furnished by ocean navigation. The southeastern or Wilmington section has made the greatest progress in this line. Watermelons, cabbages and other vegetables, and strawberries and other small fruits are there grown in abundance. Orchard fruits are most common in the western part of the State, the apple being the principal variety. Peaches are raised, but not in such great quantities as in other Southern States. Rice is raised along the tide-water rivers, where the construction of dikes makes possible a system of flooding and draining. In Hyde County, however, irrigation is accomplished by pumping. The last census reported 22,279 acres devoted to rice. Peas and sorghum are among the other crops grown.

The following table of acreages explains itself:

CROPS	1900	1890
Corn	2,720,206	2,360,627
Wheat	746,984	666,509
Oats	270,876	541,851
Rye	28,074	56,496
Hay	229,998	190,754
Cotton	1,007,020	1,147,136
Tobacco	203,023	97,077
Peanuts	95,856	17,767
Sweet potatoes	68,730	71,752

Stock-Raising. Stock-raising is of secondary importance. Swine is about the only variety of farm animal raised on a scale which permits any considerable outside shipments. There were five times as many mules and asses in 1900 as in 1850. During that period the number of sheep decreased almost two-thirds, the decrease being the most marked in the last decade. The number of horses has increased considerably since 1870, particularly since 1890. Dairying is becoming more important. The following table needs no further comment:

	1900	1890
Dairy cows	233,178	223,416
Other cattle	391,340	407,487
Horses	159,153	131,451
Mules and asses	136,435	100,011
Sheep	208,412	402,247
Swine	1,300,469	1,251,006

Manufactures. Prior to 1880 the manufactures were little more than such necessary neighborhood industries as are common to rural communities. In the two decades following 1880 the value of products increased 100.9 and 135.1 per cent. respectively, and the corresponding increase in the number of wage-earners engaged was 85.7 and 109.9 per cent. In 1900 the total number of wage-earners was 70,570, or 3.7 per cent. of the total population. The absence of legislation bearing upon child labor is reflected in the unusually large total of persons employed who are under sixteen years of age. They number one-tenth of the total employed. Most mill-owners, however, have agreed to discontinue the employment of children under twelve years of age.

From the table appended it will be seen not only that each of the ten leading industries made gains from 1890 to 1900, but in a number of them the value of the product increased threefold or more. The manufacture of cotton goods has realized the largest growth. Several favorable conditions have united to bring about this result. The fact that the cotton fields are near the factories results in the saving of the cost of transportation; the cheapness of living results in lower wages; there is a plentiful supply of wood for fuel; and there is, as already mentioned, plenty of water power. The streams of the State, it is estimated, can furnish 3,500,000 horse power, only a little more than one-fifth of which is now utilized. From 1890 to 1900 the value of the manufactured cotton product increased 196.7 per cent., amounting in 1900 to 29.9 per cent. of the total value of the products of the State. The cotton manufactures employed 42.9 per cent. of the wage-earners, the rank of North Carolina during that period rising from tenth to third in the value of this product, Massachusetts and South Carolina alone exceeding it. North Carolina was exceeded by Massachusetts alone in the number of wage-earners in this branch of industry. The spindles now running annually consume an amount of cotton almost equal to the crop grown in the State. The industry is carried on for the most part by small mills scattered over the Commonwealth. The value of cottonseed oil and cake increased over 400 per cent. in the decade 1890-1900.

A number of other important industries are included in the group dependent upon agricultural products, the manufactures of tobacco being of greatest importance. This is one of the earliest established industries in the State. North Carolina has a wide reputation for certain brands of smoking tobacco and cigarettes. The value of the product increased 184.7 per cent. from 1890 to 1900. The manufacture of flour and grist-mill products is another large and flourishing industry. The tanning and currying of leather developed from comparative insignificance into an industry of some prominence during 1890-1900. The following table of the leading industries explains itself:

INDUSTRIES	Year	Number of establishments	Average number wage-earners	Value of products, including custom work and repairing
Total for selected industries for State	1900	4,071	55,642	$77,351,282
	1890	2,068	24,045	28,707,151
Increase, 1890 to 1900	......	2,003	31,597	$48,644,131
Per cent. of increase	......	96.9	131.4	169.4
Per cent. of total of all industries in State	1900	56.3	78.8	81.5
	1890	56.4	71.5	71.1
Cotton goods	1900	177	30,273	$28,372,798
	1890	91	8,515	9,563,443
Cottonseed oil and cake	1900	21	564	2,676,871
	1890	11	318	529,746
Tobacco—chewing, smoking, and snuff	1900	80	6,408	13,620,816
	1890	90	6,002	4,783,481
Flouring and grist-mill products	1900	1,773	1,019	8,867,462
	1890	1,039	1,124	5,279,068
Leather—tanned, curried, and finished	1900	75	366	1,502,378
	1890	55	107	190,887
Fertilizers	1900	18	427	1,497,625
	1890	12	343	994,135
Cars and general shop construction and repairs by steam railroad companies	1900	12	1,141	1,511,376
	1890	9	434	393,576
Lumber and timber products	1900	1,770	11,751	14,862,593
	1890	713	6,466	5,898,742
Lumber, planing-mill products, including sash, doors, and blinds	1900	101	1,939	2,892,058
	1890	42	584	915,070
Furniture, factory product	1900	44	1,759	1,547,305
	1890	6	152	159,000

Forests and Forest Products. The total wooded area in 1900 was 35,300 square miles, or 73 per cent. of the State's area. Over a portion of this the best timber, particularly the oak and poplar, has been removed. Extensive areas of yellow pine have been cut, and the bulk of the lumber product consists of this variety. The cypress forests have contributed but little to the lumber supply. In 1901 an examination in the mountain regions was made, and the report estimated the stand of timber at 10,650,000,000 feet, of which 41.41 per cent. was oak, 17.20 chestnut, and 5.30 hemlock. The value of the lumber product increased from less than $1,000,000 in 1850 to $5,898,742 in 1890, and $14,862,593 in 1900. The dependent industries—the manufactures of planing-mill products, etc.—made large gains in the decade 1890-1900, as is shown in the above table. The turpentine and resin product was valued at over $1,000,000 in 1900.

Transportation and Commerce. The Raleigh and Gaston Railroad Company was the first to begin construction, in 1836. This and the Wilmington and Weldon Railroad were completed in 1840. The most active decade in railroad construction was 1880-90, when the mileage increased from 1846 to 3128 miles. In 1900 there were 3732 miles in operation. The major part of the mileage belongs to the three principal systems, namely: The Seaboard Air Line (614 miles), the Atlantic Coast Line (949 miles), and the Southern (1226 miles). A number of the rivers are navigable through the coast plain region, and together with the coast waters are of considerable importance in the local commerce. There are two customs districts—Wilmington and Pamlico. The former ranks eighth among the Atlantic districts in the value of its foreign trade, the greater part of which consists of exports.

Banks. There were no banks in North Carolina until 1804, when two were chartered. The State subscribed for shares in both. The State Bank of North Carolina was organized in 1810 in Raleigh, with branches in six towns. In this bank also the State was heavily interested, as its notes were the main currency in the Commonwealth. There were 31 banks in 1861, but the

	National banks	State banks	Private banks	Savings banks
Number	38	81	21	14
Capital	$3,280,000	$2,858,000	$205,000	....
Surplus	1,073,000	551,000	95,000	$28,000
Cash, etc	951,000	1,029,000	77,000	85,000
Deposits	8,978,000	9,403,000	925,000	2,451 000
Loans	11,437,000	10,020,000	902,000	2,899,000

vicissitudes of the next four years destroyed their financial standing. In 1866 an act was passed enabling them to close their business. A revival of banking came only during 1890-1900.

The condition of the banks in 1902 is shown on the preceding page.

Government. The present Constitution was adopted in 1868. An amendment requires a three-fifths vote of each House, and approval by a majority of the popular vote. A proposal to call a constitutional convention must receive a two-thirds vote of each House and a majority of the popular vote.

Voters must have resided in the State two years, in the county six months, in an election district four months. Persons who were not entitled to vote in any State prior to 1867, or are not descendants of persons entitled to vote prior to that time, must be able to read and write any section of the Constitution in the English language. Privileged illiterates must register before December 1, 1908. Suffrage is further conditioned upon the payment of poll tax.

Legislature. The Legislature consists of 50 Senators, representing districts of undivided contiguous counties, and 120 Representatives, at least one for every county. All members are elected for two years and receive $4 a day and mileage. They meet biennially on the Wednesday after the first Monday in January, and the session is limited to sixty days. State elections are held biennially on the Tuesday after the first Monday in November. The power of impeachment rests with the House, the trial of impeachment with the Senate.

Executive. The Governor, Lieutenant-Governor, Secretary of State, Auditor, Treasurer, Superintendent of Public Instruction, and Attorney-General are elected for four years. The Governor has the usual power to convene extra sessions of the Legislature and grant pardons. The Secretary of State, Auditor, Treasurer, and Superintendent of Public Instruction constitute a Council of State to advise with the Governor.

Judiciary. The Supreme Court consists of a Chief Justice and four associates. The State is divided into judicial districts, a judge being chosen in each district. A Superior Court must be held in each county at least twice each year. The Legislature provides special courts for cities and towns. Each county elects a clerk of the Superior Court every four years. A solicitor serving four years is elected in each judicial district.

Local. Each county elects a sheriff, coroner, treasurer, register of deeds, surveyor, and five commissioners, who hold office for two years. The commissioners have charge of the penal and charitable institutions, schools, roads, bridges, and finances. Each township elects biennially a clerk and two justices of the peace, who constitute a board of trustees. They act under the supervision of the county commissioners. The townships also elect for a similar period a constable and a school committee of three persons. These provisions, however, may be changed by statute.

Miscellaneous. Atheists are disqualified for office, and also all persons who have been convicted of treason, perjury, or other infamous crimes, and not legally restored to the rights of citizenship. The property of a married woman is her own, and not liable for the debts of her husband. Personal property is exempt for debt to the value of $500. There are also provisions for liberal homestead exemptions. A local-option liquor law was passed in 1887. The legal rate of interest is 6 per cent.; 8 is allowed by contract. The State has ten members in the Lower House of the National Congress. The capital of the State is Raleigh.

Finances. North Carolina had no debt until the advent of the epoch of railroad building. In 1848-58 several issues of bonds were authorized in aid of railroad, plank road, and canal companies, and as security the State received stock in these companies. At the beginning of the Civil War the debt of the State amounted to $18,167,000. The financial troubles of the war greatly aggravated this condition, but the enormous loans for war purposes were repudiated by order of President Johnson in 1865. Great injury to the finances of North Carolina was done during the five years of the 'carpetbag' régime that followed. Large issues of bonds for purposes of railroad construction followed one another in rapid succession. The Constitution of 1868 forbids the issue of any bonds unless a special tax for payment of interest be levied. But this did not stop the growth of the debt, for in the following two years more than $16,000,000 of the 'special tax bonds' were issued. Another cause for issuing bonds was the refunding of old obligations and their unpaid coupons. Altogether, in 1865-70, $24,375,800 of bonds were issued, and the total debt exceeded $42,000,000. As against this the State held $22,000,000 of railroad stocks, out of which only $3,000,000 paid dividend. The rest were worthless, as the money obtained from sale of the State bonds was squandered. The burden of the interest on these bonds lay very heavily upon the State, and there was constant defaulting.

This condition of affairs caused great popular dissatisfaction and a tendency toward repudiation. Payment of interest on the 'special tax' loans was stopped in 1870, the special tax laws were repealed, and all the efforts of the bondholders to enforce payment through courts remained futile. In 1879 a compromise was reached with regard to the rest of the State debt. Under this compromise the old bonds were refunded at the rate of 15 per cent. to 40 per cent., according to issues. The conversion proceeded from 1880 to 1900, and the debt remained almost the same. The compromise has improved the finances considerably. The budget of the State is small, but instead of the large deficits there is a small surplus. On November 30, 1902, the State debt was $6,527,770. The total receipts for the year were $1,924,134; expenditures, $1,866,640; the balance in the treasury, $111,280. The main sources of income are a general property tax (about 40 per cent.), North Carolina Railroad dividends (10 per cent.), railroad and corporation taxes, earnings of the State prison, etc. Of the disbursements almost $300,000 a year goes for payment of interest.

Militia. The State had 326,202 men of militia age in 1900. The militia numbered 1860 in 1901.

Population. The following figures show the growth of the population: 1790, 393,751; 1820, 638,829; 1850, 869,039; 1860, 992,622; 1870, 1,071,361; 1880, 1,399,750; 1890, 1,617,947; 1900, 1,893,810. From third rank in 1790 the State fell to tenth in 1850, and fifteenth in 1900. The per cent. of gain for 1890-1900 was 17.1, as compared with 20.7 for the United States. The State's heavy contribution to the westward tide of immigration reached its climax in the decade 1830-40, which accounts for the stationary position of the population for that decade. North Carolina has the smallest foreign-born population—4492—of any State. In 1900 there were 624,469 negroes, the State holding seventh rank in negro population. The increase in this element from 1890 to 1900 was 101,451. The negroes are much less numerous in the western or mountainous counties. As is true of most of the Southern Commonwealths, the urban population constitutes but a small percentage of the total. In 1900 17 places had over 4000 inhabitants each, and together contained 8 per cent. of the total population.

CITIES. The population of the four largest towns in 1900 was: Wilmington, 20,976; Charlotte, 18,091; Asheville, 14,694; and Raleigh, 13,643.

RELIGION. The leading religious denominations are the Baptist and the Methodist, comprising respectively about one-half and two-fifths of all church members. The Presbyterians, Lutherans, Disciples of Christ, Episcopalians, Congregationalists, and Roman Catholics are largely represented.

EDUCATION. Education in the State of North Carolina received a considerable impetus from the immigration of the Scotch-Irish during the second half of the eighteenth century. Classical schools were maintained by many of the Presbyterian missionaries, and as these were mostly graduates of Princeton University, that institution had a considerable influence on higher education in the State. Moravians and Germans also played a conspicuous part in this development. The first State Constitution contained a clause providing for public education, but nothing was done toward carrying it out before 1825, when the dividends from stocks held by the State in several banks and navigation companies, and the revenue derived from liquor licenses, etc., as well as the vacant and unappropriated swamp lands of the State, were appropriated for a common school fund. This fund was subsequently augmented by $1,133,757—the State's share of the surplus revenue distributed among the States by the act of Congress of 1836. The public school system was established in 1840, and the first State Superintendent of Public Instruction was appointed in 1852. By 1860 North Carolina was in education the most advanced of the slave-holding States.

Only a comparatively small part of the school-age population is provided with schools. North Carolina has neither a compulsory attendance law nor uniform requirements for teachers, the professional standing of whom, especially in the colored schools, is in many cases very low. According to the census of 1900, the illiterate population of North Carolina amounted to 28.7 per cent. of the total population of ten years of age and over, being 19.5 per cent. for the native whites and 47.6 per cent. for the colored. The illiteracy of the native whites shows a decrease of 3.6 per cent. for the decade of 1890-1900, as compared with the decrease of 12.5 per cent. for the colored during the same period. In 1900 North Carolina had a school population (6 to 21) of 439,431 white and 220,198 colored. The enrollment for the same year was 270,447 white and 130,005 colored; and about one-half each of the colored and white enrollment was in average attendance.

The length of the school term in 1900 was 73 days for the white and 65 days for the colored, or an average of 70.5 days, the lowest of any State. Of the 7387 teachers employed in 1900, the men constituted 49.4 per cent. The average monthly salaries of white teachers in 1900 were $26.18 for male teachers and $23.41 for female; the average salaries of the colored male and female teachers were $21.14 and $19.82, respectively, as compared with $24.69 and $20.36, respectively, in 1884. The total revenue for the public schools for 1900 amounted to $1,031,327, and the expenditure to $950,317, or about $4.60 per pupil in average attendance. The school revenue is derived principally from a general property tax, a general poll tax, liquor licenses, fines, forfeitures, and penalties.

Secondary education is provided chiefly by the private high schools and academies. There are seven normal schools for the colored youth, and a State normal and industrial college for white women. The chief institutions for higher education are the University of North Carolina, at Chapel Hill; the College of Agriculture and Mechanic Arts, and Davidson College (Presb.), at Davidson; Trinity College (M. E.), at Durham; Wake Forest College (Bapt.), at Wake Forest; Elon College (Christian), at Elon College; Guilford College (Friends), at Guilford; and Saint Mary's College (R. C.), at Belmont. Higher education for the colored race is provided by the Agricultural and Mechanical College (State), at Greensboro; Shaw University (Bapt.), at Raleigh; Biddle University (Presb.), at Charlotte; and Livingstone College (A. M. E. Zion), at Salisbury.

CHARITABLE AND PENAL INSTITUTIONS. There is an unsalaried Board of Public Charities which has supervision of the State charitable and penal institutions, and of the county and municipal jails, workhouses, and 'homes.' County 'homes' are inspected by county boards of visitors. The State maintains an insane asylum for the whites at Raleigh and one at Morganton; also an asylum at Goldsboro for colored insane—the first in the world for this class. There are a State institute for the blind at Raleigh, a school for the deaf at Morganton, and another for the colored deaf, dumb, and blind at Raleigh. A Confederate soldiers' home is located at Raleigh, and an orphan asylum for whites and for blacks at Oxford. The State penitentiary is located at Raleigh. Only those sentenced for the highest crimes are confined in the penitentiary proper. About nine-tenths of the convicts are employed on State farms. The convicts are controlled by State officers and not under the lease system.

HISTORY. On July 4, 1584, Philip Amadas and Arthur Barlow, sent by Sir Walter Raleigh under a charter granted by Queen Elizabeth to make explorations in America, dropped anchor off the present coast of North Carolina. On their return they gave the most flattering accounts of the country. The next year a colony of men was sent out under Ralph Lane to make a permanent settlement. They made no attempt to provide a food supply, and in 1586 abandoned the settlement which they had founded on Roanoke Island. The next year John White was sent with men, women, and children. He went back to England for supplies, but on his return the colony had utterly vanished; tradition relates that they were absorbed by an Indian tribe in the neighborhood. In 1629 Charles I. granted to Sir Robert Heath, under the name of Carolina, the territory between 31° and 36° N., but the proprietor failed to make use of his grant, and in 1663 Charles II. conferred on eight 'Lords Proprietors' the territory between 31° and 36° extending to the Pacific Ocean. The limits were enlarged in 1665 to 29° to 36° 30′. The proprietors received palatine powers, divided the territory into two parts, North and South Carolina, and began to send out settlers. Already there were scattered settlements along the streams and sounds in the eastern part. For the government of the colony, an elaborate scheme, the 'Fundamental Constitution' was drawn up by the philosopher John Locke. This provided for three orders of nobility and four houses of Parliament. It was never put fully into operation, and was abandoned entirely in 1693. The population was hardy and rude and paid little attention to any sort of government, occasionally driving away an obnoxious Governor by force. Up to 1710, when Edward Hyde was appointed Governor of North Carolina, there was but one Governor for Carolina with deputies for the divisions. A strong hand was, however, needed. In 1711 the Tuscarora Indians had fallen upon the scattered farms and massacred several hundred people, and the power of the Indians was broken only by aid from Virginia and South Carolina. (See MOORE, JAMES.) Pirates also were ravaging the coast.

Carolina did not prove a success from a financial standpoint, and in 1728 seven of the proprietors sold to the Crown their shares for £2500 each. Lord Carteret (afterwards Lord Granville) retained his, and in 1744 it was laid off in severalty for him. Affairs were more settled after the Crown assumed control, and the western portion of North Carolina began to receive settlers, largely Scotch-Irish from Pennsylvania, and Germans from the Palatinate. After the battle of Culloden (1746) a number of Scotch settled on the Upper Cape Fear River. Many of the royal Governors came into conflict with the inhabitants, and during the administration of William Tryon the Regulators (q.v.) threatened to overturn the Government in 1771.

The First Provincial Congress met in defiance of Governor Josiah Martin (q.v.) in 1774, and sent delegates to the Continental Congress. (See MECKLENBURG DECLARATION OF INDEPENDENCE.) The colony was the first to authorize her delegates in Congress to vote for independence, on April 12, 1776, and a State constitution was adopted, on December 18, 1776. North Carolina troops took part in many of the important battles of the war, and in 1780-81 the State was invaded by the British. The State sent delegates to the national constitutional convention in 1787, but refused to ratify the instrument, in 1788, and presented twenty-six amendments. The State did not vote in the first Presidential election, but after the adoption of the first ten amendments to the Constitution, ratified that instrument, on November 19, 1789. The western lands, now the State of Tennessee, were offered to Congress in 1784. The inhabitants, indignant at being transferred without their consent, revolted and set up the State of Franklin. Governor Caswell was able to cause the dissolution of this abortive State, and the lands were again ceded in 1790. The next year the capital was located at Raleigh. In 1795 the State University was opened for students. The question of a market for their products was a serious one to the residents of the middle and eastern counties. After 1820 much money was spent in the fruitless attempt to make the shallow rivers navigable, and to connect them by canals. The measures were opposed by the eastern counties, which had abundant water transportation. The question of constitutional revision was one of great interest for a long time. The Constitution of 1776 gave equal representation to every county, and this gave an unfair advantage to the smaller counties of the east. After much effort the Convention of 1835 was called and drafted a constitution giving representation in the Senate according to property and in the House according to population. But during this period thousands of people had gone to Ohio, Indiana, and Illinois.

The State opposed secession as a matter of expediency, and in February, 1861, refused to call a convention, but with President Lincoln's demand for troops to coerce the seceding States sentiment changed. An ordinance of secession was unanimously passed, May 20th, and the State lost the first soldier of the war at Big Bethel. North Carolina furnished more than 120,000 soldiers to the Confederate cause, nearly twice her proportion, lost more soldiers than any other Southern State, and during the last year of the war practically fed Lee's army. At the close of the war W. W. Holden, formerly a rabid secessionist, was appointed Provisional Governor. A convention was called which repealed the ordinance of secession, abolished slavery, and ordered an election for State officers. Jonathan Worth was elected Governor, but in the following year the new Constitution was rejected. With the beginning of reconstruction in 1867 the civil authority was superseded by the military. Another convention was called in 1868, and a constitution allowing negro suffrage was adopted. Under this W. W. Holden was elected Governor. In this year the Ku-Klux-Klan (q.v.) appeared, and Alamance and Granville counties were placed under martial law. The Conservative Democrats secured the Legislature in 1870, and Governor Holden was impeached. The present Constitution was adopted in 1876, and in 1900 a clause intended to restrict negro suffrage was added. The State has been Democratic in national elections since the beginning of parties, with the exception of the years 1840-48, when it voted for the Whig candidates, and 1868-72, when its vote was cast for Grant. The Governors of the colony and State have been as follows:

UNDER THE LORDS PROPRIETORS

William Drummond	1663-67
Samuel Stephens	1667-70
Peter Carteret	1670
Samuel Stephens	1670-74
John Jenkins (acting)	1675
John Harvey (acting)	1675-76
Thomas Eastchurch	1676-77
Thomas Miller (acting)	1677-78
John Harvey (acting)	1678
John Jenkins	1678-81
Henry Wilkinson	1681-83
Seth Southwell (or Sothel)	1683-89

Philip Ludwell	1689-91
Alexander Lillington	1691-94
Thomas Harvey	1694-99
Henderson Walker	1699-1704
Robert Daniel	1704-05
Thomas Cary	1705-06
William Glover (acting)	1706-07
Thomas Cary (acting)	1707-08
William Glover Thomas Cary } contestants	1708-10
Edward Hyde	1710-12
Thomas Pollock (acting)	1712-14
Charles Eden	1714-22
Thomas Pollock (acting)	1722
William Reed (acting)	1722-24
George Burrington	1724-25
Edward Mosely (acting)	1725
Sir Richard Everard	1725-29

ROYAL

George Burrington	1729-34
Nathaniel Rice (acting)	1734
Gabriel Johnston	1734-52
Nathaniel Rice (acting)	1752
Matthew Rowan (acting)	1753-54
Arthur Dobbs	1754-65
William Tryon	1765-71
James Hasell (acting)	1771
Josiah Martin	1771-75

GOVERNORS OF THE STATE

Richard Caswell		1777-79
Abner Nash		1779-81
Thomas Burke		1781-82
Alexander Martin		1782-84
Richard Caswell		1784-87
Samuel Johnston	Federalist	1787-89
Alexander Martin	“	1789-92
Richard Dobbs Spaight	Democratic Republican	1792-95
Samuel Ashe	“ “	1795-98
Wm. Richardson Davie	“ “	1798-99
Benjamin Williams	“ “	1799-1802
James Turner	“ “	1802-05
Nathaniel Alexander	“ “	1805-07
Benjamin Williams	“ “	1807-08
David Stone	“ “	1808-10
Benjamin Smith	“ “	1810-11
William Hawkins	“ “	1811-14
William Miller	“ “	1814-17
John Branch	“ “	1817-20
Jesse Franklin	“ “	1820-21
Gabriel Holmes	“ “	1821-24
Hutchings G. Burton	“ “	1824-27
James Iredell	Democrat	1827-28
John Owen	“	1828-30
Montford Stokes	“	1830-32
David L. Swain	“	1832-35
Richard Dobbs Spaight, Jr.	“	1835-37
Edward B. Dudley	Whig	1837-41
John M. Morehead	“	1841-45
William A. Graham	“	1845-49
Charles Manly	“	1849-51
David S. Reid	Democrat	1851-54
Warren Winslow (acting)		1854-55
Thomas Bragg	Democrat	1855-59
John W. Ellis	“	1859-61
H. T. Clark (acting)		1861-62
Zebulon B. Vance		1862-65
W. W. Holden (provisional)		1865
Jonathan Worth	Conservative	1865-67
Gen. Daniel E. Sickles (Military)		1867
Gen. E. R. S. Canby	“	1867-68
W. W. Holden	Republican (impeached)	1868-70
Tod R. Caldwell	“	1870-74
Curtis H. Brogden	“	1874-77
Zebulon B. Vance	Democrat	1877-79
Thomas J. Jarvis	“	1879-85
Alfred M. Scales	“	1885-89
Daniel G. Fowle	“	1889-91
Thomas M. Holt	“	1891-93
Elias Carr	“	1893-97
Daniel L. Russell	Republican	1897-1901
Charles B. Aycock	Democrat	1901 —

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NORTH CAROLINA, UNIVERSITY OF. A State institution at Chapel Hill, N. C., chartered in 1789, and opened in 1795. It comprises a college and schools of law, medicine, and pharmacy, together with a summer school for teachers. It confers the bachelor's degree in arts, science, philosophy, and law, the degree of graduate in pharmacy, the master's degree in arts and science, and the doctor's degree in philosophy and medicine. Free instruction is offered to graduates of colleges and universities, to candidates for the ministry, to teachers and young men who are preparing to teach, and to those who are laboring under bodily infirmities. A loan fund, established by Rev. C. F. Deems of New York, and enlarged by Mr. W. H. Vanderbilt, furnishes temporary assistance to indigent students. Women are admitted to the higher courses. In 1903 the university had an attendance of 698, a faculty of 66, and a library of 41,000 volumes. The campus covers 48 acres, and with the buildings, fifteen in number, is valued at $500,000.

NORTH CONWAY. A village of New Hampshire. See CONWAY.

NORTHCOTE, nôrth'kŏt, JAMES (1746-1831). An English historical and portrait painter and author, born at Plymouth. The son of a poor watchmaker, who insisted upon apprenticing James to his trade, he was hampered in his early artistic aspirations, but in 1771 managed to make his way to London, where Sir Joshua Reynolds admitted him into his studio as an assistant, and soon after invited him to live in his house. Northcote studied also at the Royal Academy, exhibited there some good portraits, and, after remaining with Reynolds five years, returned home and thence went to Italy in 1777. For two years in Rome he studied the great masters, especially Titian, then visited Florence, where he was requested to paint his own portrait for the Uffizi Gallery, and was elected a member of the Academy. Back in London in 1780, he became a regular exhibitor, first of portraits, and from 1783 on of subject pictures. The success of one of these led to his being employed by Boydell, the publisher, to paint nine pictures for the famous Shakespeare Gallery, the most celebrated of which are "The Murder of the Princes in the Tower," "The Burial of the Princes," "Prince Arthur and Hubert," and "Entry of Bolingbroke and Richard II. into London." Their popularity brought him the commission for a large painting of the "Death of Wat Tyler in 1381" (1787), now in the Guildhall, London. Of his other numerous historical subjects, the only one in a public collection is the "Presentation of British Officers to Pope Pius VII." in the South Kensington Museum. He also obtained considerable success with pictures of animals, but his fame is due chiefly to his portraits. The National Gallery contains those of Dr. Jenner, of Viscount Exmouth, and one of himself (1827). His literary ability is proved by his *Memoirs of Sir Joshua*

Reynolds (1813), to which a supplement was added in 1815, and by *One Hundred Fables* (1828), illustrated with numerous wood cuts after his own designs. In 1830 he published a *Life of Titian*, and after his death appeared a second series of fables under the title *The Artists' Book of Fables*. Consult: Cunningham,. *Lives of the Most Eminent British Painters*, edited by Heaton (London, 1879).

NORTHCOTE, Sir STAFFORD HENRY, first Earl of Iddesleigh (1818-1887). An English statesman and financier, born in London. He was educated at Eton and Oxford, graduating at Balliol College in 1839 with high honors. His first position in political life was that of private secretary to Gladstone, when the latter was president of the Board of Trade. In 1847 he was called to the bar and was made legal secretary to the Board of Trade. In 1851 he succeeded to the family title and estates as eighth baronet of his line. He was member of Parliament for Dudley and Stamford 1855-66, and was then returned for North Devon, which place he continued to represent in the interest of the Conservative Party. He was president of the Board of Trade in 1866-67, and in 1867 was made Secretary of State for India. From 1869 to 1874 he was chairman of the Hudson's Bay Company, and promoted the transfer of Prince Rupert's Land to the Canadian Government. He visited Canada and the United States in 1870 to study conditions, and was a member of the joint high commission which signed the Treaty of Washington on May 8, 1871. On the formation of Disraeli's Cabinet in 1874, Sir Stafford Northcote was made Chancellor of the Exchequer, and when his leader was elevated to the peerage under the title of Lord Beaconsfield, Northcote became leader of the Commons. In the first Salisbury Administration (1885-86) he was First Lord of the Treasury. He was created Earl of Iddesleigh and Viscount Saint Cyres in 1885. When Salisbury became Premier for the second time (1886) the Earl of Iddesleigh was made Foreign Secretary. He died suddenly on January 12, 1887, in the presence of Lord Salisbury, the Premier, in the official residence, London. Northcote published a number of political and financial pamphlets, such as *Twenty Years of Financial Policy* (London, 1862). His character was distinguished by unselfishness, pure-mindedness, and sincere patriotism. Consult his collected *Lectures and Essays* (London, 1887); Lang, *Life, Letters, and Diaries of Stafford Northcote, First Earl of Iddesleigh* (London, 1890).

NORTH DAKO'TA. A north central State of the United States, lying between latitudes 45° 55′ and 49° N., and between longitudes 96° 25′ and 104° 3′ W. It is bounded on the north by the Canadian provinces of Assiniboia and Manitoba, on the east by Minnesota, on the south by South Dakota, and on the west by Montana. Its boundaries are straight lines, except the eastern border, which is formed by the Red River of the North. Its shape is that of a rectangle, with an extreme length east and west of 360 miles, and a breadth of 210 miles. The area is 70,795 square miles, of which 70,195 cover the land surface. North Dakota ranks fourteenth in size among the States.

TOPOGRAPHY. The eastern part of the State is the perfectly level bed of the ancient Lake Agassiz, now traversed by the Red River and its tributaries. It lies about 1000 feet above sea-level, and merges westward into the rolling prairies of the central region. In the north the land rises to a height of over 2000 feet in the small forest-covered plateau known as the Turtle Mountains. This range extends about 20 miles south of the Manitoba boundary. Southwestward the prairies rise toward the grassy Plateau du Coteau du Missouri, which has an elevation of 2000 feet near the centre of the State, and rises gradually to 3000 feet in the extreme southwestern corner. There are no great altitudes above the general level. In the central region there are rounded, grassy, and boulder-crowned hills of glacial drift; and in the southwest isolated conical buttes capped with sandstone become more and more frequent until the rough and rocky 'bad lands' of the southwestern corner are reached.

The principal rivers lie from 100 to 300 feet below the surrounding plains, and are lined with bluffs. The western half of the State is traversed in a winding southeast course by the Missouri River, which enters on the western boundary and leaves the State near the middle of the southern boundary. Its chief tributaries from the State are from the right and drain the southwestern plateau. They are the Little Missouri, Knife, Heart, and Cannon Ball rivers. The Yellowstone also joins the Missouri in North Dakota immediately east of the Montana boundary line. The northern portion is drained by the Souris or Mouse River, which flows southeast from Canada and reenters that country in the opposite direction after making a long narrow loop toward the centre of the State. From this central section the James River flows southward into South Dakota, where it joins the Missouri. The remaining eastern portion is drained by the Red River of the North, chief of whose numerous tributaries is the Sheyenne. Scattered over the central and eastern plains are numerous lakes, the largest of which is Devil's Lake, an irregular body of water 32 miles long and 1 to 5 miles wide, with wooded shores.

CLIMATE, SOIL, AND VEGETATION. North Dakota has a typical continental climate characterized by enormous extremes of temperature, which, however, the dry atmosphere renders bearable, healthful, and invigorating. The mean temperature for January is 3°, and for July 70°. The extremes have a range of nearly 155° for the year, a maximum having been recorded as high as 114°, while a minimum of 40° below zero is not rare. The average annual rainfall of 17.29 inches would scarcely suffice for the needs of agriculture were it not for the fact that fully three-fourths of the precipitation falls during the growing season (April to September). In the western half of the State, however, the rainfall is insufficient for successful agriculture. The deep alluvial deposits of the Red River Valley are of inexhaustible fertility, and are conspicuously favorable to wheat-growing. The glacial drift of the prairies forms, in addition, an excellent subsoil, but toward the west it grows poorer and more scanty, especially in the southwest. Forest growth is found only along the river banks, and on the Turtle Mountains in the north, and in some sections of the Red River Valley. The remainder of the State is a treeless prairie covered with numerous species of grasses and other forage plants. The principal trees are cottonwood along the rivers, and oak, elm, birch, ash, and poplar in the Turtle Mountains.

Geology and Mineral Resources. The rock formations of the State include the Archæan, Cambrian, Silurian, Cretaceous, and Tertiary systems. The Dakota sandstone of the Cretaceous system is an important member, being the chief water-bearing stratum on which the artesian wells of North Dakota depend. Most of the rocks, however, are covered by a deposit of glacial drift, composed of sand, gravel, and clay. In the Red River Valley there is a thick layer of alluvium deposited by Lake Agassiz, whose ancient shore-lines have been traced all around the valley. The central and western portions of the State are underlaid with extensive beds of lignite, which is being more and more utilized. The production in 1901 amounted to 166,601 tons, valued at $214,151. Clay is the only other mineral utilized to any considerable extent, though some building-stone is available, and lime, salt, and a little iron are found.

Agriculture. Although stock-raising made considerable progress in the decade 1870-80, the putting of the land under plow was almost wholly the work of the succeeding decades. The number of acres included in farms doubled from 1890 to 1900, and amounted in the latter year to 34.6 per cent. of the total area. Of the farm area, 62.1 per cent. was improved. During the same decade the average size of farms increased from 277.4 acres to 342.9 acres—a larger average than is found in any other State. In 1900, 1346 farms contained over 1000 acres each. Excepting that of the 'bad lands,' in the southwest, the soil is not only unusually fertile, but also easily tilled. Its composition is fortunately such as to favor the retention of moisture. Nevertheless, there are occasionally severe droughts.

Everywhere wheat is the dominant crop. In 1899 it constituted 56 per cent. of the total crop area. In the same year the per capita acreage of wheat, 13.9 acres, was larger than in any other State. The Red River Valley, which extends entirely across the eastern end of North Dakota, is perhaps the most famous wheat-producing region in the world. In the six counties bordering the Red River almost half of the total area is devoted to wheat. Oats is the next most important cereal. The cultivation of flax increased during the decade 1890-1900 from a few thousand acres to an acreage exceeding that of any other State. Barley is most extensively produced in the northeastern counties and corn in the southeastern. Potatoes yield abundantly and are an important crop. But very little fruit is raised.

The following table gives the acreage of the leading crops for the census years indicated:

CROPS	1900	1890
Wheat	4,451,251	2,709,421
Oats	780,517	402,855
Flax	773,999	43,724
Barley	287,092	109,400
Corn	42,373	11,954
Rye	27,995	1,568
Hay	1,410,534	558,720
Potatoes	21,936	18,262

Stock-Raising. The prairie lands afford excellent pasturage, and large areas of wild salt and prairie grasses are annually cut for winter feed. With the exception of mules, all kinds of domestic animals showed large gains from 1890 to 1900. Cattle and horses are the most important varieties.

The following table, taken from the census, shows the relative prominence of the principal varieties of farm animals:

	1900	1890
Dairy cows	125,503	88,289
Neat cattle	531,931	193,585
Horses	359,948	130,931
Mules and asses	6,976	8,709
Sheep	451,437	136,413
Swine	191,798	92,213

Manufactures. But little manufacturing is carried on besides the so-called neighborhood industries. In 1900 the wage-earners numbered 2398, and the total value of the product was $9,183,114, of which $4,134,023 represented the flour and grist-mill output.

Transportation. In 1870 the combined mileage of the railways in what is now North and South Dakota was only 65 miles. In 1890 North Dakota alone had 2116 miles, which figure had increased in 1900 to 2810. The eastern part of the State is well supplied with railroad facilities. The Great Northern crosses the northern part, and the Northern Pacific the southern part. In addition, the Saint Paul, Minneapolis and Sault Ste. Marie enters the State at the southwest corner and extends in a northwest direction entirely across the Commonwealth. These three lines with their branches constitute the greater part of the total mileage. All three have connections with the Canadian system of railroads, the two former by way of the Red River Valley. There is a railroad commission empowered to alter tariffs, to make rules and regulations, and to hear and decide complaints subject to the revision of the courts. The Red River is navigable part of the year, but is not extensively used.

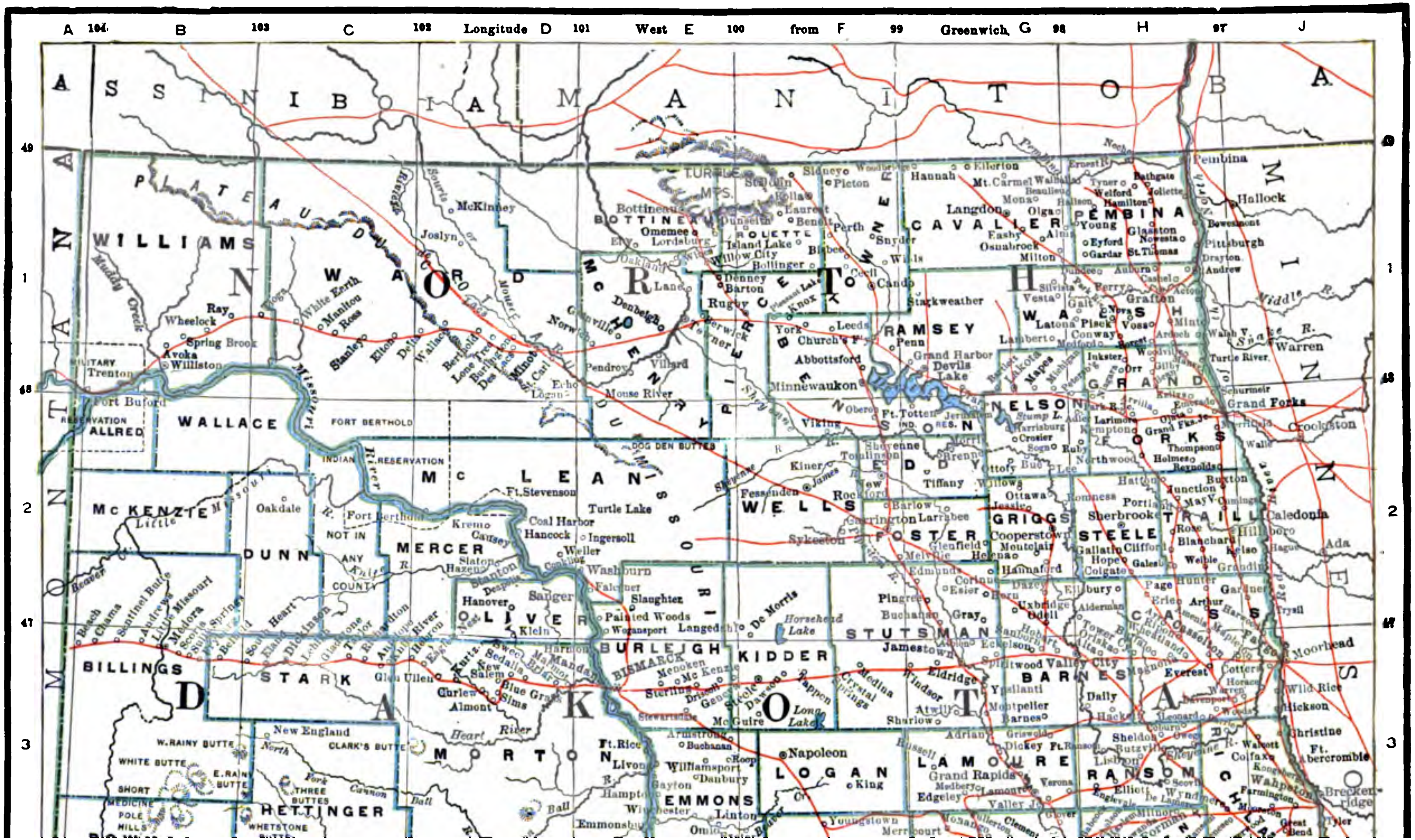
Banking. Until the organization of the State there was very little banking within its confines. In 1873 the first private bank commenced operations. The first incorporated bank opened in 1878 as a national bank. At the time of admission to Statehood there were 30 national and 8 State banks. One of the first measures of the Legislature in 1890 was to pass a stringent banking law prohibiting private banking; creating the office of Superintendent of Banks; and providing for reports and examinations. Under the security of this law many State banks were organized, and the number of national banks diminished somewhat. In 1892-93 the reputation of the North Dakota banks was seriously injured by the long list of failures of the so-called 'Mears Banks,' organized by E. Mears according to the Territorial law, and therefore not amenable to the new regulations. The last of these banks went into liquidation in 1896, and the reputation of the banks of the State was restored. The condition of the banks in 1902 is shown in the following table:

	National banks	State banks
Number	49	163
Capital	$2,076,000	$1,782,000
Surplus	329,000	223,000
Cash, etc	794,000	917,000
Deposits	9,772,000	9,326,000
Loans	9,218,000	5,840,000

AREA AND POPULATION OF SOUTH DAKOTA BY COUNTIES.

County.	Map Index.	County Seat.	Area in square miles.	Population.	
				1890.	1900.
*Armstrong	D 5		1,460	.....	.....
Aurora	G 6	Plankinton	724	5,045	4,011
Beadle	G 5	Huron	1,270	9.585	8 081
Bonhomme	H 7	Tyndall	569	9,057	10,379
*Boreman	D 4		1,231	.....	.....
Brookings	J 5	Brookings	817	10,132	12,561
Brown	G 4	Aberdeen	1,745	16,855	15,286
Brule	F 6	Chamberlain	808	6,737	5.401
Buffalo	F 5	Gannvalley	483	993	1,790
Butte	B 5	Bellefourche	7,834	1,037	2,907
Campbell	E 4	Mound City	765	3,510	4,527
Charles Mix	G 6	Wheeler	1,123	4,178	8,498
Choteau	...	Now belongs to Butte Co.	.....	8	.....
Clark	H 5	Clark	973	6,728	6.942
Clay	H 7	Vermilion	408	7.509	9,316
Codington	H 4	Watertown	786	7,037	8.770
Custer	B 6	Custer	1,612	4,891	2,728
Davison	G 6	Mitchell	486	5,449	7,483
Day	H 4	Webster	1,077	9.168	12.254
Deuel	J 5	Clearlake	621	4,574	6,656
*Dewey	D 4		2,219	.	.....
Douglas	G 6	Armour	445	4.600	5,012
Edmunds	F 4	Ipswich	1,176	4,399	4,916
Ewing	....	Now belongs to Butte Co.	.....	16	.....
Fall River	B 6	Hot Springs	1,757	4.478	3,541
Faulk	F 4	Faulkton	1,010	4,062	3.547
Grant	J 4	Millbank	694	6,814	9,103
Gregory	F 6	Fairfax	1,004	295	2.211
Hamlin	H 5	Castlewood	543	4,625	5,945
Hand	F 5	Miller	1,418	6.546	4,525
Hanson	H 6	Alexandria	486	4,267	4,947
Hughes	E 5	Pierre	765	5.044	3.684
Hutchinson	H 6	Olivet	817	10.469	11.897
Hyde	F 5	Highmore	875	1,860	1,492
*Jackson	D 6		...	50	.....
Jerauld	G 5	Wessington Springs	548	3,605	2,798
Kingsbury	H 5	Desmet	834	8,562	9,866
Lake	H 5	Madison	549	7,508	9,137
Lawrence	B 5	Deadwood	814	11,673	17.897
Lincoln	J 6	Canton	579	9,143	12,161
*Lugenbeel	D 6		1,066	. ..	...
Lyman	F 6	Oacoma	3,456	238	2,632
McCook	H 6	Salem	575	6,448	8,682
McPherson	F 4	Leola	1,146	5 940	6,327
Marshall	H 4	Britton	860	4,544	5,942
Meade	B 5	Sturgis	3,003	4,640	4,907
*Meyer	E 6		1,407	. .	.....
Miner	H 6	Howard	569	5.165	5,864
Minnehaha	J 6	Sioux Falls	802	21,879	23,926
Moody	J 6	Flandreau	517	5,941	8.326
Pennington	B 5	Rapid City	2,796	6,540	5,610
Potter	E 4	Gettysburg	900	2,910	2,988
*Pratt	....		. ...	23	.....
Presho	....		.....	181	.....
*Pratt	....		. ...	34	. ...
Roberts	J 4	Sisseton Agency	1,102	1,997	12,216
Sanborn	G 5	Woonsocket	576	4,610	4,464
Schnasse	D 4		1,563	.....	.....
*Shannon	C 6		1,066	.....	....
Spink	C 5	Redfield	1.518	10,581	9,487
Stanley	E 5	Fort Pierre	4,882	1,028	1,349
*Sterling	D 5		.....	96	.....
Sully	E 5	Onida	1,052	2,412	1,715
Todd	....		. ...	188	.....
*Tripp	E 6		1,480	.....	. ..
Turner	H 6	Parker	624	10,256	13,175
Union	J 7	Elkpoint	447	9.130	11,163
Walworth	E 4	Bangor	745	2,158	3,839
*Washabaugh	....		1,228	....	.....
*Washington	C 6		1,540	40	.....
Yankton	H 7	Yankton	515	10,444	12,649
Ziebach	C 5		....	210	.....
Cheyenne River Indian reservation	D 4		....	.....	2,357
Pine Ridge Indian reservation	C 6		....	.....	6,827
Rosebud Indian reservation	E 6		....	.....	5,201
Standing Rock Indian reservation	D 3		....	.....	1,653

*Counties as yet not fully organized; parts of Indian reservations.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BOTTINEAU
ROLETTE
TOWNER
CAVALIER
PEMBINA
WALSH
RAMSEY
BENSON
PIERCE
NELSON
GRAND FORKS
GRIGGS
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STUTSMAN
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BURLEIGH
LOGAN
LA MOURE
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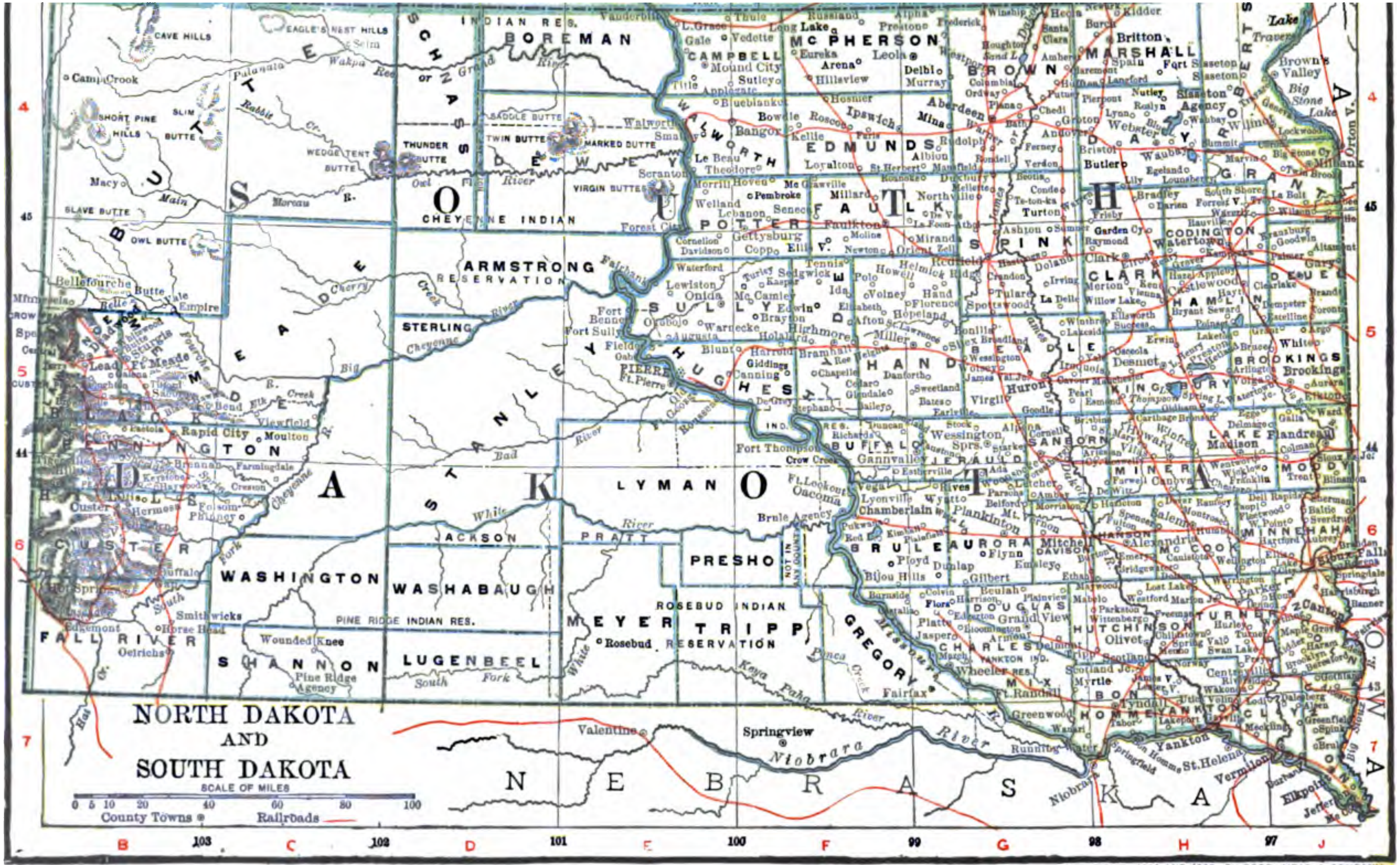
MORTON
OLIVER
MERCER
McLEAN
DUNN
McKENZIE
BILLINGS
STARK
HETTINGER
WALLACE
ALLRED
PLATEAU DU COTEAU MISSOURI
TURTLE MTS.
FORT BERTHOLD
INDIAN RESERVATION
MILITARY RESERVATION
DOG DEN BUTTES
Missouri
Bismarck
Jamestown
Fargo
Grand Forks
Devils Lake
Minot
Pembina
Williston
Mandan
Valley City
Wahpeton
Moorhead
Crookston


NORTH DAKOTA
AND
SOUTH DAKOTA

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AREA AND POPULATION OF NORTH DAKOTA BY COUNTIES.

County.	Map Index.	County Seat.	Area in square miles.	Population.	
				1890.	1900.
Barnes	G 3	Valley City	1,506	7,045	13,159
Benson	F 1	Minnewaukon	1,380	2,460	8,320
Billings	B 3	Medora	6,150	170	975
Bottineau	E 1	Bottineau	1,137	2,893	7,532
Bowman	....	....	.....	6	.....
Buford	....	....	.....	803	.....
Burleigh	E 3	Bismarck	1,680	4,247	6,081
Cass	H 2	Fargo	1,752	19,613	28,625
Cavalier	G 1	Langdon	1,512	6,471	12,580
Church	....	....	.....	74	.....
Dickey	G 3	Ellendale	1,146	5,578	6,061
Dunn	....	....	.....	159	.....
Eddy	F 2	New Rockford	648	1,377	3,330
Emmons	E 3	Williamsport	1,550	1,971	4,349
Flannery	....	....	.....	72	.....
Foster	F 2	Carrington	641	1,210	3,770
Garfield	....	....	.....	33	.....
Grand Forks	H 1	Grand Forks	1,432	18,357	24,459
Griggs	G 2	Cooperstown	730	2,817	4,744
Hettinger	....	....	.....	81	.....
Kidder	F 3	Steele	1,398	1,211	1,754
Lamoure	G 3	Lamoure	1,148	3,187	6,048
Logan	F 3	Napoleon	980	597	1,625
McHenry	E 1	Towner	1,468	1,584	5,253
McIntosh	F 3	Ashley	1,000	3,248	4,818
McKenzie	....	....	.....	3	.....
McLean	D 2	Washburn	3,348	860	4,791
Mercer	C 2	Mannhaven	1,930	428	1,778
Morton	D 3	Mandan	4,740	4,728	8,069
Mountraille	....	....	.....	122	.....
Nelson	G 2	Lakota	990	4,293	7,316
Oliver	D 2	Sanger	727	464	990
Pembina	H 1	Pembina	1,134	14,334	17,869
Pierce	F 1	Rugby	1,008	905	4,765
Ramsey	F 1	Devils Lake	1,200	4,418	9,198
Ransom	H 3	Lisbon	864	5,393	6,919
Renville	....	....	.....	99	.....
Richland	H 3	Wahpeton	1,445	10,751	17,387
Rolette	F 1	Rolla	943	2,427	7,995
Sargent	H 3	Forman	864	5,076	6,039
Sheridan	....	....	.....	5	.....
Stark	C 3	Dickinson	6,002	2,304	7,621
Steele	H 2	Sherbrooke	720	3,777	5,888
Stevens	....	....	.....	16	.....
Stutsman	F 2	Jamestown	2,296	5,266	9,143
Towner	F 1	Cando	1,048	1,450	6,491
Traill	H 2	Hillsboro	872	10,217	13,107
Wallace	....	Grafton	.....	24	.....
Walsh	G 1	....	1,308	16.587	20.288
Ward	C 1	Minot	6,690	1,681	7,961
Wells	F 2	Fessenden	1,296	1,212	8,310
Williams	B 1	Williston	3,512	109	1,530
Standing Rock Indian reservation	D 3	....	....	.....	2,208
Unorganized territory	....	....	.....	511	.....

GOVERNMENT. The State Constitution was adopted in October, 1889. A proposed amendment must receive the approval of a majority of the members elected to two successive legislative assemblies, and of a majority of the qualified electors at a popular election. Voters must be either citizens, or civilized Indians who have severed their tribal relations two years before election. Voters must also have resided in the State one year, in the county six months, and in the precinct ninety days. The Legislature may prescribe penalties for failing, neglecting, or refusing to vote at any general election. The capital of the State is Bismarck.

LEGISLATIVE. The Senate must consist of not less than 30 or more than 50 members; the House of Representatives of not less than 60 or more than 140 members. The Senators are elected from districts of contiguous undivided counties for a term of 4 years. The Representatives are elected at large from the Senatorial districts for a term of 2 years. Both receive $5 per day and mileage. Sessions are biennial, beginning on the first Tuesday after the first Monday in January, and are limited to 60 days.

EXECUTIVE. The Governor, Lieutenant-Governor, Secretary of State, Auditor, Treasurer, Superintendent of Public Instruction, Commissioner of Insurance, three Commissioners of Railroads, an Attorney-General, and a Commissioner of Agriculture and Labor are elected every two years. The Governor can veto all bills or any item of any appropriation bill, but his veto is overridden by a two-thirds vote of both Houses. An unreturned bill becomes a law after three days. The Governor may call extra sessions, and, in conjunction with a board of pardons, may exercise the pardoning power.

JUDICIARY. There is a Supreme Court of three judges elected by the State at large for the period of 6 years. There are 6 district courts, a judge being elected in each district for 4 years. The Legislature can increase the number. A clerk of the district court is elected in each county for 4 years. County court judges are elected for 2 years. The Legislature provides by law for the election of justices of the peace and police magistrates.

LOCAL GOVERNMENT. General laws provide for organizing new counties and changing county lines. There must be, however, at least 24 Congressional townships and 1000 inhabitants in each county. Changes in boundaries must be approved by popular vote of the counties affected. Township organization is also provided for by a general law. Every two years the counties elect a register of deeds, auditor, treasurer, sheriff, and attorney. Other county, township, and district officers may be provided for by law.

OTHER LEGAL PROVISIONS. Trusts or combinations controlling the price or cost of exchange of articles are unlawful. The importation, manufacture, sale, or gift of intoxicating liquors is prohibited. The legal rate of interest is 7 per cent., though 12 may be allowed by contract. Judgments outlaw in 10 years, notes in 6 years.

FINANCES. The small public debt was created mainly in 1884-89, before admission to Statehood, for purposes of construction of public buildings. It bore 6 per cent., but was refunded after 1890 in 4 per cent. bonds. At the time of admission the debt was $689,000, and the Constitution prohibits any increase of this debt by more than $200,000. The income of the State is derived from a general property tax limited by the Constitution to 4 mills, from a tax on corporations and railroads, and from sale of public lands. All the proceeds from the last source must go into the permanent school fund.

On June 30, 1902, the State had a balance on hand in the treasury of $562,582.81. The total receipts from June 30, 1900, to June 30, 1902, were $3,126,435.08, and the expenditures for the same period amounted to $2,740,278.27. The bonded indebtedness on June 30, 1902, was $722,300.

MILITIA. The number of men of militia age in 1900 was 80,191. The militia in 1901 numbered 718.

POPULATION. The population of North Dakota by decades is as follows: 1870, 2405; 1880, 36,909; 1890, 182,719; 1900, 319,146. North Dakota at the first two censuses was a part of the Territory of Dakota. The increase in the last decade amounted to 74.7 per cent. The counties along the Red River are the most densely populated. But few people are located in the western half of the State. There is a larger per cent. of foreign-born than is found in any other State. In 1900 this element of the population numbered 113,091, and there was a still larger number of native whites of foreign parents, these two elements almost equaling four-fifths of the total population. The Canadians and Swedes are the chief foreign nationalities represented. Only two towns had more than 4000 inhabitants in 1900: Fargo, 9589; and Grand Forks, 7652. The State sends two members to the National House of Representatives.

RELIGION. The principal Protestant denomination is the Lutheran. It represents about one-third of all the church members. The Roman Catholics form over one-seventh of the total population. The other denominations, in order of importance, are Methodist, Presbyterian, Baptist, and the Congregational.

EDUCATION. The Constitution provides for a free public school system under the supervision of a board of commissioners consisting of the Governor, the State Superintendent of Public Instruction, and the president of the State University. The system of high schools is under the control of local boards of education, city superintendents, and State high school boards; and there are a State normal school and institutions for higher education. The proportion of illiteracy in 1900 was 5.6 per cent., being the highest (with the exception of Missouri) in the North Central division of States. This proportion ranges from 0.9 per cent. for the native white population, to 6.7 per cent. for the foreign white, and to 59.2 per cent. for the colored. The 2641 common schools (245 graded) had in 1900 an enrollment of 77,686, and an average daily attendance of 43,560. The length of the school term in 1900 was 155.7 days, as against 113 days in 1890. The average monthly salaries of male and female teachers in 1900 were $41.72 and $36.80 respectively.

The total income for school purposes in 1900 was $1,456,496, the revenue being derived principally from local taxes, from the permanent school fund, and from the sale and rental of school lands. The expenditure per pupil, based on average attendance, was $35.03—the highest expenditure found among the North Central States and a figure exceeded in but few States. Under the enabling act admitting the State of North Dakota to the Union, the 16th and 36th sections of every township were granted for the maintenance of the common schools. The State thus acquired about 2,300,000 acres. In 1900 North Dakota had 27 public high schools with a total attendance of 1130. Normal education is provided by two public schools (at Mayville and Valley City) and one private normal school. The institutions for higher education are the University of North Dakota, at Grand Forks; Fargo College (Cong.), at Fargo; Red River Valley University (M. E.), at Wahpeton; and the Agricultural College, at Fargo.

CHARITABLE AND PENAL INSTITUTIONS. The State maintains a school for the deaf at Devil's Lake, an asylum for the insane at Jamestown, a school for the feeble-minded at Grafton, and a soldiers' home at Lisbon. The State penitentiary is located at Bismarck.

HISTORY. The whole territory of Dakota was a part of the Louisiana Purchase, and was for a long time unorganized. Lewis and Clark in their expedition of 1804-06 spent the first winter near Mandan. British subjects had posts for the fur trade within the territory, and Lord Selkirk, considering it British territory, built a fort near Pembina in 1810. Previously, about 1780, French Canadians had settled at this place. Frémont in 1839 explored much of the country, and Lieutenant Warner in 1855 made a report on the region for the Government. The Sioux Indians in 1851 ceded a portion of their lands to the Government and they were opened for settlement. The part east of the Missouri River was first attached to the Territory of Minnesota in 1849. The part west, together with much of Idaho, Wyoming, and Montana, became part of Nebraska Territory in 1854. On March 2, 1861, the Territory of Dakota was organized.

The Indians were hostile and population was sparse until after 1866. With the growth of population came agitation for Statehood, and the Territory was divided into two (see SOUTH DAKOTA), and on February 22, 1889, Congress authorized the calling of conventions to form constitutions. The convention for North Dakota met at Bismarck July 4, and formed a constitution. It was ratified in October, together with a prohibition article which was submitted separately. On November 2d President Harrison declared the State admitted. Politically the State has been Republican from its admission, with the exception of one election (1892), when a fusion of the Farmers' Alliance with the Democrats gave them control.

GOVERNORS OF NORTH DAKOTA

John Miller	Republican	1889-91
Andrew H. Burke	"	1891-93
E. C. D. Shortridge	Democratic-Independent	1893-95
Roger Allin	Republican	1895-97
Frank A. Briggs	"	1897-99
Frederic B. Fancher	"	1899-1901
Frank White	"	1901 —

Consult: the report by the Commissioner of Immigration, Hagerty, *The State of North Dakota: An Official Statistical, Historical, and Political Abstract* (Aberdeen, S. D., 1889); Beadle, *Dakota* (Saint Paul, 1889).

NORTH DAKOTA, UNIVERSITY OF. A coeducational State institution at Grand Forks, N. D., established in 1883. By the enabling act of Congress under which the State was admitted, the university received a grant of 86,080 acres of land, and the School of Mines, a grant of 40,000 acres. The university comprises a college of arts, a normal college, and departments of law, mining engineering, mechanical and electrical engineering, military science, and pharmacy, together with a preparatory department. In 1902 it had 500 students, 35 instructors, and a library containing 10,000 volumes. The college property was valued at $2,500,000, including a campus of 80 acres, valued with the college buildings at $350,000, and the income was $80,000. University extension work is carried on by means of lectures given in different parts of the State.

NORTH DOWNS. A ridge of hills in England. See under DOWNS.

NORTHEAST BOUNDARY DISPUTE. In American history, the name applied to the long-standing dispute between the United States and Great Britain concerning the northeastern boundary of the United States. The controversy grew out of a difference in interpretation of the second article of the Treaty of Paris of 1783, which undertook to define the boundaries between the United States and Canada. In this article the boundary between Maine and New Brunswick was described as the Saint Croix River, and it was soon found to be a difficult matter to determine what was the Saint Croix River. Complaints were made that the British were encroaching upon American territory, and collision between the Americans and the English intruders gave forebodings of international trouble. In 1794 John Jay was charged, among other things, with the settlement of the dispute. The only thing he accomplished in this connection was the securing of a provision in the treaty negotiated by him (see JAY TREATY) for the appointment of three commissioners to determine the Saint Croix River. The commissioners met at Halifax in March, 1798, and determined the Saint Croix River, but left unsettled the place of its source. A new difficulty arose over the ownership of the Passamaquoddy Bay Islands, which lie near the mouth of the Saint Croix River. No settlement could be reached on this point until 1814, when an article was incorporated in the Treaty of Ghent for the appointment of a commission to bring about some adjustment. By a decision of the commission rendered in 1817, Moose, Dudley, and Frederick islands were awarded to the United States, the others to Great Britain.

Still another disputed point was the determination of the boundary line from the source of the Saint Croix to the highlands which separate the waters flowing into the Saint Lawrence from those which make their way into the Atlantic Ocean. Various efforts were made by the two governments to reach an agreement on this point, and provisions for this purpose were made in treaties both in 1803 and in 1807, but neither treaty was ever ratified. Finally the Treaty of Ghent provided for the appointment of a commission to settle the dispute, with the reservation that if an agreement could not be reached the disputed question should be referred to the arbitration of a friendly sovereign. The chief task of the commissioners was the determination of the 'northwest angle of Nova Scotia' mentioned in the treaty and the 'northwesternmost head of the Connecticut River.' The commissioners were unable to agree as to the location of these points. In 1827 a convention was concluded between the two Powers for the reference of the question to the King of the Netherlands. In January, 1831, he made his decision awarding part of the disputed territory to the United States and part to Great Britain. Finding it next to impossible to execute the treaty of 1783, the King drew a boundary line of his own. The decision was satisfactory to neither party, and was formally rejected by the Government of the United States. Meantime border riots and collisions were occurring in the disputed territory to the disturbance of the general peace and security. Several efforts were then made to reach a compromise, but without effect. Finally, the dispute was settled by the Webster-Ashburton Treaty (q.v.) of 1842.

NORTHEAST CAPE. The most northerly point of Asia. See Severo Cape.

NORTHEAST PASSAGE. See Polar Research.

NORTHEN, nôr'ten, Adolf (1828-76). A German battle painter, born at Münden, Hanover. He studied from 1847 to 1851 at the Academy of Düsseldorf, and made that city his permanent home after having declined to accept a Hanoverian stipend coupled with the condition that he should complete his studies under Horace Vernet in Paris. Most of his pictures represent episodes from the campaigns of Napoleon, such as "Encounter Near the Göhrde Forest" (1852, Hildesheim Museum); "Battle of Waterloo" (1855) and "Defense of a Farm" (both in the Hanover Museum); "Napoleon's Retreat from Moscow" (several times); "Episode in Battle of Waterloo" (1861) and "Storming of Planchenois in 1815" (1862, both in the Hamburg Gallery). His observations on the battlefields in Denmark, 1864, and in Bohemia, 1866, resulted in the depiction of various scenes in those campaigns, notably the "Engagement Near Oeversee" (1866, Rudolphinum, Prague). Although his health was failing at the time of the Franco-German War, he followed the armies to France, and among other war scenes he produced "Attack of Prussian Hussars at Vionville," his last painting.

NORTHER. See Cold Wave.

NORTHERN LIGHTS. See Aurora Borealis.

NORTHERN TERRITORY. A vast region in the northern part of South Australia, under whose control it is (Map: Australia, E 1). It has an area of 523,620 square miles. The Minister appointed to have charge of the district has his official residence at Palmerston. The climate is tropical, and sections of it are well adapted to the growing of tropical plants, particularly sugar-cane. Parts of it are devoted to sheep and cattle grazing, but the greater portion is wholly unoccupied. Tin, copper, silver, and gold are found. A telegraph line connects Port Darwin with Adelaide, and all messages for the southern colonies are received by way of Port Darwin. In 1900 the population, exclusive of aborigines, was estimated at 1560 Europeans, 2200 Chinese, and 515 others. See South Australia.

NORTH'FIELD. A town in Franklin County, Mass., 50 miles northwest of Worcester; on the Central Vermont Railroad (Map: Massachusetts, C 2). The birthplace of Dwight L. Moody (q.v.), Northfield has become, as a result of his influence, a noted centre of religious education and training, being the seat of Northfield Seminary for Young Ladies, founded in 1879, and the Northfield Training School. Mount Hermon School for Boys, which is associated with the work of Northfield, is in the town of Gill. The annual summer conference of Christian workers and the student conference have made the town of considerable repute as a summer resort. Northfield has the Dickinson Public Library. The inhabitants are interested principally in agriculture. It was incorporated in 1672. Its affairs are administered by town meetings. Population, in 1890, 1869; in 1900, 1966.

NORTHFIELD. A city in Rice County, Minn., 43 miles south of Minneapolis; on the Cannon River, and on the Chicago, Milwaukee and Saint Paul and the Chicago Great Western railroads (Map: Minnesota, E 6). It is the seat of Carleton College (Congregational), opened in 1870, and of Saint Olaf College (Lutheran), opened in 1875, and has an Odd Fellows' Widows' and Orphans' Asylum, Scoville Library, Goodsell Observatory, and a handsome Y. M. C. A. building. The city is the centre of a productive farming section, and has manufactures of brick and woolen knit goods. Settled in 1856, Northfield was chartered as a city in 1875, the charter of that date, as revised in 1889, being still in operation and providing for a government vested in a mayor, elected every two years, and a unicameral council. The water-works are owned and operated by the municipality. Population, in 1890, 2659; in 1900, 3210.

NORTHFIELD. A village in Washington County, Vt., 10 miles south by west of Montpelier, the State capital; on the Dog River, and on the Central Vermont Railway (Map: Vermont, D 5). It is the seat of Norwich University, established in 1819 and incorporated in 1834. The village has a Soldiers' Monument and another to Charles Paine, Governor of the State (1841-43); other features of interest are the neighboring heights, Paine and Bald mountains. Valuable deposits of granite and black slate are found in this vicinity. Granite-working, dairying, and the manufacture of lumber products and woolen goods are the principal industrial interests. The village of Northfield was first incorporated in 1855. There is a municipal electric light plant. Population, in 1890, 1222; in 1900, 1508.

NORTH'FLEET. A town in Kent, England, on the Thames, one and one-half miles west of Gravesend (Map: England, G 5). Its industries comprise shipbuilding, chemical works, chalk and lime pits, cement factories, and brick yards. It has an interesting church of the thirteenth century; Huggen's College, established in 1847; and a workingman's club. Population, in 1891, 11,700; in 1901, 13,000.

NORTH FORELAND. See Foreland, North and South.

NORTH GERMAN CONFEDERATION. A union of German States north of the Main, formed in 1866 under the hegemony of Prussia, following on the defeat of Austria in the Seven Weeks' War (q.v.) and the dissolution of the Germanic Confederation. (See Germany.) It was first organized in August with 18 States, the number being increased to 22 before the end of October. A constitution was adopted which, with slight modifications, is that of the present Germany. Offensive and defensive alliances were concluded with Bavaria, Baden, and Württemberg, by which these States agreed to place, in case of war, their military forces under the command of the King of Prussia. The Franco-German War brought complete unity to Germany. On January 18, 1871, the King of Prussia, at Versailles, assumed the title of German Emperor, and in April the Constitution of the Confederation, so amended as to provide for the rights of the newly admitted South German States, was promulgated for the Empire.

NORTH HOLLAND. A province of the Netherlands occupying the peninsula lying between the Zuider Zee and the North Sea, and bounded on the south by the provinces of Utrecht and South Holland (Map: Netherlands, C 2). It includes also the islands of Texel and Vlieland of the West Friesian Islands. Area, 1069 square miles. The province contains but little forest, the greater part being low meadow and moorland protected along the coast by dunes and dikes. Agriculture, gardening, and cattle-raising, and in the cities linen manufacturing are the principal industries. The province is traversed by a number of canals, the most important of which are the North Holland Canal, between Amsterdam and Helder, and the North Sea Canal, connecting the Zuyder Zee and the North Sea directly. Population, in 1899, 968,105. The capital is Haarlem and the largest city is Amsterdam. For history, see Holland; Netherlands.

NORTH'INGTON, Robert Henley, Earl of (c.1708-72). An English Lord Chancellor, son of Anthony Henley. Educated at Westminster, and at Saint John's and All Souls', Oxford, he studied at the Inner Temple. For ten years he was a representative of Bath in Parliament, and afterwards he became Attorney-General, Keeper of the Great Seal, and Speaker of the House of Lords. In 1760 he was made Lord Henley and presided at the trial of Lord Ferrers. The year following he became Lord Chancellor. He retired from the Chancellorship in 1767. He was a great favorite of George III., and was commonly known as 'Tom Tilbury' or 'Surly Bob.' Consult Lord Henley's *Memoir* (London, 1831).

NORTH ISLAND. See New Zealand.

NORTHMEN. See Normans.

NORTH PLATTE. The county-seat of Lincoln County, Neb., 294 miles west of Omaha; at the junction of the North and South Platte rivers, and on the Union Pacific Railroad (Map: Nebraska, D 2). It has a United States land office, a Y. M. C. A. library, with about 2000 volumes, and a high school that cost $35,000. The industrial establishments include railroad machine shops, employing several hundred men, and a cold storage plant. North Platte is the centre of an irrigated section, and is an important shipping point for alfalfa, sugar beets, and cattle. Population, in 1890, 3055; in 1900, 3640.

NORTH RIVER. The name applied to the lower course of the Hudson River.

NORTHROP, nôrth'rŭp, Cyrus (1834—). An American educator, born in Ridgefield, Conn. He graduated at Yale in 1857, and at the law school there in 1859. Two years later he was appointed clerk of the Connecticut House of Representatives, and in 1862 of the Senate. In 1863 he was made professor of rhetoric and English literature in Yale, and he held this chair until 1884, when he became president of the University of Minnesota.

NORTH SEA, or German Ocean (Lat. *Germanicum Mare*, Ger. *Nord See*, Dan. *Vesterhavet*, West Sea). That part of the Atlantic between the eastern coast of Great Britain and the Continent of Europe (Map: Europe, D 3). It is pear-shaped in general outline, with a wide opening northward into that part of the Atlantic Ocean known as the Norwegian Sea, and with a narrowing arm extending from the main oval body southward to the Strait of Dover, which, with the English Channel, forms the southern communication with the Atlantic. On the east the Skagerrak leads between Jutland and Norway into the Cattegat, which connects through the Sound and the Great and Little Belts with the Baltic Sea. The greatest width of the North Sea, between Dundee, Scotland, and the entrance of the Limfjord in Jutland, is 412 miles; its greatest length from north to south is 680 miles; and its area is about 200,000 square miles, of which 2500 square miles are occupied by islands. A number of large rivers flow into the southern part of the North Sea; the chief of these are the Elbe, Weser, Ems, Rhine, which is joined at its mouth by the Meuse, and Scheldt on the Continent, and the Thames and the Humber in Great Britain. These render the water less saline than that of the main ocean, though the salinity is greater than that of the Baltic, the percentage of salty constituents being 1.025 in the southern part of the sea. They also contribute their sediment to the formation of the numerous shoals and sandbanks which line the southern and southeastern shores. These shores are very low, the land in many places lying below the sea-level. They have been much encroached upon by inundations, which have left the higher portions of the former coast-line as a chain of islands. Behind these are a series of shallow lagoons and inlets, of which the most notable are the Jade (q.v.) in Germany, and the Zuyder Zee (q.v.) in Holland.

In general the depth of the North Sea increases gradually northward. The mean depth of the southern portion is about 100 feet, near the middle it is 250, and in the north 400 feet. Along the steep, rocky coast of Norway there runs a trough with a depth of nearly 1000 feet within 20 miles of the shore. On the other hand, there are in the southern half of the sea, besides the shoals mentioned along the coast, several shallow regions rising considerably above the mean level of the bottom. Among these the Dogger Bank occupies a large portion of the south-central part of the sea, with a depth of 60 to 100 feet, the surrounding depths being 150 to 200 feet. The tides of the North Sea are very irregular, owing to the fact that two tidal waves enter it, one from the north and one from the south. The former sweeps southward along the west shore, the latter northward along the eastern coast. Midway between the shores there seems to be very little rise and fall and at some points none at all, while in some places on the southern shore, where the two waves unite, there is a difference of 20 feet between high and low tide. The winds on the North Sea are variable, those from the west being the most prevalent. Rain and fogs occur at all seasons, and the violent northwest storms blowing toward the shoals on the southeast coast make navigation there exceedingly dangerous, especially along the coast of Jutland. Nevertheless, owing to its favorable position, the North Sea is one of the most frequented and most important commercial highways of the world. Its fisheries are also among the foremost, providing support for many thousand inhabitants of the surrounding countries.

By means of the Kaiser Wilhelm Canal ships can now enter the Baltic Sea without making the passage around Jutland.

Consult: Fulton, "On the Currents of the North Sea, and Their Relation to Fisheries," *Scotland Fishery Board Report for 1896;* Haas, *Deutsche Nordsee Küste, friesische Inseln und Helgoland* (Bielefeld, 1900).

NORTH SHIELDS. A seaport of England. See Shields, South and North.

NORTH STAR, Order of the. A Swedish civil order of merit with four classes, founded in 1748 by Frederick I. The decoration is an eight-pointed white star surmounted by a crown and suspended from a black ribbon. The round, blue shield bears the polar star with five rays, and the device "Nescit occasum" ("It never sets"). It is conferred especially for notable scientific achievements. See Plate under Orders.

NORTH TONAWANDA, tŏn'ȧ-wŏn'dȧ. A city in Niagara County, N. Y., 10 miles north of Buffalo; on the Niagara River, at the mouth of Tonawanda Creek, which separates the city from Tonawanda, also on the Erie Canal, and on the Erie, the Lehigh Valley, and the New York Central railroads (Map: New York, B 3). Several other lines pass through the city on leased roads. It is an important industrial and commercial centre, known especially for its lumber and iron interests. There is an extensive production of pig iron, nuts and bolts, barrel organs, and steam merry-go-rounds. The manufactures include also roofing material, steam piping, steam radiators, steam pumps, and miniature railroads. According to the census of 1900, an aggregate capital of $5,027,000 was invested in the various industries, the production of which was valued at $6,446,000. There is a public library with over 5400 volumes. North Tonawanda, chartered as a city in 1897, is governed by a mayor, chosen every two years, and a unicameral council, elected two from each ward and three at large. The water-works are owned and operated by the municipality. Population, in 1890, 4793; in 1900, 9069.

NORTHUM'BERLAND. The northernmost county of England, bounded on the east by the North Sea, and on the south, in part, by the River Tyne (Map: England, D 1). The River Tweed and the Cheviot Hills are on the Scottish border. The whole surface, except the narrow coastal region, is uneven, with rounded hills, moorlands, and fertile wooded valleys. The summers are cooler, but the winters milder, than in the southern counties. The coast region and the valleys are cultivated, producing turnips and cereals; the western part is largely pastoral. The chief industries are coal-mining and the manufactures which depend upon the coal supply; the salmon fisheries are also of importance. Population, in 1891, 506,030; in 1901, 602,900. The county returns four members to Parliament. Newcastle-upon-Tyne, the chief city of Northumberland, is a separate county borough. Among the considerable towns are Tynemouth, Wallsend, and Cowpen. Northumberland contains numerous historic landmarks, including remains of Hadrian's Wall and of Roman military roads and famous battlefields of the Scottish wars.

Bibliography. Hodgson, *History of Northumberland* (Newcastle, 1820-40), is the standard work, and is continued in Hodgson-Hinde, *General History of Northumberland* (Newcastle, 1858). Materials collected by Hodgson are also used in Bateson, *History of Northumberland* (12 vols., Newcastle, 1893 et seq.), an elaborate and complete work. Consult also: Gibson, *Northumberland Castles, Churches, and Antiquities* (London, 1848-54); Hartshorne, *Feudal and Military Antiquities of Northumberland* (Oxford, 1858); Bruce, *Roman Wall* (London, 1874); Lebour, *Geology of Northumberland and Durham* (Newcastle, 1886); Andrews, *Bygone Northumberland* (London, 1899); and the *Proceedings of the Surtees Society* (Durham, 1835 et seq.).

NORTHUMBERLAND, Earls of. See Percy.

NORTHUMBERLAND, John Dudley, Duke of. An English politician, father-in-law of Lady Jane Grey, whom he plotted to place on the throne of England. See Grey, Lady Jane.

NORTHUMBERLAND, Robert de Mowbray, Earl of (?-c.1125). An English baron, whose father and uncle came over with William the Conqueror. He was created Earl of Northumberland about 1081, and seven years afterwards fought to support Robert of Normandy's claim to the English crown against that of the latter's younger brother, William Rufus. He burned Bath, besieged Ilchester, carried fire and sword over western Wiltshire, and then began a conflict with the Bishop of Durham. His next antagonist was King Malcolm of Scotland, whom he slew near Alnwick in 1093, and two years afterwards he headed an insurrection against William II. in favor of his cousin, the Count d'Aumale. The King besieged Northumberland in his strong castle at Bamborough, and the Earl, being lured therefrom on a pretense, was captured after a stout resistance at Tynemouth Monastery. It is supposed that he was kept a prisoner for the remainder of his life.

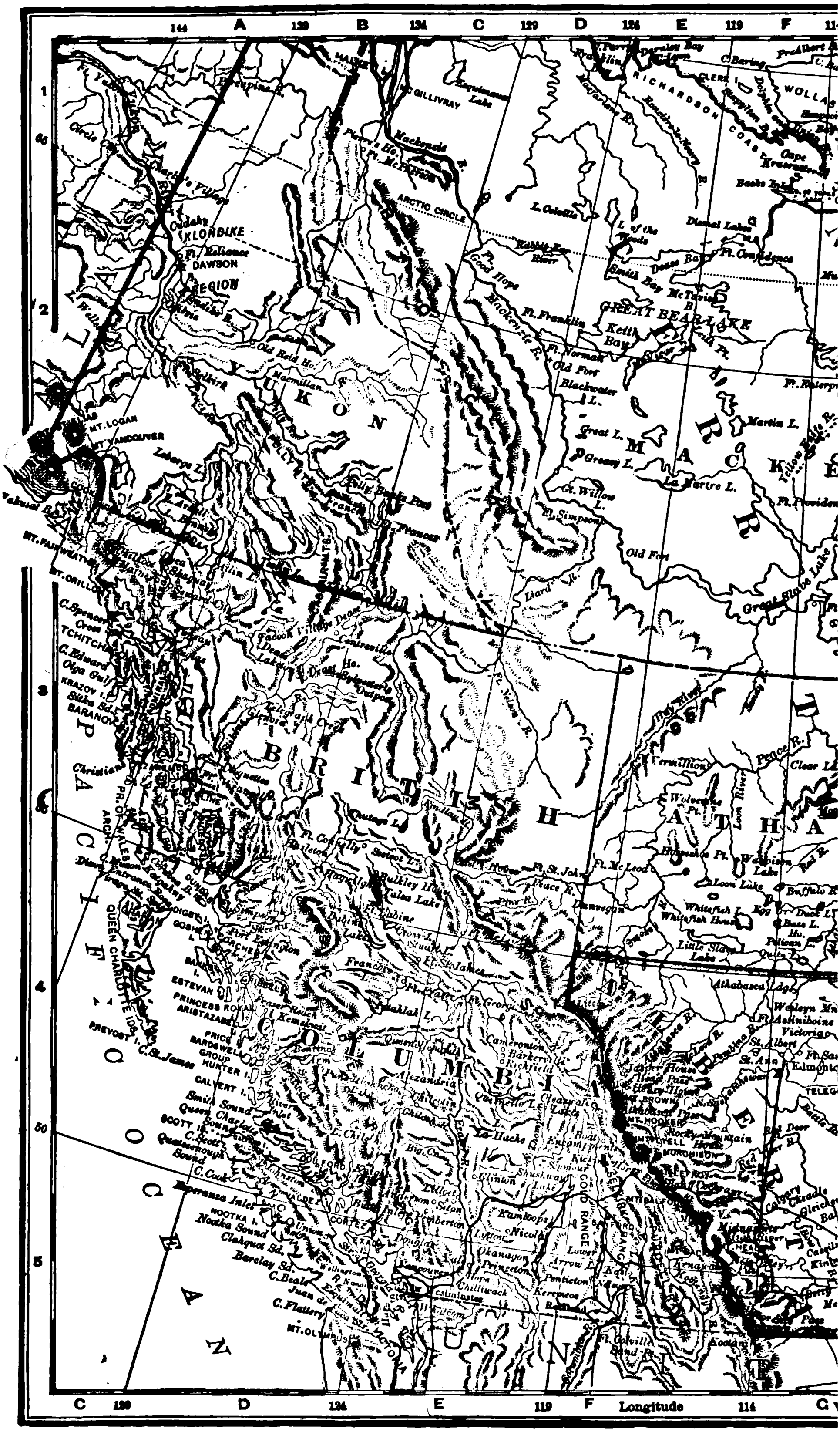
NORTHUM'BRIA (ML. *Northumbria*, from AS. *norþ*, north + *Humbre*, Humber). In Anglo-Saxon England, a kingdom of the Heptarchy (q.v.) formed out of the two earlier kingdoms of Bernicia, established by Ida in 547, and extending from the Forth to the Tees, and Deira, extending from the Tees to the Humber. Æthelric of Bernicia in 588 drove out Ælla of Deira and united the two under his rule. Under Oswald (died 642) it was the strongest kingdom in the Heptarchy and the champion of Christianity against pagan Mercia. Its separate existence was brought to an end by Egbert in 827. The name survives in the modern county of Northumberland.

NORTHWEST BOUNDARY DISPUTE. The dispute between the United States and Great

Britain concerning the northwest boundary of the United States. By the Treaty of Ghent, concluded between the two governments, December 24, 1814, provision was made for the appointment of two commissions to determine the northern boundary from the Saint Lawrence River to Lake Superior, and from Lake Superior to the Lake of the Woods. At the same time the American commissioners proposed the 49th parallel from the Lake of the Woods to the Rocky Mountains as a continuation of the northern boundary between the United States and Canada. This proposition, however, was not acceptable to the British negotiators, nor was any agreement upon the subject reached at the time. Meanwhile the occupation of Oregon had extended the boundary dispute to the territory west of the Rocky Mountains. Russia, which claimed part of Oregon, ceded her claims of all territory south of 54° 40′ N. lat. to the United States in 1824. Spain also claimed Oregon on the ground of discovery, but by the treaty of 1819 quitclaimed her title to land north of the 42d parallel to the United States, leaving Great Britain and the United States as the only disputants. By the convention of 1818 the two governments accepted the 49th parallel as the boundary between Canada and the United States from the Lake of the Woods to the Rocky Mountains. The proposition of the United States to accept a continuation of that line to the Pacific as a suitable division of the Oregon country between the two claimants was rejected by Great Britain on the ground that it would give the Columbia River to the United States. After fruitless negotiations, the United States agreed to accept an arrangement by which the two Powers were to occupy the Oregon territory jointly for a period of ten years. This was embodied in the convention of 1818. By a convention concluded at London, August 6, 1827, the two governments agreed to extend indefinitely the stipulation of 1818 for joint occupation, with the reservation that the convention was subject to abrogation after October 20, 1828, by either party giving twelve months' notice. During the administration of President Tyler negotiations for the permanent settlement of the dispute were carried on between Secretary of State Calhoun and the British Minister Pakenham, who offered to accept the 49th parallel as far as the Columbia River, and from thence onward the Columbia River itself, as the boundary. The Government of the United States declined to accept this proposition, as well as a proposition to submit the question to arbitration. The American public, moreover, was very insistent that no essential rights be waived, and the popular opposition to the making of any concession gave rise to the political watchword, "Fifty-four forty, or fight." Matters thus stood when the Presidential election of 1844 occurred. The Democratic Party, in its national platform, asserted the right of the United States to the whole of Oregon, and won the election partly on this issue. Notwithstanding this emphatic position of the party, the new Administration resumed the negotiations, offering substantially the same proposition as Calhoun had offered. This was refused by the British Government, whereupon negotiations were broken off. The President formally withdrew the proposal and reasserted our "rightful claim to the whole of Oregon." In April, 1846, Congress authorized the President at his discretion to give the notice required by the convention of 1827 for its abrogation, and this was accordingly done. Finally the dispute was amicably settled by a treaty concluded in July following (1846), by which it was provided that the boundary line should be the 49th parallel to the middle of the channel which separates Vancouver's Island from the continent, and thence southerly through the channel, and the Straits of Juan de Fuca to the Pacific Ocean, the navigation of the channel and straits to remain free and open to both parties. A subsequent dispute between the two governments as to the meaning of the provisions in respect to the channel was referred to the German Emperor (1871) as arbitrator. He decided the following year in favor of the American claim. See SAN JUAN BOUNDARY DISPUTE.

NORTHWESTERN UNIVERSITY. A coeducational institution at Evanston-Chicago, Ill., in affiliation with the Methodist Episcopal Church, founded in 1851. It comprises a college of liberal arts, and schools of law, medicine, pharmacy, dentistry, and music and oratory. The college of liberal arts and the school of music are at Evanston, the professional schools in Chicago. Students are admitted on certificate from accredited schools or on examination in three groups of studies. The courses in the college lead to the bachelor's and master's degrees in arts, philosophy, science, and letters, and to the degree of doctor of philosophy. The college course is largely elective after the second year, and provision is made for advanced credits by which the time required for subsequent professional studies may be shortened. Advanced courses in certain departments are offered to graduate students, but this work is not organized into a distinct graduate school. Two schools of preparatory instruction are maintained by the university, the Academy, in Evanston, and the Grand Prairie Seminary at Onarga. The Garrett Biblical Institute, under Methodist Episcopal control, forms the theological department of the university, and maintains close relations with the Norwegian-Danish Theological School and the Swedish Theological Seminary, both at Evanston. In 1903 the university had 305 instructors and 3691 students, of whom 769 attended the college. The college campus covers about 45 acres, on the shores of Lake Michigan, with well-equipped buildings, including the Dearborn Observatory and the Library building, the latter containing the general and Greenleaf libraries, with about 52,000 volumes and 33,000 pamphlets. The endowment in 1902 was $4,000,000, the income $465,000, and the total value of property under the control of the colleges, $6,761,250.

NORTHWEST FRONTIER PROVINCE. A province of British India, bounded on the west and north by Afghanistan, on the east by Kashmir and the Punjab, and on the south by Baluchistan. It was formed in 1901 by separating from the Punjab the District of Peshawar and other portions lying mainly west of the Indus. These districts, which are directly under British administration, have an area of 16,466 square miles, and had a population in 1901 of 2,125,480. The Chief Commissioner of the province has also political control over the remaining region along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Mackenzie R.
Ft. McPherson
ARCTIC CIRCLE
Esquimaux Lake
RICHARDSON COAST
C. Bathurst
L. Colville
Dismal Lake
Ft. Confidence
Smith Bay
GREAT BEAR LAKE
Keith Bay
Ft. Good Hope
Ft. Franklin
Ft. Norman
Old Fort
Blackwater L.
Great L.
Grassy L.
Martin L.
La Martre L.
St. Willow L.
Ft. Simpson
Liard R.
Old Fort
Great Slave Lake
M A C K E N Z I E
KLONDIKE
Ft. Reliance
DAWSON
REGION
Y U K O N
Ft. Selkirk
Macmillan R.
Pelly Banks Post
Ft. Frances
MT. LOGAN
MT. VANCOUVER
Laberge L.
Yakutat Bay
MT. FAIRWEATHER
MT. CRILLON
C. Spencer
Cross Sd.
C. Edward
Olga Gulf
KRAZOV I.
Sitka Sd.
BARANOV I.
Chilkoot
Skagway
Dease Lake
Telegraph Creek
Glenora
Ft. Nelson R.
Peace R.
Vermillion
Ft. McLeod
Dunvegan
Lesser Slave Lake
Athabasca Ldg.
Wolverine Pt.
Loon Lake
Whitefish L.
Clear L.
B R I T I S H
C O L U M B I A
P A C I F I C
O C E A N
PR. OF WALES ARCH.
Dixon Entrance
QUEEN CHARLOTTE ISLANDS
PREVOST I.
C. St. James
Port Simpson
Port Essington
Ft. Connolly
Babine Lake
Stuart L.
Ft. St. James
Ft. St. John
Ft. George
Fraser Reach
Kemano
Bentinck Arm
Alexandria
Quesnel
Barkerville
Richfield
Cameronton
Clearwater L.
La Hache
Big Bar
Lillooet
Kamloops
Shuswap L.
Nicola
Lytton
Okanagon L.
Princeton
Penticton
Chilliwack
New Westminster
Lower Arrow L.
Kootenai L.
Ft. Colville
Sand Pt.
GOLD RANGE
SELKIRK RANGE
MT. BROWN
MT. HOOKER
MT. MURCHISON
Rocky Mountain House
Jasper House
Henry House
Athabasca R.
Edmonton
St. Albert
Victoria
Calgary
Red Deer R.
Smith Sound
Queen Charlotte Sound
SCOTT IS.
C. Scott
Quatsino Sound
C. Cook
Esperanza Inlet
NOOTKA I.
Nootka Sound
Clayoquot Sd.
Barclay Sd.
C. Beale
Juan de Fuca Str.
C. Flattery
MT. OLYMPUS
CORTEZ
Vancouver
ESTEVAN
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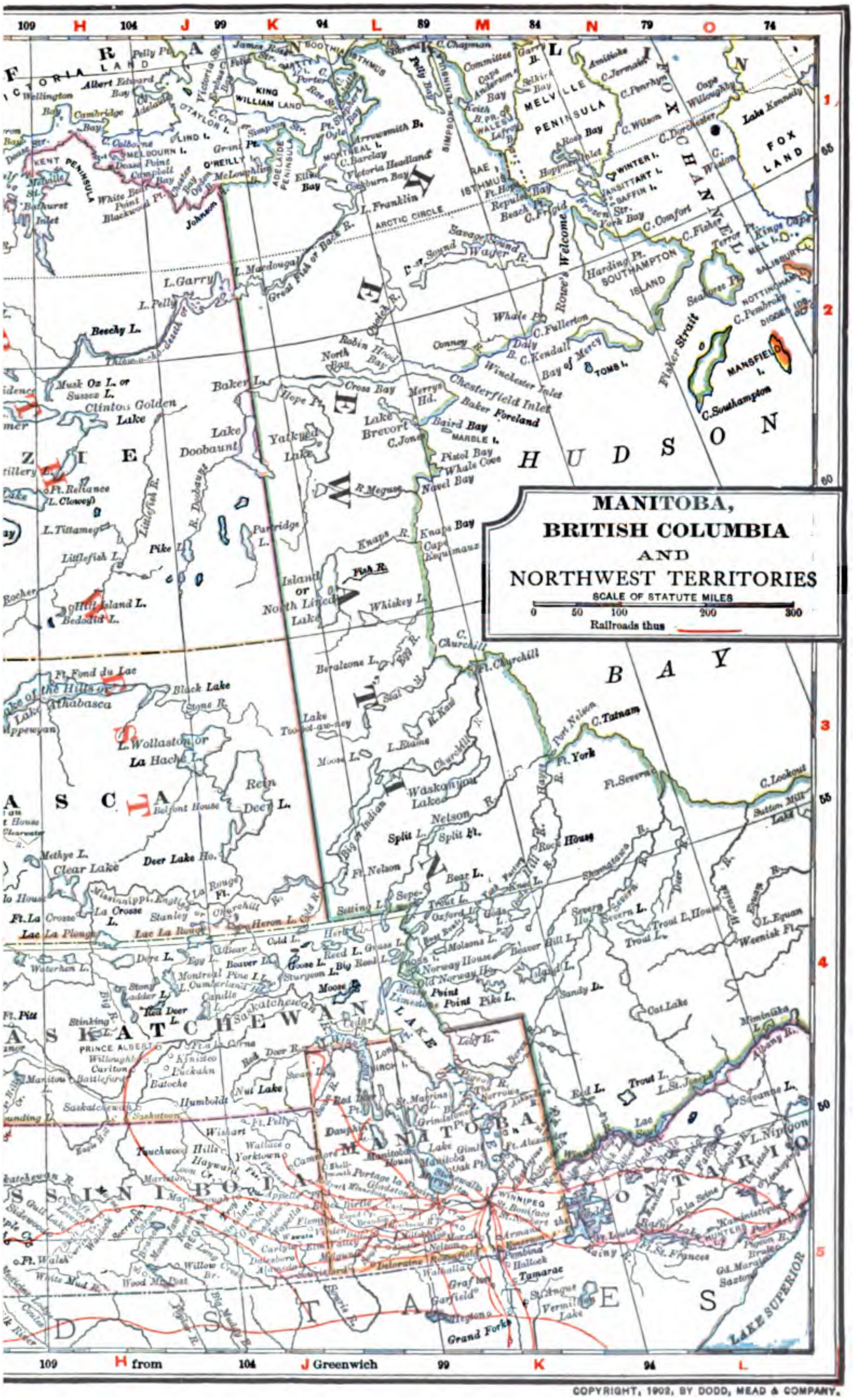

MANITOBA,
BRITISH COLUMBIA
AND
NORTHWEST TERRITORIES

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the Afghan frontier, a country covered by the Suleiman Mountains. About 2,500,000 acres of the districts around Peshawar are cultivated, and a large portion of this area is irrigated. The capital of the province is Peshawar (q.v.).

NORTHWEST PASSAGE. See Polar Research.

NORTHWEST PROVINCES. The former designation of the United Provinces of Agra and Oudh, British India.

NORTHWEST TERRITORIES. The designation for the sparsely inhabited region of Canada which includes the organized territories of Assiniboia, with a land area of 90,340 square miles; Alberta, about 100,000 square miles; and Saskatchewan, 114,000 square miles; and the unorganized territories of Athabasca, about 251,300 square miles of land area; Mackenzie, about 563,200 square miles; Ungava, about 456,000 square miles; and Franklin, about 300,000 square miles. The term 'Northwest Territories' probably referred originally to the region over which the Northwest Company exercised authority, the territorial limits of which do not seem to have ever been clearly defined. An Imperial act of 1868 enabled the Crown to accept of the Hudson's Bay Company the surrender of the lands known as Rupert's Land, the limits of which were also indefinite, for admission into the Dominion. An act of 1869 provided that Rupert's Land and the Northwest Territories be admitted as a part of Canada under the name of the Northwest Territories. In 1870 Manitoba was made a province, under which in 1876 Keewatin was made a district. Manitoba was slightly enlarged in 1881, and in 1898 the Yukon Territory was established. In 1882 the districts of Assiniboia, Saskatchewan, Alberta, and Athabasca were formed, and in 1895 the remaining portion was divided into the districts of Ungava, Mackenzie, and Franklin. Of the Northwest Territories, a portion of the southwest belongs to the greater interior American Plain, and is less broken than the region farther north, much of it being prairie. North of this prairie region lies an immense wooded area. As the inhospitable Arctic regions are approached the forest growth becomes very scanty or disappears entirely, so that there is a very considerable area of barren land where little is found save lichens and mosses. The northern portion of the Northwest Territories is mainly a broken plain draining into the Arctic Sea. The greater part of the Northwest Territories is characterized by short summers and long and very severe winters. For a fuller statement of physical conditions, see Canada.

A large variety of minerals is known to exist, bituminous coal and lignite being very abundant in southern Alberta. Coal is mined in considerable quantities in the foothills of that region. In the southwest the soil is generally very fertile, and the climatic conditions are such that hardy crops can be profitably grown. This region is practically all comprehended in the districts of Assiniboia, Alberta, and Saskatchewan. In the census of 1901 it was found that 6,569,064 acres of this region, or 3.50 per cent. of the land surface, is occupied as farms and lots. Of the 22,813 farms of five acres and over, 64.08 per cent. were between 100 and 201 acres each. Over 93 per cent. of the farmers owned the farms they occupied. Over 24 per cent. of the farm land was in an improved state. Hay leads in respect to acreage, 155,870 acres in 1891, 831,157 in 1901. The acreage of wheat increased during the same period from 113,811 in 1891 to 530,274 in 1901, and oats gained from 61,637 acres to 259,552. In the latter year there were 22,897 acres in barley, 9925 acres in potatoes, and 15,095 in forage crops for winter feeding. Small fruits are successfully raised, but the climatic conditions are not favorable for orchards. The increase in the live stock was equally marked, as is seen in the following table:

LIVE STOCK	1901	1891
Horses three years and over	132,942	39,267
Horses under three years	43,520	21,709
Milch cows	102,785	37,008
Other horned cattle	489,004	194,824
Sheep	154,152	64,920
Swine	73,926	16,283

The prairie land affords excellent facilities for pasturage. Only the three southernmost districts have the advantage of railroad transportation. Settlements are being made in the territories of Alberta, Assiniboia, and Saskatchewan, and the total population of this area increased from 66,799 in 1891 to 158,940 in 1901, of whom a little over one-sixth are in Saskatchewan, and the remainder about evenly divided between Alberta and Assiniboia. In Ungava, Franklin, and Mackenzie there are large areas as yet unvisited by white man. The population of this region, together with Athabasca and Keewatin, increased from 32,168 in 1891 to 52,709 in 1901. There is a scattered Indian population in the Northwest Territories and Keewatin, amounting in 1900 to 27,057, besides about half that number of half-breeds. The Northwest Territories are under the administration of a Lieutenant-Governor, appointed by the Governor or Council of the Dominion. He has an executive council of three members. There is a Legislative Assembly of 31 members. Only Alberta, Assiniboia, and Saskatchewan have a form of local government with representation in the legislature. The Territorial Government meets at Regina. For a more detailed statement concerning settlements, etc., see under titles of the separate districts. Consult Blanchard, *The Discovery and Conquest of the Northwest* (Chicago, 1880).

NORTHWEST TERRITORY. In American history, that portion of the national domain lying, roughly speaking, north of the Ohio River, east of the Mississippi, south of the Great Lakes, and west of Pennsylvania, and embracing territory which constitutes the present States of Ohio, Indiana, Illinois, Michigan, Wisconsin, and part of Minnesota—a total area of about 265,878 square miles. This territory passed into the possession of Great Britain by the Treaty of Paris in 1763, and by her was ceded to the United States of America in 1783. The greater part of it was claimed on the basis of their early charters, by Virginia, New York, Massachusetts, and Connecticut. The other States refused to recognize these claims, and insisted that this territory should belong to the country as a whole. In 1780 Congress gave a solemn pledge that if the lands thus claimed were ceded to the Confederation they should be disposed of for the common benefit of all the States and admitted into the Union as republican States, and on an equal footing with the original States. On the strength of this pledge New York ceded her claims in 1781, Virginia hers in 1784, Massachusetts hers in 1785, and Connecticut hers in 1786. All of these colonies, however, reserved for special purposes certain lands from the cession. Thus Virginia retained in what is now the southern part of Ohio a considerable area, known as the Virginia Military District, and Connecticut retained 3,250,000 acres, known as the Western Reserve (q.v.), in what is now the northern part of Ohio. By an ordinance of 1785 Congress made provision for surveying the lands thus ceded. The lands were then thrown open for sale, and the result was a great influx of immigrants from the older States. On the first of March, 1784, the very day on which Virginia completed her cession, Jefferson, as chairman of a committee, reported to Congress a temporary plan of government which was adopted on April 23d. Jefferson's scheme contemplated the division of the territory into new States, divided by lines of latitude two degrees apart, and intersected by two meridians of longitude to be drawn through the mouth of the Kanawha and the falls of the Ohio, and to the new States thus created were to be given the names of Sylvania, Michigania, Chersonesus, Assenisipia, Mesopotamia, Illinoia, Washington, Polypotamia, and Pelisipia. The ordinance further provided that after the year 1800 neither slavery nor involuntary servitude should exist in any of the said States except as a punishment for crime. This ordinance never went into effect, and was repealed by the celebrated ordinance of 1787. This latter ordinance was prepared by a committee of which Nathan Dane, of Massachusetts, was chairman, and received the approval of Congress, July 13, 1787. It was a constitution of government for the Northwest Territory, and contained, besides, six articles of compact between the old States and the new States to be created out of the said territory. It provided that there should be formed out of the territory in question not less than three or more than five States, and undertook to define their boundaries. For the purposes of temporary government this vast domain was constituted into one district, and was committed to the rule of a governor, a secretary, and three judges, all appointed by Congress. Until the election of a legislature, the Governor and the judges sitting together were authorized to adopt such laws of the original States as they deemed necessary and suitable, subject to the approval of Congress. Provision was made for a legislature to be called into existence as soon as there were 5000 free male inhabitants of full age in the territory. It was to consist of a Legislative Council composed of five members chosen by Congress, and a House of Representatives chosen by freeholders. There were also a number of organic provisions regarding land tenure, taxation, inheritances, and the alienation of property. The articles of compact constituted a sort of bill of rights, and guaranteed freedom of religious worship and belief, the privilege of the writ of habeas corpus, trial by jury, benefit of the common law, the security of private contracts, and freedom of navigable waters. Finally the Northwest Territory was dedicated to freedom by the famous article that prohibited slavery and involuntary servitude. In October, 1787, General Arthur St. Clair, a veteran of the French and Revolutionary Wars, was appointed the first Governor of the Territory. In July of the following year he reached Marietta, the seat of government for the Territory, and his first act was an order for the creation of Washington County. Shortly thereafter he appointed a number of magistrates and established a Court of Quarter Sessions. In 1798, the population having far exceeded the required number, a legislature was called and met for the first time at Cincinnati, September 24, 1799. The Lower House consisted of 22 members, representing the nine counties of the Territory. In July, 1800, the western part of the Territory was constituted into the District of Indiana, with William Henry Harrison as Governor, and with Vincennes as capital. In January, 1805, Michigan Territory was created, with Gen. William Hull as Governor; in February, 1809, the Illinois Territory was organized, with Kaskaskia as its seat of government, and in April, 1836, part of Michigan Territory was organized into the Territory of Wisconsin. Consult: Hinsdale, *The Old Northwest* (New York, 1891); and Moore, *The Northwest Under Three Flags* (New York, 1900).

NORTHWICH, nôrth'wĭch. A market-town and railway junction in Cheshire, England, at the confluence of the Weaver and Dane, nine miles south-southeast of Warrington (Map: England, D 3). It is noted for its salt mines, brine springs, and supplemental industries. The town has an ancient and dilapidated appearance, owing to land subsidences wrought by the mining and brine-pumping. The Marston mine, 300 feet deep, its vault supported by enormous salt pillars, is the most picturesque of the excavations. The municipality is progressive; maintains a free public library, technical schools, gymnasium, and park; owns remunerative markets, waterworks and public baths, which include medicinal brine baths. The brine springs have been worked from prehistoric times. During the Civil War Northwich was fortified by Parliament, and was the scene of exciting encounters. Population, in 1891, 15,000; 1901, 17,600.

NOR'TON, ANDREWS (1786-1853). An American theologian and scholar. He was born at Hingham, Mass., and graduated from Harvard College in 1804. He studied theology and in 1809 became a tutor in Bowdoin College. He went to Harvard in 1811 to teach mathematics, but resigned the next year to conduct the *General Repository*, a magazine devoted to the propagation of liberal Christianity. In 1813 he was made librarian of Harvard, in addition to which he was appointed lecturer on the criticism and interpretation of the Scriptures. He was in the Harvard Divinity School, 1819-30, Dexter professor of sacred literature. The remainder of his life was devoted to literary pursuits. His first work of importance was *A Statement of Reasons for Not Believing the Doctrine of Trinitarians concerning the Nature of God and the Person of Christ* (1833; new edition with memoir by W. Newell, 1856; 11th ed., 1876). In 1833 he became associated with Charles Folsom in the publication of the *Select Journal of Foreign Periodical Literature*. Other works of importance were: *Evidences of the Genuineness of the Gospels* (1837-44), and *On the Latest Form of*

Infidelity (1839). Specimens of his verse may be seen in Griswold's *Poets and Poetry of America* (Philadelphia, 1842).

NORTON, Caroline Elizabeth Sarah (1808-77). A British author, born in London. Her father was Thomas Sheridan, and her grandfather Richard Brinsley Sheridan (q.v.). Her talent developed at an early age, and when only thirteen she wrote *The Dandies' Rout*. Her *Sorrows of Rosalie: a Tale, with Other Poems*, appeared in 1829, two years after her unfortunate marriage to an impecunious barrister, the Hon. George Chapple Norton, whom she virtually supported for many years. Her marital troubles led her to publish a pamphlet on *English Laws for Women in the Nineteenth Century*, which, together with some other writings, undoubtedly had considerable influence in causing those laws to be changed. Her reputation rests chiefly upon her poems, most of which were written in the style of Byron, though a few, like "The Faded Flower" and "Joe Steel," show that she could have written equally well in quite a different vein had she so chosen. Among her other works are *A Voice from the Factories* (1836), and *The Child of the Islands* (1845).

NORTON, Charles Bowyer Adderley, first Baron (1814—). An English public man, born in Knighton, Leicestershire. He graduated at Christ Church in 1835, and was Conservative member of Parliament for North Staffordshire in 1841-78. During that time he was president of the Board of Health, vice-president of the Education Council (1858-59), Colonial Under Secretary (1866-68), and president of the Board of Trade (1874-78). He was knighted (1869) and made a peer of the realm (1878), with a title taken from his estate, Norton-on-the-Moors, Staffordshire. He interested himself in education, particularly in reformatory schools, and published books on the subject, besides one on *Socialism* (1896) and another on *High and Low Church* (1898).

NORTON, Charles Eliot (1827—). An American scholar, son of Andrews Norton. He was graduated from Harvard in 1846, and began his career in a business house in Boston engaged in the India trade. In 1849 he went to India and to Europe, and thenceforth devoted himself to scholarship and literature. During the Civil War he was editor of the Loyal Publication Society papers, and from 1864 to 1868 was editor, with J. R. Lowell, of *The North American Review*. In 1875 he became professor of the history of art in Harvard University, and was made professor emeritus in 1900. He came to stand, more than any other American perhaps, for the finer ideals of culture, and was in consequence often misjudged for utterances which seemed unpatriotic, but were really inspired by a desire to promote the higher interests of his fellow citizens. His work in literature, which deals chiefly with Italy, consists of: *Considerations on Some Recent Social Theories* (1853); *The New Life of Dante* (1859; parts translated with essays; complete translation in 1867); *Notes of Travel and Study in Italy* (1860); *Historical Study of Church-Building in the Middle Ages* (1880); *The Divine Comedy of Dante* (1891-92), a very helpful prose translation. He was also the literary executor and editor of several important men of letters, as Lowell, Carlyle, Emerson, G. W. Curtis, Ruskin (the "Brantwood Edition"), and A. H. Clough (*Poems*), of all of whom he was a personal friend.

NORTON, Charles Ledyard (1837—). An American journalist and author, born in Farmington, Conn., and educated at Yale, where he graduated in 1859. He continued his studies at the Sheffield Scientific School until the outbreak of the Civil War, when he enlisted in the Seventh Regiment, New York State National Guard. In 1862 he was appointed captain in the Twenty-fifth Connecticut Volunteers, and from 1863 until he was mustered out in 1866 was colonel of the Seventy-eighth Regiment United States colored troops, with main duties in the Department of the Gulf. He commanded a large district in western Louisiana during the early months of reconstruction, and then for a year was manager of a cotton plantation in southern Louisiana. Forced by ill health to turn to literary pursuits, he edited the *Christian Union* from 1868 to 1878, and was subsequently connected editorially with the *Domestic Monthly*, *Our Continent*, and *Outing*. His published works include: *Canoeing in Kanuckia* (with John Habberton, 1878); *A Handbook of Florida* (3d ed. 1892); *Political Americanisms* (1890); and *Jack Benson's Log* (1895).

NORTON, Frank Henry (1836—). An American author and journalist, born in Hingham, Mass., and educated at the Dwight School in Boston and at the Pictou Academy, Nova Scotia. He was assistant librarian and then assistant superintendent of the Astor Library, New York City, from 1855 to 1865, and from 1866 to 1867 was head librarian of the Mercantile Library of Brooklyn. In 1872 he entered journalism, from 1879 to 1881 was editor and owner of the New York *Era*, and from 1883 to 1891 was a member of the New York *Herald* staff. He wrote various burlesques and melodramas, among which are *Alhambra*, *Azrael*, *Cupid and Psyche*, and *Leonie*, and published *Historical Register of the Centennial Exhibition, 1876, and of the Paris Exposition, 1878* (1878); *Life of Winfield Scott Hancock* (with D. K. Junkin, 1880); *Life of Alexander H. Stephens* (1883); *Daniel Boone* (1883); and *The Malachite Cross* (1894).

NORTON, Sidney Augustus (1835—). An American chemist, born at Bloomfield, Trumbull County, Ohio. He graduated at Union College in 1856, and at the Miami Medical College in 1867, and studied chemistry at Bonn, Leipzig, and Heidelberg. He then taught for a number of years, and in 1873 was appointed professor of chemistry at the Ohio State University. He published: *Elements of Natural Philosophy* (1870); *Essays and Notes* (1874); *Elements of Physics* (1875); *Elements of Inorganic Chemistry* (1878); and *Organic Chemistry* (1884).

NORTON, Thomas (1532-84). An English poet, born in London. When a boy he became amanuensis to the Protector Somerset; and at the age of eighteen published a translation of the "Letter which Peter Martyr wrote to the Duke of Somerset," a valuable document, as the original is lost. In 1555 he entered the Inner Temple as student, and afterwards practiced law, becoming counsel for the Stationers' Company (1562), and solicitor to the Merchant Tailors' Company (1581). Entering Parliament in 1558, he was soon known as a bold and eloquent debater. He took an active part against the Catholics; and as licenser of the press, was engaged in several most cruel tortures. Toward the close of his life he was imprisoned for a short time in the Tower on a charge of treason. He died March 10, 1584. Norton wrote much verse in English and Latin. He is, however, most remembered for his share in *Gorboduc*, the first English tragedy in blank verse (performed in the hall of the Inner Temple on Twelfth Night, 1560-61). The first three acts were written by Norton; the last two by Thomas Sackville (q.v.).

NORTON, Thomas Herbert (1851—). An American chemist, born at Rushford, N. Y. He studied at Hamilton College and at the University of Heidelberg, and then held the post of manager in a large chemical factory in Paris. In 1883 Norton was chosen professor of chemistry and librarian in the University of Cincinnati. He traveled afoot through Greece and Syria, and in May, 1900, was appointed by President McKinley to establish the American consulate in Kharput, Turkey, as a recognition of his knowledge of the Orient.

NORTON SOUND. An arm of Bering Sea, on the west coast of Alaska, south of Cape Prince of Wales (Map: Alaska, C 3). It is 200 miles wide at its entrance, extends about the same distance into Alaska, and receives the waters of the Yukon River. It is ice-bound from October to June. Norton Sound was discovered by Captain Cook in 1778.

NO′RUMBE′GA. A name given by early explorers and map-makers to various portions of the eastern coast of North America, and also to a river and a mythical city. Upon the map of Verrazano's voyages, published 1529, Aranbega appears as a place on the New England coast. The narrative of the anonymous "Dieppe Captain," in 1539, makes Norumbega stretch from Cape Breton to Florida. Mercator's map of 1541 apparently locates Anorumbega around the Hudson River, and that of 1569 represents Norombega as a city with high towers. Jean Allefonsce, the pilot of the Cartier-Roberval expedition (1541-44), speaks of a great river, brackish forty leagues from its mouth, rocky, and filled with islands. This has been variously identified as the Hudson, Long Island Sound, and the Penobscot. Gastaldi's map, in 1556, makes Nurumbega the region near Cape Breton, while Thevet, in the same year, apparently makes the Norumbega the Hudson. David Ingram, a sailor, claimed that in 1568 he was put ashore on the Gulf of Mexico by Sir John Hawkins and made his way by Indian trails to the Saint John's River in Canada in 1569. While passing through Norumbega on his route he visited a city three-fourths of a mile through, the houses of which had pillars of crystal and silver. He saw a peck of pearls and rubies six inches long, while all the inhabitants had heavy ornaments of gold, and the richest furs were plentiful. This story was printed by Hakluyt in his *Principall Navigations* (1589), but Sir Humphrey Gilbert secured a copy before, and, in 1583, set out to explore the country. With him he carried the poet Parmenius to sing the praises of the country. Michael Lok's map, in 1582, represents the Penobscot as a strait reaching to the Saint Lawrence, and makes Norombega the country included between the two. Other maps of the sixteenth century locate the country in New England and indicate a city about the 43d degree. Champlain, in his explorations of the Maine coast (1604-06), searched for the city, and ascended the Penobscot to the site of the present city of Bangor, but found no trace. The name begins to disappear in the seventeenth century; but John Smith, in 1620, applies it to New England and the coast down to Virginia, while Lucini, an Italian engraver, represents it as alternative with Nova Anglia in 1647. Heylin, in 1669, still dreams of a wonderful city.

The etymology of the word 'Norumbega' is vague and uncertain. Grotius first identified the term with Norbergia, and suggested a Norse origin. Prof. E. N. Horsford derives it from *Norvegr*, Norway, and identifies the river with the Charles. He claims to have discovered ruins of a Norse city, subsequently occupied by Breton French, near Watertown, Mass., and in 1889 he erected a memorial tower at the junction of Stony Brook and the Charles. An Indian origin meaning 'still water,' or 'place of a great city,' has been suggested, while others call attention to the Spanish 'vagas,' or 'bagas,' fields. Weise, in his *Discoveries of America to 1525* (New York, 1884), derives the name from the Old French *L'Anormée Berge*, the Grand Scarp, i.e. the Palisades. Fiske also identifies the Hudson as the Norumbega River and locates an old French city on Manhattan Island.

Consult: Winsor, *Narrative and Critical History of America*, vols. iii.-iv. (Boston and New York, 1884); Beauvois, *La Norambegue* (Brussels, 1880); Fiske, *Dutch and Quaker Colonies in America*, vol. vi. (Boston and New York, 1899); Horsford, *Defenses of Norumbega* (Boston, 1891), and *Discovery of Ancient City of Norumbega* (privately printed, 1890).

NORVAL, nôr′val. The son of Lady Randolph and her first husband in Home's tragedy *Douglas*. He was exposed at birth and brought up by an old shepherd, Norval, whose name he took. His identity was discovered by his mother after he had saved Lord Randolph's life, and he was advanced by his stepfather, but was killed by him as the result of jealousy aroused by Glenalvon, Randolph's heir presumptive. His mother then took her own life. The part was played by both Kemble and Macready.

NORWALK, nôr′wạk. A city in Fairfield County, Conn., 14 miles west by south of Bridgeport; on the Norwalk River, near Long Island Sound, and on the New York, New Haven and Hartford Railroad (Map: Connecticut, B 5). It is attractively situated on the Sound, and is a popular residential place as well as a noted summer resort. Its more prominent buildings include the Carnegie Library, Norwalk Hospital, Fairfield County Children's Home, and the State Armory. There are extensive manufactures of hats, corsets, shirts, shoes, cassimeres, felt goods, silks, locks, air compressors, etc. The oyster interests also are important, and considerable coastwise trade is carried on. The New York and Norwalk steamboat line maintains regular service to New York. The government is vested in a mayor, annually elected, and a unicameral council. There are municipal water-works. Population, in 1900, 6125. Norwalk was settled in 1649 and incorporated as a town in 1651. It embraced what is now the cities of South Norwalk, chartered in 1870, and Norwalk. The latter was incorporated in 1836, as a borough, and was chartered as a city in 1893. On November 11, 1779, Norwalk was burned by a British and Hessian force under Generals Tryon and Garth. Consult: Selleck, *Norwalk* (Norwalk, 1896); and Byington, "Ancient and Modern Norwalk," in the *Connecticut Quarterly*, vol. i. (Hartford, 1895).

NORWALK. A city and the county-seat of Huron County, Ohio, 55 miles west by south of Cleveland; on the Lake Shore and Michigan Southern and the Wheeling and Lake Erie railroads (Map: Ohio, E 3). It is a city of fine residences, particularly on the main street, and has a handsome court house and jail. Norwalk is well situated for a commercial centre in an agricultural and stock-raising country; its extensive industrial interests are represented by piano works, iron and steel works, railroad shops, pickling works, manufactories of interior decorations, curtain poles, novelties, umbrellas, tobacco, etc., and by a printing and publishing house. The government is vested in a mayor, elected every two years, and a unicameral council. The water-works, with reservoirs having a capacity of 500,000,000 gallons and covering an area of about forty acres, are owned and operated by the municipality. Settled in 1817, Norwalk was incorporated first in 1828, and in 1881 received a city charter. Huron County is the westernmost of the ten counties in northern Ohio composing the 'Connecticut Reserve,' or 'Western Reserve,' part of which was granted to Revolutionary sufferers. Population, in 1890, 7195; in 1900, 7074.

NOR'WAY (AS. *Norwæg*, *Norþweg*, Icel. *Noregr*, *Norvegr*, Norw., Dan., Swed. *Norge*, ML. *Norregia*, *Northwagia*, North Way). A long, narrow coast country of Europe on the North Atlantic, constituting with Sweden the Scandinavian Peninsula. The length of the coast around the outer belt of rocks is 1700 miles, the entire shore line, including the fiords and the large islands, being about 12,000 miles, long enough to stretch half around the globe. The country extends from latitude 57° 58′ to 71° 11′ N. Its width in the south is about 250 miles, in the northern half about 60 miles, and in Finmarken, the extreme north, a little greater. The area is 124,129 square miles—a little more than that of New Mexico. The northern coast is washed by the Arctic Ocean; Norwegian sealers sail every year as far north as it is open. On the south the Skagerrak, connecting the North Sea with the Cattegat, separates Norway from Jutland. Toward the east Norway has a land frontier 1500 miles long, being bordered by the Russian Government of Archangel for about 50 miles, by Finland for nearly 500 miles, and by Sweden for 950 miles. The eastern boundary extends most of the way in the midst of a belt of desolate plateau land through which the boundary with Russia was defined only in 1826 and with Sweden in 1751. At three places, at the head of the Gulf of Bothnia, the Trondhjem depression, and farther south, complete land connections have been made by means of railroads across the peninsula. Two-thirds of the people live in the south.

TOPOGRAPHY. The coasts are remarkable as a region of fiords. The shore line is everywhere broken by deep incisions of the sea into the rocky cliffs. Traces of the glacial period are found all over the land, and the fiords and islands fronting them are ascribed to the work of glaciers. Norway as a whole is a rugged plateau, with deep-cut valleys, the whole surface greatly denuded, peaks and groups of peaks rising, here and there, above the general level of the more plain-like region of the east. In the west, near the sea, are very ancient mountains worn down and rounded by denudation, and chiefly composed of hard igneous rocks that have better withstood the destructive forces which leveled the eastern districts to a plain.

In the southeast and the middle north (mainly north of Trondhjem) is the woodland rising to an average height of from 300 to 1500 feet, with forest-clad hillsides from which Norway's lumber is derived. The highland begins in the southwest with a width of 60 miles, and a plateau height which soon reaches 3000 feet, merging finally into the wide waste through which the eastern boundary passes. In the extreme west geographers distinguish three mountain ranges—the Langfjeld in the south, the Dovrefjeld between the northern and southern districts, and the Kjölen between Norway and Sweden farther north.

HYDROGRAPHY. The height axis is not far from the west coast, and the western rivers therefore are short, although their volume of water is large on account of the heavy rainfall. The eastern rivers flow along fairly regular parallel valleys, which are open and flat in the mountains, but are cut deep through the plateau. A few of the eastern fluvial basins are large, that of the Glommen being 16,000 square miles, that of the Drammen 6600 square miles, and that of the Skien 4250 square miles, but the volume of water is comparatively small on account of the smaller rainfall. The slope is great and the rivers are filled with falls and rapids, which impart great beauty, but prevent navigation. The mountain highland and woodland are dotted with an enormous number of lakes, most of them narrow and long, due to the intense action of glaciers. It is supposed that in the great glacial period the inland ice must have extended even above the highest peaks. Most of the larger lakes are found in the long valleys—the largest of them, Mjösen (140 square miles, 60 miles long, 1500 feet deep), Randsfjord, Spirilen, Kröderen, and others, lying at a height of about 400 feet above the sea just outside the border of the highland in the east country.

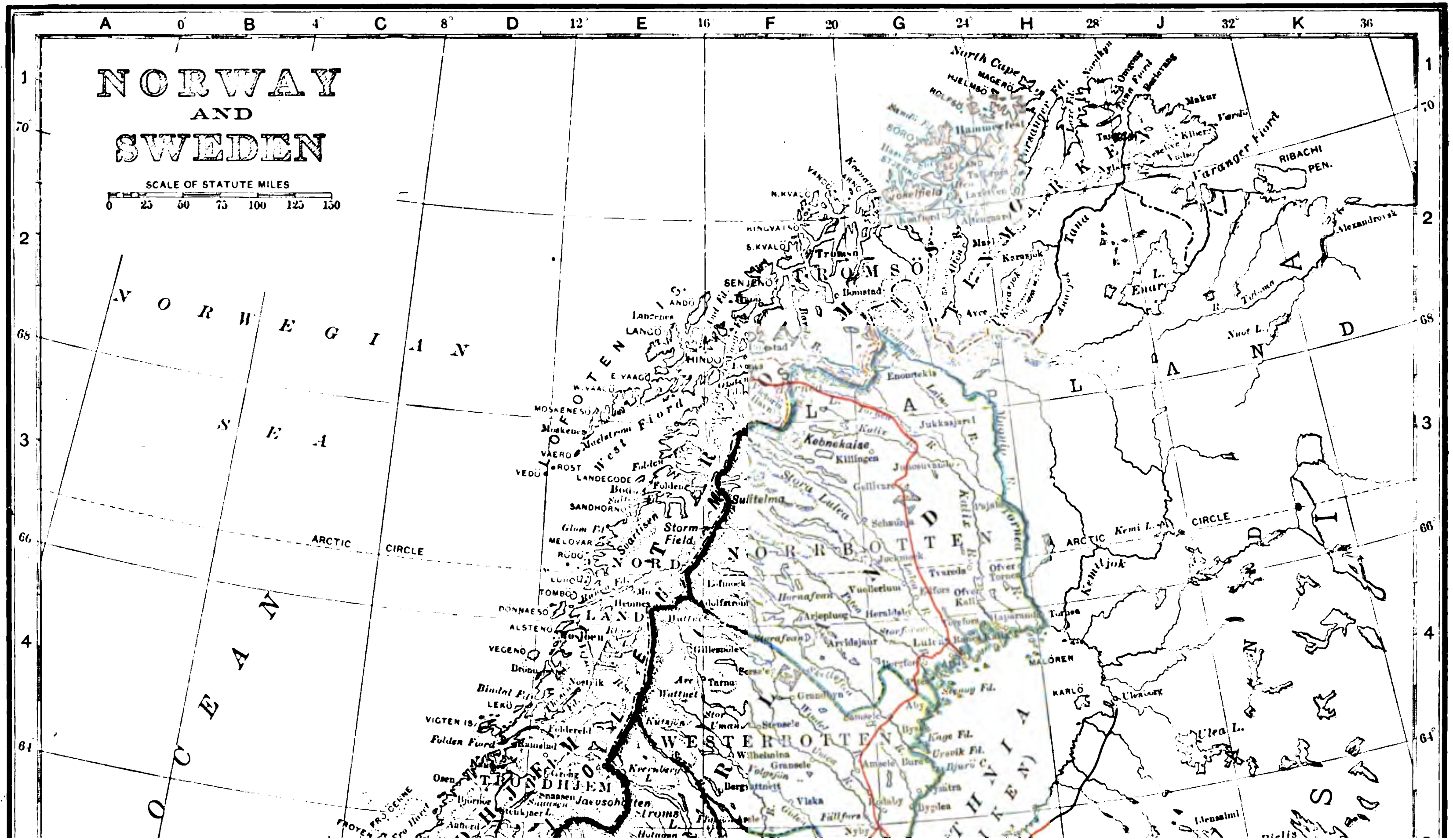
CLIMATE. Norway reaches 300 miles into the Arctic zone, and nearly a third of the country is in the domain of the midnight sun and winter darkness. The summer day is long and bright, but the winter day is short and dark. At Christiania, in the far south, the sun is above the horizon on the shortest day less than six hours. The west coast is warmer than the interior because it has the full effect of the westerly winds, whose temperature is modified by blowing from the temperate waters of the Atlantic. The fiords therefore do not freeze, but are navigable the year around. The land, rising from the coast into mountain tops and plateaus, in places rises into regions of perpetual snow where glaciers descend into the valleys. The line of perpetual snow, at the parallel of 62° N., is between 4500 and 5000 feet above the sea; at 66° 30′ the snow line falls to 3900 feet, and at 70° to about 3000 feet.

The climate varies in different parts of the country. Southeast Norway, limited on the north by the Dovrefjeld, has a mean annual temperature varying from 44° to 31° F. July is the warmest month, with a mean temperature of 61° at Christiania. The winter is most severe in the heart of the country. At Christiania the mean winter temperature is 25°. The temperature of West Norway is fairly uniform, the mean annual temperature being highest (44° to 45°) at the extreme western ends of the land. The annual rainfall is greatest along the western coast, ranging from 50 to over 80 inches. On the southeast coast, near Grimstad, it is 48 inches, while on the Dovrefjeld it is only 12 inches. Snow is less frequent in the west than in the east on account of the milder winter temperature. The country north of the Dovrefjeld is colder than in the south, but the climate of the coast region is also modified by oceanic influences. The most varied shades of continental and maritime climates are thus represented in Norway. The inland districts of Southeast Norway and Finmarken, with their severe winters and relatively high summer temperature, their gentle breezes and small rainfall, are examples of typical inland climate. The whole coast line, with mild winters, cool summers, abundant rainfall, and unsettled weather, is an example of typical maritime climate. On the whole, the climatic conditions are favorable to the development of a strong, healthy, energetic people.

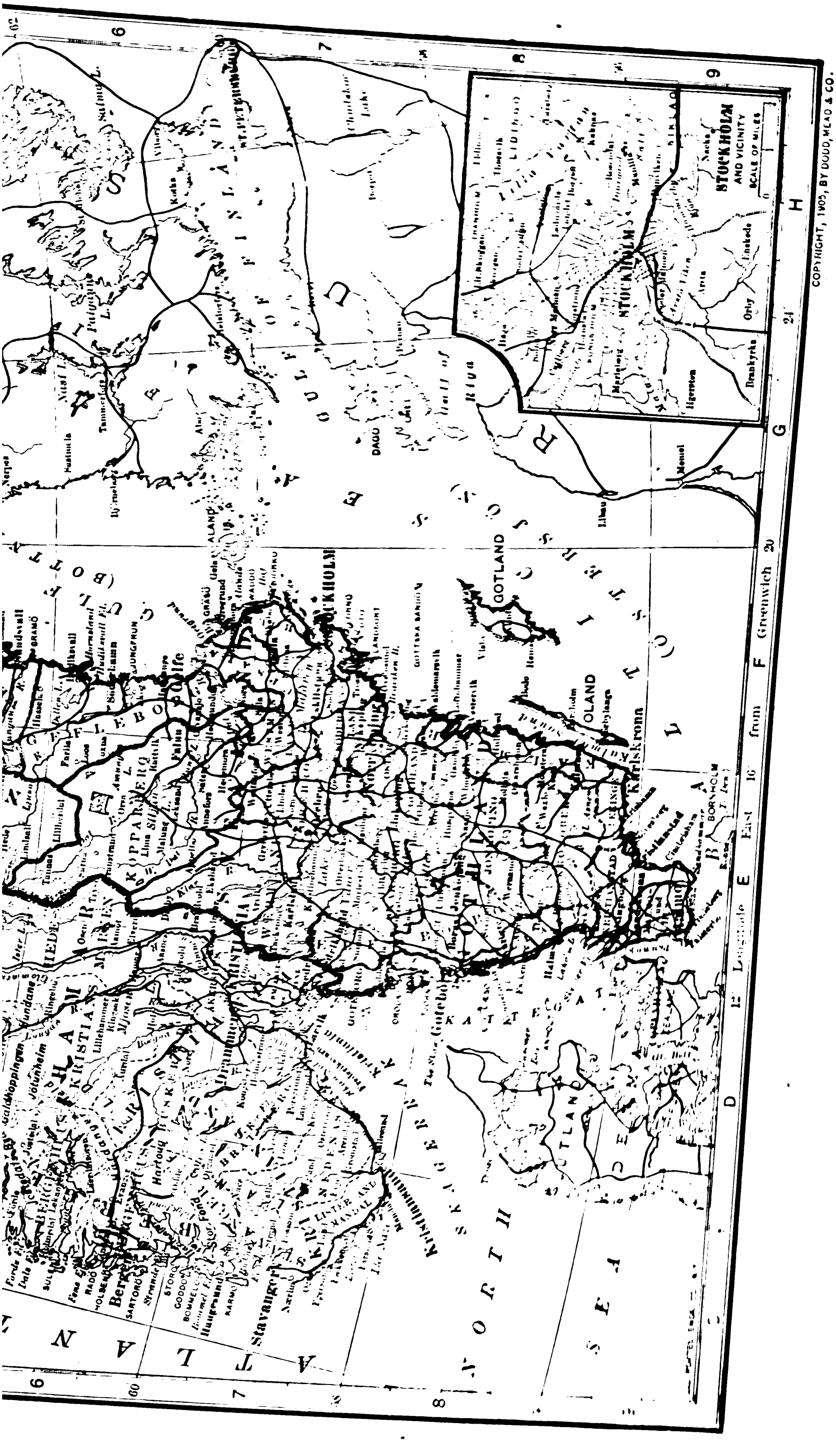
Flora. The richest vegetation is found in the southeast around Christiania Fiord and the large lakes. Considering its northerly position, Norway has a luxuriant vegetation. About 1500 species of phanerogams alone grow wild. In the southeast conifers form thick forests from sea-level to 3000 feet. Up to about 1600 feet above the sea a luxuriant growth of oak, ash, lime, maple, elm, and lowland birch is found, secondary to the conifers, but giving its characteristic stamp to the lowland flora. Above the limit of conifers is the birch zone, reaching 3500 feet above the sea, where the true mountain plants begin to be prominent. Above the birch limit the willow and the lichen zones are distinguished. In the willow zone there are no trees—only a dense growth of low bushes. Reindeer moss predominates in the lichen zone. The extreme coast region is destitute of forest, and also of some continental plants found inland, but is especially rich in mosses. The arable soil is found in narrow strips of deep valleys and around fiords and lakes. Large continuous tracts fit for cultivation do not exist, and only 1-140th of the total surface is in grain fields.

Fauna. The animal life is that of the rest of North Europe, with relics, chiefly in the north, of Arctic elements such as the mountain or Arctic fox, the ptarmigan, the snow bunting, and various insects. With its long coast line Norway is richer in species of fish than most northern lands, more than 200 species being found. There are a number of Arctic contributions, including the Greenland shark, which is fished for its liver. Very numerous are fishes which belong to the north or general European fauna, including most of the food fishes, such as cod, haddock, coalfish, pollack, torsk, herring, sprat, and mackerel. The salmon is caught along the coast and in the rivers, where it comes to spawn. Trout and red char are the most widely distributed fresh-water fish. Of the ten species of reptiles and amphibia, the lizard and the frog are found everywhere, but the viper has its northern limit at the Polar circle. The birds number 280 species, of which 190 breed in the country. Most of them are birds of passage, as the falcon, geese, and ducks. The mild climate of the south and west coasts induces the starling, blackbird, woodcock, duck, swan, etc., to winter there. Along the west and northern coasts are numerous colonies of swimming birds. The birds of the lowlands are similar to those of Europe in general. There are 67 mammals. The hedgehog is found in the south, the lynx in unfrequented forests, and the glutton, a great enemy of the reindeer, among the mountains of the north, where the reindeer grazes. Wolves, formerly numerous, have nearly disappeared, except in North Norway. Bears are gradually disappearing, and the commonest beast of prey is the fox among the mountains. The common seal and the gray seal breed on the Atlantic islands, and all the Arctic seals, and even the walrus, sometimes appear on the north coast. The lemming lives in the mountain wastes and sometimes overruns the lowlands, damaging crops. A few beavers remain, and the mountain hare, which turns white in winter, is found all over the country. The ruminants are represented only by the red deer, the elk, and the reindeer among wild animals. The wild reindeer is decreasing on account of over-hunting, but many herds of tame reindeer are kept in the north and even among the mountain wastes of the south that lie too high for general grazing.

Geology and Mining. Archæan rocks have a wide extension in Norway, particularly through the mountain regions of the west and in the districts from Lake Mjösen southward. Gneiss and granitic gneiss are the prevailing rocks in these regions. During Cambrian and Silurian time the open sea extended over the greater part of Norway, and on its bottom lime, mud, sand, and gravel were laid down, forming a series of strata rich in fossils and very thick. Cambrian and Silurian rocks are thus widely represented, particularly east of the mountains and north of Lake Mjösen, and also among the northern mountains behind the coastal areas of igneous rocks. A belt of Post-Silurian and Cambrian rocks extends from Lake Mjösen southward through the Christiania region to the south coast, forming the subsoil of that beautiful and undulating country. Over large areas of the ancient rocks are spread the deposits of the Ice Age to no great depth. Raised beaches along the outer parts of many fiords are proof of the former lower position of the land. The mining industry is not important, for Norwegian ores are not rich nor large in extent. The Kongsberg silver mines, owned by the State, yielded 898 tons of silver between 1624 and 1898. The Röros copper mines, owned by a joint stock company, yielded 73,000 tons of copper between 1647 and 1897. Iron ores occur in many places, but little is mined, and coal does not occur except on the remote island of Andö. At the end of 1900 there were about 40 mining establishments, employing 3017 workpeople, and 6 smelters, with 302 laborers. The chief mineral products of 1900 were silver, worth $88,440; copper ore, $679,487; pyrites, $630,872; and iron ore,


NORWAY AND SWEDEN

SCALE OF STATUTE MILES



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$35,644. Fine marble, building stone, roofing slate, soapstone, and millstones are produced in large quantities and are important exports.

Fisheries. Fishing is among the oldest of the country's industries. The value of the large fisheries has averaged for 31 years $5,796,400 a year. This does not include the catch (daily fishing, as the Norwegians call it) which supplies the wants of the home population. The value of all the fisheries, including the Arctic fisheries and various extra sources of profit, such as oil and fish guano, is about $13.400,000 a year. The cod is the largest fishery, the number of persons engaged in it in 1900 being 82,098, and the value of the catch $3,636.492. The largest centre of the industry is the Lofoten Islands, where, in the first few months of the year, about 40,000 men are engaged in fishing or in preparing the catch for market. The average per man for the whole of the fishing is from 900 to 1000 cod. The fish are sold partly to traders on the islands who have warehouses with salting and storing rooms, and partly to merchant vessels, which carry their purchases to other ports. The herring fisheries, next to the cod in importance, are carried on all along the coast, the summer fisheries employing over 20,000 men, and the value of the product being usually over $2,400,000. The catch in recent years has not been so large as formerly, but is now improving. The mackerel is rare north of Trondhjem Fiord, and is fished chiefly in the Skagerrak and the fiords off it. The industry in 1900 employed 2741 men, the product being worth $152.492. The salmon, sea trout, lobsters, and oysters (small yield) also figure in the total product of the large fisheries, the total value in 1899 having been $6,510,256. The mackerel is also caught in the North Sea, and the Arctic fisheries engage every season about 2000 men who sail over the Arctic Sea from Greenland and Jan Mayen Island in the west to Spitzbergen and Finmarken in the east, for sealskins and oil, whale oil, and bearskins.

Agriculture. Of the total area, 59 per cent. is bare mountain, 21 per cent. woodland, and only 10 per cent. is in pastures, hay lands, and fields. In the southeast cultivated plants and fruits ripen in the open air, but in the north and on the higher tracts there is little or no agriculture. Crop and cattle raising are usually carried on together. Oats is the chief grain, but none of the cereals suffices for the needs of the country. Barley and rye are grown much farther north than oats, but wheat is rarely found north of the Trondhjem Fiord. The area annually sown to wheat is about 10.000 acres, with a yield of about 255,000 bushels. Rye is the great bread cereal, its cultivation extending to the 70th parallel, the area annually sown being about 34,000 acres, and the yield about 900,000 bushels. Among root crops only potatoes are cultivated to a large extent, and they are one of the chief foods. The average production is about 23.000,000 bushels. The yield of the different kinds of grain is large compared with that of most European countries, due to careful cultivation and heavy manuring.

Live Stock. Norway has only about one-third of the cattle of Scandinavia, but the pastures give adequate grazing for most of the sheep. In 1900 there were in the country 172,990 horses, 950,201 cattle, 998,819 sheep, 214,594 goats, 165,348 swine, and 93,576 reindeer.

Of the two types of horses, the small fiord horse is an excellent working animal in the mountain districts, where good roads are lacking. The larger Gudbrandsdal is quick and strong as a farm and carriage horse. The cattle of several different breeds are small, but good milkers. They often seek their food over large areas of sparse pastures. Attempts to improve them by an admixture of foreign blood have not been very successful. Most of the butter and cheese is made in coöperative dairies with the best equipment, and brings the highest price in the British market. Norwegian sheep are small, slender, and fine wooled. They have been crossed with foreign breeds to their advantage. The gross return of the live stock industry annually averages about $37,520,000, which, added to the average return of $18,760,000 a year from the farm crops, gives a gross income from Norwegian husbandry of over $56,000,000 on an average. The buildings on Norwegian farms are comparatively expensive on account of the severity of the winter. Domestic animals require warm barns, and everything, including hay, must be housed. The number of farms in 1890 was 236,286.

Forest Industries. Lumbering has always been one of the greatest industries. The large forests lie far from the inhabited districts as a rule, and the timber-cutters and log-drivers live in huts, most of them being strong and hardy single men. Three-fourths of the forests are pine lands, but the Norway pines and spruces convenient to Christiania and other shipping points have been depleted in many places so that the more northern forests in Sweden are now the larger source of Scandinavian lumber. Norway's forest products, however, form about one-third of the country's total exports. The value of the unwrought or partly wrought timber exported in 1901 was $9.539,888, and of wrought timber (mostly wood pulp) $6,436,448.

Other Industries. About 50,000 persons are engaged in the manufacturing and other industries outside of those mentioned above. The production of lumber and wooden ware is the oldest and largest branch, employing in 1895 12,073 work people. There are many saw and planing mills, chiefly along the rivers. The most important machine shops are in Christiania. Iron ships are built and there are carriage and car works. In machine production Norway has yet much to learn from other countries. The textile industries, spinning and weaving mills, jersey factories and roperies, employ about 9000 persons, and number 64 establishments, most of them situated in the outskirts of the towns. Paper-making derives its importance from the large resources of wood pulp. Small tanneries and flour mills are scattered all over the country. Breweries, tobacco and tinning works, are chiefly in the larger towns, and particularly in Christiania. Potteries, china factories, iron foundries, nail-rolling and wire mills, have a considerable output. Only about 2000 persons are employed in making articles of attire. As the country is deficient in industrial development, the imports of manufactures are large.

Commerce. The growth and average annual amount of Norway's trade may be seen from the following table:

	1881-85	1891-95	1901
Imports	$40,500,000	$59,500,000	$76,900,000
Exports	28,500,000	35,000,000	41,400,000

The aggregate foreign commerce since the middle of the nineteenth century has more than quadrupled. The imports largely exceed the exports, but this difference is covered to a great extent by the profits from the shipping trade, as Norway is a great carrier of freight for foreign countries. Articles of food and drink are the largest imports. Nearly half the value of the imports is represented by cereals, rye being the chief item, with barley, wheat flour, rye flour, and wheat following. Groceries, particularly sugar and coffee, are large imports. Bacon and other meats are brought chiefly from the United States. Cotton and woolen goods and yarn are the chief textile purchases. Among the imports of raw material are coal, hides and skins, iron and steel, cotton, wool and hemp. The country buys over 1,250,000 tons of coal every year. Oils, particularly kerosene, hempseed, and linseed, amount to about $1,500,000 a year. Steam-engines, locomotives, metal goods, and vessels are also large imports. Timber and fishery products are the most important exports. About one-fourth of the timber is sent abroad as deals and boards. Some 350,000 tons of wood pulp are annually sold. The increased sales of the products of agriculture and cattle-raising, which have quadrupled since 1871-75, are especially due to exports of butter and condensed milk. Among other important exports are packing paper, ships, ice, dressed stone, iron and steel nails, and metal and ores. The United Kingdom and Germany are most important in Norwegian commerce, the United Kingdom commanding about one-third and Germany one-fourth of the entire trade, while Sweden has less than a tenth. The sales to the United States are very small, as the latter country produces in great abundance most of the export commodities of Norway; but Norway buys from this country cotton, wheat, provisions, tools, machinery, fertilizers, locomotives, and leather goods to the value of several million dollars a year. The foreign commerce is carried on chiefly through the ports of Christiania, Bergen, and Trondhjem, the timber-trading towns of Fredrikstad and Drammen being also especially important. Christiansand is widely known for its export of salted and dried fish.

TRANSPORTATION AND COMMUNICATIONS. The Norwegians are a race of sailors. Their merchant marine is the fourth largest in the world, and in proportion to population it heads the list. While the natural commerce is comparatively small, Norwegian vessels and sailors are conspicuous in the sea carriage of freight for foreign nations. A considerable number of their vessels are engaged in the fruit trade between the United States and Latin America. In 1902 the mercantile marine included 5445 sailing vessels (935,947 tons) and 1223 steamers (531,142 tons), or a total of 6668 vessels with a tonnage of 1,467,089. The total length of railroads in 1901 was 1308 miles, of which the State railroads had a mileage of 1168.

BANKS. The right to issue paper money is reserved to the Bank of Norway (Norges Bank), a joint stock bank owned in part by the State. The bank has charge of the money transactions of the State, and does business as a loan, circulation, discount, and deposit institution. The head office is at Christiania, and it has twelve branch offices in the most important towns. The balance sheets for 1901 showed total assets of $26,578,926. The Mortgage Bank of the Kingdom of Norway, "Kongeriget Norges Hypothekbank," makes loans on real estate. The capital of the bank is partly supplied by the State, and amounted in 1901 to $4,690,000; the loans on mortgage at the end of 1901, $36,159,560, of which about one-fourth had been granted on town and three-fourths on country property; the total amount of bonds issued was $34,062,671. There were 78 private joint stock banks, with a paid up capital of $11,373,492. The number of chartered savings banks, all controlled by the Ministry of Finance, was 421, with 695,524 depositors and $86,292,423 deposits.

GOVERNMENT. Norway, though united to Sweden since 1815, under the same King, retains its own Government with a separate Ministry and Legislature. The law of succession to the crown is the same in both countries, and commissioners appointed by the two Parliaments regulate the questions touching the transmission of the crown. Affairs common to the two governments are attended to by a Council of State composed of both Swedes and Norwegians. The form of government in Norway is fixed by the Constitution or fundamental law of May 17, 1814, which has undergone several subsequent modifications. The Norwegian State is a constitutional monarchy with the parliamentary or responsible system of government. The legislative power is vested in a Parliament or Storthing, which, upon assembling, divides itself for legislative purposes into two chambers, the Odelsthing and the Lagthing. The former consists of three-fourths of the whole number of members chosen to the Parliament. The members include representatives from the cities and representatives from the country, all chosen for a period of three years and renewed integrally. All male citizens twenty-five years of age who have resided in the State for a period of five years are qualified to vote for members of the Storthing unless disqualified for special causes. To be eligible to membership in the Storthing one must be a male citizen thirty years of age, and must have resided in Norway for a period of ten years. Certain high State functionaries are disqualified. The elections are indirect and in the second degree. A certain number of primary electors in the country choose one secondary elector; the secondary electors then assemble in the chief towns of the electoral district and choose a certain number from their own body to serve as representatives in the Storthing. The Storthing meets annually, but cannot remain in session for a longer period than three months without the authorization of the King. The King may call extraordinary sessions of the Storthing and dissolve it, but he does not have power to dissolve the ordinary sessions and order new elections. The members receive a compensation of about $3 per day during the session.

After the separation of the Storthing into two chambers, each meets separately, chooses its own officers, and is the judge of the election and qualifications of its members. Bills are first presented to the Odelsthing by its own members or by the Government, and after passage are sent to the Lagthing, which must either accept or reject them *in toto*. In case of a deadlock between the two chambers they come together in united session and deliberate and vote as a single assembly. The chief powers of the Storthing are to enact laws, impose taxes, raise loans, supervise the finances, vote appropriations, and approve treaties concluded with foreign powers. The Lagthing has the exclusive right of choosing the justices of the High Court, while to the Odelsthing belongs the right to inspect the public accounts and to prefer impeachments against public officials, including members of the Storthing. The members of the Lagthing, together with the justices of the Supreme Court, form a court (Rigsret) for the trial of ministers, members of the Storthing, and justices of the Supreme Court. To the King belongs the right of sanctioning laws passed by the Storthing. If, however, he withholds his sanction and the law is passed a third time by the Storthing, it becomes valid without the royal approval. The King is commander of the army and navy, may declare defensive war, make treaties, levy troops, etc. He is declared to be inviolable and irresponsible. He exercises his authority through a Council of State composed of two Ministers and at least seven Councilors, appointed by himself from among Norwegians. One of the Ministers, together with two of the Councilors (who change annually), form a 'delegation,' which resides permanently at Stockholm near the King. The King can take no official action without consulting the Council of State or that part of the Norwegian Government which has its seat at Christiania. The Ministers and Councilors preside over the departments of administration and have access to the Storthing, where they are allowed to take part in the deliberations, but with no right to vote. The departments are as follows: Worship and Education; Justice; Interior; Public Works; Finance and Customs; Defense; Public Accounts.

The judicial system consists in the first place of a Supreme Court (Höiesteret), composed of a president and at least six other justices, elected by the Lagthing, and having a territorial jurisdiction embracing the whole Kingdom. There are also three Superior Courts (Steftesverretter), each consisting of a bench of three justices, one of whom bears the title of Chief Justice. For the administration of civil justice Norway is divided into 111 districts, each with an inferior court. There is also a court of mediation, so called, in each town and district, composed of two laymen popularly elected and before whom, as a rule, civil cases must first be brought. According to the new code of criminal procedure, adopted in 1887, all criminal cases must be tried before a jury court (Lagmandsret) consisting of three judges and ten jurors, or before the Meddomsret, a tribunal consisting of one professional judge and two lay assistants, summoned for each case. The former has jurisdiction of the more important offenses, while the latter is a court of first instance for the trial of misdemeanors. For the purposes of local government, Norway is divided into 20 districts, in each of which is an executive officer called an amtmana. These districts embrace the two cities of Christiania and Bergen and 18 counties (aemter). Smaller administrative divisions are the communes and wards. Each commune has a representative assembly (its size varying according to the population of the commune), and a smaller council, chosen by the representatives from their own body. They also elect triennially a chairman. All the chairmen of an amt form with the amtmana a sort of county diet, which meets annually under the presidency of the amtmana to fix the amt budget. The members of the local governing bodies are chosen by an electorate more narrow than that which chooses the members of the Storthing.

Finance. The total revenue in the year 1902-03 was $27,403,000. A little over a third of it is derived from the customs, and less than a tenth from the railroads. The other sources of income include the excise tax, stamps, income tax, post office, State telegraphs, State mines, and other State property. The total debt in 1901 was $61,300,756. Gold is the standard of value. The crown (26 4-5 cents) is the unit of coinage. The metric system of weights and measures is obligatory.

Army and Navy. See the articles Armies and Navies. The six strongest fortresses are Oskarsborg, Tönsberg, Bergen, Fredriksten, Ogdenes, Christiansand.

Population. By the census of 1900 the population was 2,239,880, or 18 to the square mile. Norway is thus the most thinly populated country in Europe. About two-thirds of the entire population live upon the coast and along the fiords; about a fourth in the interior lowland districts; the remainder belong to the mountain districts. Three-fourths of the inhabitants dwell in the rural districts. Nearly all the sixty-one towns in Norway are small. The population of Christiania (the capital) and Bergen together is about half the town population of the country. A small proportion of the inhabitants are of foreign birth.

The list of the political districts, with areas and populations, is as follows:

DISTRICTS	Area, square miles	Population Dec. 3, 1900
Christiania (town)	6	227,626
Akershus	2,017	116,228
Smaalenene	1,600	136,886
Hedemarken	10,600	126,182
Kristians	9,785	116,280
Buskerud	5,721	112,676
Jarlsberg and Laurvik	896	104,554
Bratsberg	5,865	99,052
Nedenes	3,610	79,935
Lister and Mandal	2,805	81,567
Stavanger	3,532	127,592
Söndre Bergenhus	6,026	135,752
Bergen (town)	5	72,251
Nordre Bergenhus	7,136	89,041
Romsdal	5,788	136,137
Söndre Trondhjem	7,185	135,382
Nordre Trondhjem	8,696	83,433
Nordland	14,804	152,144
Tromsö	10,134	74,362
Finmarken	17,918	32,800
Total	124,129	2,239,880

Emigration. In the nineteenth century Norway lost by emigration to the United States a comparatively larger part of its population than any other country in Europe excepting Ireland. Most of them made their new homes in the Northwestern United States. Emigration has greatly fallen off in the past few years, and amounted to only 12,488 in 1901.

Education. The Norwegian primary school has a seven years' course adapted for children between seven and fourteen years of age. Every child that does not receive an education equivalent to the primary course by its fifteenth year may be compelled to attend these elementary schools, which in 1898 numbered 5971, with 259,460 pupils in the country, and 73,313 in the towns. Secondary schools numbering 86, of which 30 are private, give a higher course of instruction, and have about 16,000 pupils. The Royal Frederick University in Christiania has 63 professors and 1400 students.

Religion. The Evangelical Lutheran creed is the State religion, and the Church is called the Norwegian Established Church, most of the inhabitants being members. All other religions are tolerated. Norway is divided into 6 bishoprics, and each diocese into deaneries, which are again subdivided into livings at present numbering 478. The total number of parishes is 956. The dissenters in 1900 numbered 52,680, including 1969 Roman Catholics and 10,286 Methodists.

The poor are provided for by local taxes, though the counties and the State assist. The number of persons receiving relief of any kind in 1899 was 80,730.

Ethnology. Since Neolithic times Norway has been mainly inhabited by tall, blonde longheads, of Teutonic stock, who are believed to have come from the Caucasian steppes during the prehistoric migrations. Because of the great ice cap which lingered on the mountains, Norway was peopled much later than Sweden, which shows Paleolithic inhabitation, while the former has revealed only the Neolithic. There were three land bridges by which man may have come to the Scandinavian peninsula, one on the west joining the British Isles to Norway; the second from Rügen in North Germany to Scania in Sweden; and a third much later bridge from Finland to East Sweden. By the middle bridge Sweden and Norway received the red deer and the Teutonic longhead population, which is almost pure in the former country. Whatever Finnic elements are present may have come by the Bothnia bridge. On the west there came a dark, short type of probably Round Barrow or Pictish origin. It would seem that these people brought the Shetland pony. The longheads coming in from Sweden around the southwest coast lowlands occupied the interior of the country after the melting away of the ice cap. This region was never touched by that tremendous wave of migration of short, dark longheads called 'Mediterraneans' by Sergi, coming, it is conjectured, originally from North Africa. Thus there has been forming here for a long period from these light and dark elements a virile race in an environment whose stress was a spur to the education of manly qualities for which the Norwegians have excelled since they came in the purview of history.

The Norwegians prefer a country life, but little of the modern movement toward cities being noticed until recently. They are of tall stature (5 ft. 8 in.), with strong, well-knit frames, and good muscular development. Fair skin, blue eyes, and light flaxen hair characterize the bulk of the population, but the dark type is often recognized. Among the children flaxen hair is almost universal, but with development the hair, eyes, and skin become darker in a majority of cases. As a people the Norwegians are remarkably hardy and show a preference for athletic sports which require great endurance. For this reason they are typical explorers. In character they are frank, yet cautious and reserved, honest, and religious. While modified Danish is the literary language, the old Norse survives in a few districts, as it does in Iceland. Since the peasants speak various dialects of Old Norse, and many of the educated consider the presence of the Danish language an anomaly, efforts to revive Norse have been zealously prosecuted for many years.

History. The early history of Norway is preserved only in the legendary sagas. The most recent archæological researches show that the Scandinavian people were probably the autochthonous inhabitants of the peninsula. The historical period of Norway reaches no further back than the ninth century. The petty tribal kingdoms which existed here as in all northern countries were united under Harald Haarfagr or Fairhair (died c.933), who in the last third of that century established the seat of government at Trondhjem in the north. At this time the Danes and Norwegians (see **Normans**) were the terror of Europe through their plundering expeditions and invasions.

The introduction of Christianity, the result of the intercourse which the Norwegians had with the more civilized parts of Europe through their maritime expeditions, was gradually effected in the hundred years that followed the death of Harald Haarfagr. Haakon the Good, son of Harald Haarfagr, attempted vainly to establish it; but this result was brought about by Olaf Trygvasson (995-1000) and Olaf the Saint (c.1015-1030), wild northern missionaries who bore the cross in one hand and the sword in the other. Olaf the Saint zealously prosecuted the conversion of his countrymen and raised himself to supreme power in the land by the subjection of the small kings or chieftains who in the times of heathenism had subdivided the Kingdom among them. In 1028 Olaf was driven out by Canute the Great of Denmark, and, having attempted to recover his throne, was defeated and slain in 1030. On the death of Canute in 1035, Olaf's son, Magnus I., recovered possession of the throne, and thenceforth, till 1319, Norway continued to be governed by native kings. Of these the most noteworthy were Sverre Sigurdson (1184-1202), a statesman of considerable ability who was put in power by the nationalist democrat party, who after years of bitter strife had overcome the party of the nobles and clergy, and Haakon the Old (1217-63), in whose reign independent Norway reached the height of its prosperity. During these centuries the Norse adventurers had established permanent colonies in Iceland and Greenland, and for a time the Orkney and Shetland islands and the Hebrides were in the possession of the Norwegian kings, whose last inroad into Scotland was repelled in 1263. The thirteenth century saw the beginning of written Norse literature and law. The death of Haakon V. without male heirs, in 1319, threw the election of a new king into the hands of the national assembly, who made choice of Magnus of Sweden, surnamed Smek, the son of Haakon's daughter. He was in turn succeeded by his son, Haakon, and the latter's son, Olaf, after having been elected King of Denmark in 1376, became ruler of both Scandinavian kingdoms on the death of his father in 1380. This young king, who exercised only a nominal sway under the guidance of his mother, Queen Margaret (q.v.), the only child of Valdemar IV. of Denmark, died without heirs in 1387. The ambitious and capable Margaret succeeded to the thrones of Denmark and Norway, and in 1389 she became mistress also of Sweden, and the three kingdoms were bound together by the Union of Calmar in 1397.

From the Union of Calmar till 1814 Norway continued united with Denmark; but while it shared in the general fortunes of the latter State, it retained its own constitutional mode of government, and exercised its right of electing the sovereign until, like the sister kingdom, it agreed of its own free will to relinquish this privilege in favor of hereditary succession to the throne. (See DENMARK.) Norway declined in prosperity and energy after the fourteenth century, in the middle of which the Black Death swept over it, leaving the land exhausted and partially depopulated. Oppressed by Denmark, her colonies and her commerce lost, there seemed to be little left of the national life. The Napoleonic wars severed the union which had existed for more than 400 years; for Denmark, after having given unequivocal proofs of adhesion to the cause of Bonaparte, was compelled, after the triumph of the Allies, to purchase peace by abandoning its sovereignty over Norway. Crippled in her resources and also bankrupt, she saw herself constrained to sign the Treaty of Kiel in 1814, by which it was stipulated that she should cede Norway to Sweden, receiving by way of indemnity Swedish Pomerania and the island of Rügen, which were subsequently exchanged with Prussia for Lauenburg. The Norwegians refused to admit the validity of the Treaty of Kiel, and a National Diet, assembled at Eidsvold, tendered the crown of Norway, as an independent kingdom, to the Danish Crown Prince Christian Frederick (the future Christian VIII.). This Assembly drew up a constitution based on the French Constitution of 1791. These measures found, however, neither supporters nor sympathizers among the other nations; and with the sanction of the Great Powers, Bernadotte, Crown Prince of Sweden, led an army into Norway, and after taking Frederikstad and Frederikshald, threatened Christiania. Denmark being unable to support the cause of Prince Christian, and Norway being utterly destitute of the means necessary for prosecuting a war, resistance was of no avail, and the Norwegians were glad to accept the proposals made to them by the Swedish King for a union with Sweden on the understanding that they should retain the newly promulgated Constitution, and enjoy full liberty and independence within their own boundaries. These conditions were agreed to, and strictly maintained; a few unimportant alterations in the Constitution, necessitated by the altered conditions of the new union, being the only changes introduced in the machinery of government.

Norway has firmly resisted every attempt on the part of the Swedish monarchs to infringe upon the constitutional prerogatives of the nation, and the feeling of national autonomy has been intensified by a striking difference between the democratic population of Norway and the more conservative population of Sweden, where the aristocracy still exercises considerable influence on the Government. The national movement, which continued throughout the nineteenth century in spite of repeated attempts on the part of the sovereign to mediate between the Norwegian and Swedish parliaments, had as its ultimate aim the reduction of the bond between the two kingdoms to a mere personal union. Conservative, Liberal, and Radical ministries succeeded each other in rapid alternation, but while the two former parties were too weak to effect any permanent arrangement, the Radicals, who were as a rule in a decided majority, failed in their policy against the resolute resistance of the Swedish Landsthing. The Norwegian Parliament, the Storthing, for some time before 1890, sought to enforce its policy by refusing to vote adequate supplies for the defense of the united kingdoms, and attempted to organize the military strength of the nation in the form of a militia and volunteer corps, on whose sympathy the Storthing might depend. After 1890 the policy of the Radical Party, which in secret was aiming at complete separation from Sweden, crystallized in the demand for a special Ministry of Foreign Affairs for Norway as well as a distinct diplomatic and consular service. This, however, the sovereign refused to concede. A temporary truce was concluded in 1895, when a new law regulating the commercial relations of the two countries went into effect, and a joint committee composed of Swedish and Norwegian representatives was intrusted with the execution of its provisions; but in the election of 1897 the Radical Party gained an overwhelming victory, and the conflict was renewed with increased ardor. In 1899 King Oscar II. finally gave his consent to a law removing the emblem of Sweden from the flag of Norway, which thus resumed the use of its old ensign. A bill, however, tending toward the final establishment of a separate consular service for Norway failed of the royal approval in 1900. In 1898 a law providing for direct election to the Storthing by universal manhood suffrage went into effect. This was supplemented by a law in 1901 dealing with communal electors, by which the suffrage was granted to all adult males and such women as paid a tax on an income of more than 300 kroner.

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NORWEGIAN LANGUAGE. The language which, together with Icelandic and Faroese, forms the West Norse division of the Scandinavian group. Like the other members of this group division, the Norwegian is more homogeneous than either Danish or Swedish. Chiefly as a result of phonetic changes its inflections are less original than those of Icelandic, although it retains the three genders. Its common Scandinavian characteristics are the suffixed definite article, the medio-passive, and the neuter-ending *-t*. Norwegian was divided at an early period into two main dialect-groups, the Eastern, including the Gudbrandsdal and the Drontheim, which resembles the Swedish, and the Western, represented by Hardanger, Voss, Sogn, and Sætersdal, which approaches the Icelandic. A subdivision of the West Norwegian, spoken along the coast, resembles the Danish.

The early period of the language is similar to that of Icelandic (q.v.). During the period from 1350 to 1530 Norwegian was strongly influenced first by the Swedish and later by the Danish. As a result of the Union of Calmar (1397), by which Norwegian independence was lost, Danish was substituted for the native language for purposes of literature and public business, although the Norwegian survived in the country districts in various dialects, and was used for social intercourse and the composition of folk tales and ballads. The modern standard language shows many divergencies both in forms, in vocabulary, and in syntax from the Danish of Denmark, and is generally distinguished from it as Dano-Norwegian. By the Norwegians themselves the dialects and the standard language are alike called Norse, but this usage is not recognized by scholars. During the last fifty years efforts have been made to emphasize the Norwegian character of the language by adapting its orthography to local pronunciation, and by introducing forms from the native speech. Dano-Norwegian has been described as Danish with a Swedish pronunciation.

A peculiar language movement in Norway is attracting attention throughout Scandinavia. It is no less than the creation and spread of a new form of Scandinavian speech, called by its originator, Ivar Aasen (q.v.), *Landsmaal* (national tongue). It is a written language, not used for social intercourse, and is based upon the existing dialects of Norway. At first this artificial language was used exclusively in poetry, but in 1858 the first newspaper in the *Landsmaal* appeared, and since then it has spread rapidly. In 1868 a society for the propagation of the new idea was established, branches of which now exist all over Norway. A number of acts have been passed by the Parliament in favor of the *Landsmaal*, among which may be mentioned that founding a chair in that subject at the University of Christiania. At present all acts of Parliament are published both in Dano-Norwegian and the *Landsmaal*. The principal literary supporter of the movement is the novelist Arne Garborg. Consult: Sargent, *Grammar of the Dano-Norwegian Language* (Oxford, 1892); Groth, *Danish and Dano-Norwegian Grammar* (Boston, 1894); Poestion, *Lehrbuch der norwegischen Sprache* (2d ed., Vienna, 1900); Noreen, *Altisländische und altnorwegische Grammatik* (2d ed., Halle, 1892); Aasen, *Norsk Grammatik* (Christiania, 1864), and *Norsk Ordbog*, with a supplement by Ross (ib., 1872-90); Larsen, *Oversigt over de norske Bygdemaal* (ib., 1898); Larsen, *Dictionary of the Dano-Norwegian and English Languages* (3d ed., Copenhagen, 1897); Brynildsen, *Dictionary of the English and Dano-Norwegian Languages* (ib., 1900—); Falk and Torp, *Etymologisk Ordbog over det norske og det danske Sprog* (Christiania, 1901—).

NORWEGIAN LITERATURE. Norwegian literature is commonly considered to have begun with the separation of Norway from Denmark and the adoption of the Norwegian Constitution in 1814. The history of literature in Norway, however, reaches back a thousand years before this time to Bragi (c.800), the first skald who is historically known to have composed poetry in the Old Norse language. His principal poem is the *Ragnarsdrapa*, which owes its preservation, in common with much of the skaldic poetry of old Norway, to the Icelander Snorri Sturluson, who incorporated it in his *Snorra Edda*.

There are a number of other poets in this and the succeeding period in Norway. After Bragi, the next in importance is Thjodolf of Hvin (c.855-930), whose principal poem is the *Haustlöng*, also contained in the *Snorra Edda*. Besides this poetry by known authors, most of the anonymous poems of the *Elder Edda*, composed, it is thought, between 875 and 1025, are doubtless ultimately of Norwegian origin. To the Old Norse prose literature of the thirteenth century Norway also made important contributions. At the head of these works stands the *Thidrekssaga*, the story of Dietrich of Bern, written about 1250 by an unknown author, and extremely valuable as a storehouse of Germanic legend. The *Karlamagnussaga*, the story of Charlemagne, from this same century, and the narrative of Barlaam and Josaphat, *Barlaamssaga ok Josaphats*, are also by Norwegian authors. There are in addition to these several old law codes of value as historical material, and the unique dialogue between father and son, the *Konungsskuggsja*, or *Speculum regale*, written in the reign of Sverre (1184-1202), and possibly by the King himself.

After the accession of Olaf, the son of Margaret, in 1380, Norwegian history for four centuries becomes Danish history. Under Danish rule Norway underwent complete national extinction and became but a province of Denmark. Even the Reformation failed to arouse her from this lethargy, and not until 1814, when Norway was ceded to Sweden by the Peace of Kiel, was there evidence of a national awakening. The literary history of this whole period in Norway coincides with the history of Danish literature, with which it is inseparably connected.

After the *Eufemiavisur* of about 1300, so called from the German queen of Haakon Magnusson, who had these paraphrases of German originals—*Iwein*, *Duke Frederick of Normandy*, and *Flore and Blancheflur*—made in the Norwegian language, there is no poetry until the period of learning subsequent to the Reformation. The first names at this time are Peder Dass (1647-1708), and Dorthe Engelbrechtsdatter (1635-1716). The former, a Norwegian clergyman, wrote secular and religious poems which have made him to this day the favorite poet of the common people of Norway. The names that follow are those of Norwegians, but, as has been indicated, their place is in Danish and not in Norwegian literature. This is true of Ludvig Holberg (1684-1754), the father of the Danish drama; of Kristian Biaumann Tullin (1728-1765), the poet of nature; of Johan Herman Wessel (1742-1785), the dramatist and poet, after Ewald, the second great name in the literature of the so-called 'Age of Enlightenment.'

An important factor in the development of a national Norwegian literature, as it was a matter of the greatest significance for Danish literature itself, was the formation of the *Norske Selskab*, or 'Norwegian Society,' in Copenhagen, in 1772. The intentions of the 'Society' were by no means to make propaganda for things Norwegian, as opposed to things Danish, but it is interesting to note that among its members are a number of poets who already exhibited a distinctly national feeling, which in choice of material and natural environment, and in inherent spirit, is not Danish, but Norwegian. The Norwegian poets of the period—Johan Nordal Brun (1745-1816), who wrote *Zarina*, the first Danish tragedy produced on the stage, and some of the most popular of the patriotic songs of Norway; Claus Fasting (1746-91), distinguished for his epigrams and criticism; Claus Frimann (1746-1829); Envold Falsen (1755-1808)—important as they were, have but little meaning at the present time. Edvard Storm (1749-94), who wrote ballads and songs in Norwegian peasant dialect, some of which are known throughout Norway to this day, was the only Norwegian writer of importance who held to the Danish side of this controversy, which so strikingly marks the last days of what may be called the Danish period in the literary history of Norway.

The actual history of Norwegian literature as a product in Norway of purely national conditions finds its beginning at the time of the separation of the Kingdom, in 1814, from Denmark. The 'Norwegian Society' presently changed the scene of its activity from Copenhagen to Christiania, but, although its traditions subsequently influenced popular taste, it never afterwards played an active part in literature. The first poetry which arose under these new conditions in Norway was vehemently patriotic, and is called by the Norwegians themselves, from the day of the adoption of the Norwegian Constitution, *Syttendemai-Poesi*, the 'poetry of the 17th of May.' From among the numerous writers of the time three only, the so-called 'Trefoil,' may be mentioned as of especial significance, the lyric poet C. N. Schwach (1793-1860), the poet and dramatist H. A. Bjerregaard (1792-1842), and the novelist Mauritz Christoffer Hansen (1794-1842), whose best work is contained in his stories of peasant life. The first great poet of modern Norway, Henrik Wergeland (1808-45), became, as no other writer in Norway before him, the poet of the people. His first great success was achieved with a volume of lyrics, published in 1829. In 1830 appeared the long dramatic poem *Skabelsen, Mennesket og Messias*, "The Creation, Man, and Messiah," which drew out, in 1832, a pamphlet on "Henrik Wergeland's Poetic Art and Poetry," by Johan Sebastian Welhaven (1807-73), mercilessly attacking him for his sins of poetical commission. The controversy between the two poets, at first personal, subsequently assumed a wider character and presently divided the whole country into a national and a critical faction, the one the embodiment of the pro-Norwegian spirit of the 17th of May, the other the party of 'intelligence,' which looked to perpetuate what were in reality the hereditary tendencies of the 'Norwegian Society,' and to develop Norwegian culture harmoniously with that of Europe and especially that of Denmark. The contest was waged even more violently after the publication, in 1834, of Welhaven's polemical poem, a cycle of sonnets called *Norges Dæmring*, "Norway's Twilight," in which he vigorously censured the mistaken zeal of the ultra-national faction which Wergeland represented. The battle was ultimately to Welhaven and his followers, who had, in point of fact, revolutionized the æsthetic taste of Norway, and by the introduction of a sound criticism had determined the direction of its future literary development. Welhaven, between 1839 and 1859, published numerous lyrical poems. His critical prose is among the finest that Norway has ever produced. Wergeland's best work was done after the downfall of his fortunes and his popularity. His last poem, *Den engelske Lods*, "The English Pilot," is his greatest. Andreas Munch (1811-84), poet and dramatist, followed the direction pointed out by Welhaven. His first work of importance was the romance *Den Eensomme*, "The Solitary," published in 1846. His *Billeder fra Nord og Syd*, "Pictures from North and South," is considered one of the best prose works in the language.

Important for its bearing upon the development of a national literature in Norway was the attention that was presently paid to the wealth of native material contained in the old folk-tales and popular poetry, which has been preserved among the peasantry in great abundance, and under the peculiar conditions of the country has retained an essentially national character in manner and matter. The principal workers in this field at the beginning were the naturalist Peter Christian Asbjörnsen (1812-85) and Jörgen Moe (1813-82), who published conjointly, in 1841, *Norske Folke-Eventyr*, "Norwegian Popular Tales." Asbjörnsen published subsequently *Norske Huldre-Eventyr og Folke-*

sagen, which contains descriptions of his own of natural scenery and popular life. The recognition of this material pointed out a new direction in Norwegian literature and has had a profound effect upon latter-day writers.

The present period of Norwegian literature, and the period of its broadest development, begins with Björnson and Ibsen, the greatest writers that Norway has produced. With them literature enters upon a new era of productivity at home, and, what had not been the case before, of influence abroad; for the work of these two poets, even at an early time in their career, had carried the name and fame of Norwegian literature far beyond the confines of Norway and of Scandinavia, until now, and principally through them, it has become in the widest sense a living and forceful part of the literature of the world. (For details see BJÖRNSON; IBSEN.) Jonas Lie (b.1833), who plainly shows the influence of Björnson, has written sea-stories that have attained great popularity. His first novel, *Den Fremsynte*, "The Visionary," appeared in 1870. His most successful and widely known novel is *Lodsen og hans Hustru*, "The Pilot and His Wife." He attains, however, a higher artistic result in his later novels of modern social life, *Livssalen*, "The Life Convict;" *Familien paa Gilje*, "The Family at Gilje;" *En Malström*, "A Maelstrom;" and others that have been written since 1883. Anna Magdalena Thoresen (1819-1903) also shows the influence of Björnson in her tales of nature and popular life. Her *Billeder fra Midnatssolens Land*, "Pictures from the Land of the Midnight Sun," is possibly her best work. The most original of the woman writers of Norway is Camilla Collet (1813-95), the sister of the poet Wergeland, whose most important novel is the realistic *Amtmandens Döttre*, "The Magistrate's Daughters." After Ibsen, Björnson, and Lie, the fourth great name in Norwegian literature of the present period is Alexander Kjelland (b.1849). Although his subjects are exclusively Scandinavian, he belongs, more than any of his countrymen, in his literary affinities less to Norway and more to Europe, whose general cultural tendencies he reflects. Kjelland's best work is contained in his short stories, the first volume of which appeared as *Novelletter* in 1879. His novels, the greatest of which is *Skipper Worse*, whose theme is the pietistic movement in Norway, are all novels of tendency.

Learned literature in Norway, although it has made important contributions to theology, to the physical sciences, and to philosophy, has found its highest and most characteristic expression in history. The founder of historical writing in Norway was Rudolf Keyser (1803-64), who wrote *Norges Historie*, "History of Norway;" *Den norske Kirkes Historie*, "History of the Church in Norway;" and other works on the history and antiquities and literature of his native country. His pupil, Peter Andreas Munch (1810-63), wrote, as his most important work, *Det norske Folks Historie*, "History of the Norwegian People." In collaboration with Keyser and with Carl Richard Unger (1817-97), he also did philological work of value in editing Old Norse texts. Johan Ernst Sars (b.1835), in his *Udsigt over den norske Historie*, "Review of Norwegian History," has produced one of the most notable prose works in the language.

In every field of literary activity modern Norway has unfolded, and is still unfolding, an extraordinary development, and this not only from the point of productivity, but in the quality and character of the work produced. The most distinct tendencies in Norwegian literature of the present period are the pessimistic-naturalistic direction originally pointed out by Ibsen, and the optimistic-realistic direction of Björnson and his followers, but there are writers who belong to neither school. Other writers than those mentioned have made a name outside of Norway, as well as at home. Among them are Aasmund Olafsson Vinje (1818-70), Kristoffer Janson (b.1841), Arne Garborg (b.1851), Amalie Skram (b.1857), and still more recently, Knut Hamsun, Gabriel Finne, and Vilhelm Krag.

Consult: Horn, *History of the Literature of the Scandinavian North*, trans. by Anderson (Chicago, 1884); Gosse, *Northern Studies* (London, n. d.); Schweitzer, *Geschichte der skandinavischen Litteratur* (Gera, 1896); Jæger, *Illustreret Norsk Literaturhistorie* (Christiania, 1896); Halvorsen, *Norsk Forfatterlexikon, 1814-56* (ib., 1881).

NORWEGIAN MUSIC. See SCANDINAVIAN MUSIC.

NORWE'GIUM (Neo-Lat., from ML. *Norwegia, Norvegia*, Norway). A name given by Dahll to a substance separated by him from the mineral *gersdorffite* found on the island of Ostweö, Norway. It is also said to exist in some specimens of unrefined lead. Its elementary character, however, has not been positively established.

NORWICH, nôr'rĭch *or* nôr'rĭj. Capital of Norfolk, England, and a county in itself, on the Wensum, immediately above its confluence with the Yare, 20 miles west of Yarmouth, and 98 miles north-northeast of London (Map: England, H 4). The town covers an area of about five miles in circumference, and is skirted on its north and east sides by the river. On the west and south it was surrounded by walls which have been removed to make room for the extension of the city. In the market-place and its vicinity are many large shops and good houses. The castle, finely situated on an elevation near the centre of the town, originally covered with its works an area of about 23 acres. The bridge over the ditch has one of the largest and most perfect Anglo-Norman arches in existence. The massive quadrangular Norman keep is now used as a museum. The cathedral, almost wholly Norman in plan, was founded in 1094 by Bishop Herbert Losinga. It is 411 feet long, 191 feet broad at the transepts, and is surmounted by a spire 315 feet high. Near the cathedral are a number of ancient and interesting structures now more or less in ruins, among which may be mentioned Saint Ethelbert's and the Erpingham Gate, the former in Decorated English, the latter in late Perpendicular, and both valuable and rich specimens of their styles. There are many places of worship, of which Saint Peter's Mancroft, a handsome cruciform edifice of the fifteenth century, with a remarkably fine peal of 12 bells, Saint Andrew's, Saint Clement's, Saint George's, Saint Giles's Saint Michael's, and others are worthy of mention. The free grammar school was founded by Edward VI. The city possesses public recreation grounds covering an area of 200 acres, and owns profitable real estate, markets, and a sewage farm. It also maintains a free public library, baths, Norwich Castle, gardens, and museum, and provides allotments and technical education. Three miles south of Norwich is Castor Saint Edmunds, which prior to the Roman Era was called Caister, and under the Romans received the name Venta Icenorum. It is the seat of extensive and flourishing industries, among which are the manufacture of mustard, starch, beer, shoes, foundry products, and agricultural implements, and dyeing and malting. It has also extensive nursery gardens. The city was one of the earliest manufacturing centres for textiles in England. This branch of industry, however, has declined. Its shipping trade, facilitated by a canal and river system of communication with the sea, is chiefly in agricultural products and coal. Annual fairs are held.

Norwich occupies a place in history from the time of the earliest Danish invasions. It had its origin in the castle erected as a stronghold by the East Anglian kings, and resorted to as a place of safety by the inhabitants of Venta Icenorum, who gave it the name of North-wic, or northern station or town. The East Anglian bishopric was removed hither in 1094. About 4000 Flemings settled at Norwich in the reign of Elizabeth, and gave great impetus to the prosperity of the town by the branches of manufacture which they introduced. The municipality dates from the reign of Henry II. Norwich returns two members to Parliament. Population, in 1851, 68,000; in 1891, 101,300; in 1901, 111,728. Consult: Jessopp, *Norwich* (London, 1884); Bayne, *History of Norwich* (Norwich, 1889); Quennell, *Norwich Cathedral, with a History of the See* (London, 1898).

NORWICH. A city and one of the county-seats of New London County, Conn., 90 miles southwest of Boston, Mass., and 50 miles southeast of the State capital, Hartford; on the Thames River, at the head of navigation, and on the Central Vermont and the New York, New Haven and Hartford railroads (Map: Connecticut, G 3). It is built among the hills, in the valleys of the Yantic and Shetucket, which here form the Thames; and has exceptional water power, a prominent feature in the development of its industrial interests. There is a large trade in lumber, coal, manufacturers' supplies, groceries, dry goods, etc. Norwich is one of the prominent manufacturing centres of the State, the chief articles produced being firearms, cotton, silk, and woolen fabrics, stoves and furniture, rolled and cast iron, leather and belting, and a great variety of machinery. The city is noted for its picturesque beauty, and possesses many fine residences, several public parks, and streets shaded with beautiful elms and maples. It has a Free Academy, which was built and endowed by private subscriptions from wealthy citizens. A fine new building, including an art museum, and costing nearly $200,000, the gift of W. A. Slater, has been erected for the academy. Other institutions include the William W. Backus Hospital, representing an endowment of over $500,000, the Otis Free Library, having 24,000 volumes with an annual circulation of nearly 100,000, and the Y. M. C. A. The courthouse and Saint Patrick's Roman Catholic Church are notable structures. The Indian burying ground where Uncas is buried is of historic interest. So is the spot where Miantonomoh fell. The government, under a revised charter of 1877, is vested in a mayor, chosen every two years, and a bicameral council, elected one-half each year on a general ticket, which controls elections of all administrative officials, with the exception of one water commissioner, who is annually chosen by popular vote. The water-works are owned and operated by the municipality. Population, in 1890, 16,156; in 1900, 17,251. Settled in 1659 by a company from Saybrook, Norwich (named from Norwich, England) was chartered as a city in 1784 and rechartered in 1871. It was the home of Samuel, Jabez, and Jedediah Huntington, Christopher Leffingwell, and Nathaniel Niles—all prominent during the Revolutionary period. Consult: Gilman, *Historical Discourse Delivered at Norwich in 1859* (Boston, 1859); and Caulkins, *History of Norwich* (Hartford, 1866).

NORWICH. A village and the county-seat of Chenango County, N. Y., 42 miles northeast of Binghamton; on the Chenango River, and on the New York, Ontario and Western and the Delaware, Lackawanna and Western railroads (Map: New York, E 3). It has a village hospital and a public library with 12,000 volumes; and among its fine structures are the municipal building, county jail, and the Lackawanna depot. Norwich is of considerable importance as an industrial centre, having railroad shops, a blast furnace, stone quarries, and manufactories of drugs and medicines, perfumes, furniture, gloves, silk ribbons, hammers, etc. There are also a number of creameries, the village being surrounded by a productive dairying and farming section. Population, in 1890, 5212; in 1900, 5766.

NORWICH, GEORGE GORING, Earl of (c.1583-1663). An English Royalist. He was made clerk of the Council of Wales, and among other important monopolies a large share of the tobacco grant was given to him (1636). After Charles I. had become a prisoner in the hands of Parliament, Goring headed an abortive Royalist rising in Kent. The Commons voted that he should be banished, but rescinded this vote, and a special court sentenced him to death, but he was not executed, either because the Speaker, Lenthal, who gave the casting vote, had received favor from Goring, or on the pleading of the Dutch and Spanish ambassadors. From 1652 to the Restoration he lived on the Continent, and Charles II. granted him a pension of £2000 and reappointed him to the Privy Council.

NORWICH CRESTED CANARY-BIRD. See CANARY.

NORWICH UNIVERSITY. An institution of learning at Norwich, Vt., founded at Middletown, Conn., in 1819, by Capt. Alden Partridge, and known as the American Literary, Scientific, and Military College. In 1829 it was removed to Norwich, Vt., and was incorporated under its present name in 1834. In 1898 it was officially recognized as the military college of the State of Vermont. It has long been known as an engineering and scientific school, and many of its graduates have served in the various wars. In 1903 the institution had 9 instructors and 70 students. Dewey Hall, a memorial building erected in honor of Admiral George Dewey, a former student, was opened in 1902.

NOR′WOOD. An electoral district and favorite residential section in the south of the metropolitan borough of Lambeth, London, England, eight miles south of Saint Paul's Cathedral (Map: London, F 7). It was formerly a suburban village noted for Beulah Spa, a popular pleasure ground picturesquely laid out around a mineral spring, now built over, and represented by the Beulah Spa hotel. Norwood is divided into Upper, Lower, and South Norwood. It adjoins the grounds of the Crystal Palace. Norwood Junction is an important suburban railway station. Population, in 1891, 28,248; in 1901, 35,887.

NORWOOD. A town in Norfolk County, Mass., 14 miles southwest of Boston; on the New York, New Haven and Hartford Railroad (Map: Massachusetts, E 3). It has the Morrill Memorial Library with 7000 volumes; and among its industrial plants are railroad repair shops, large tanneries, an iron foundry, manufactories of glue and ink, and an extensive printing establishment. Norwood was incorporated in 1872; the government is administered through town meetings. The water-works are owned by the municipality. Population, in 1890, 3733; in 1900, 5480.

NORWOOD. A city in Hamilton County, Ohio, adjoining Cincinnati on the northeast; on the Baltimore and Ohio Southwestern, the Norfolk and Western, and the Cincinnati, Lebanon and Northern railroads (Map: Ohio, A 7). It is well laid out on a site of great natural beauty, and is a favorite residential suburb of Cincinnati. There are several important manufacturing establishments whose factory buildings are noteworthy for their architecture and for their splendid equipment. Among these plants are the lithographing and playing-card works, the elastic-bookcase factory, and the electrical manufacturing concern. Pianos, laundry machinery, washing-machines, machine tools and iron-working machinery, iron castings, wood-millwork, and paper bags and specialties also are manufactured. Settled about 1790, Norwood was incorporated as a village under the general laws of 1888 and became a city in 1902. The waterworks and electric light plant are owned and operated by the municipality. Population, in 1900, 6480.

NOSAIRIANS. A Mohammedan sect. See ANSARIES.

NOSE (AS. *nosu*, *nasu*, OHG. *nasa*, Ger. *Nase*, nose; connected with Lat. *nasus*, Lith. *nósis*, OChurch Slav. *nosŭ*, Skt. *nas*, nose). The nose is not only the organ of smell, but is likewise part of the apparatus of respiration and voice. Considered anatomically, it may be divided into an external part—the projecting portion, to which the term nose is popularly restricted; and an internal part, consisting of two chief cavities, the *nasal fossæ*, separated from one another by a vertical septum, and subdivided by spongy or turbinated cells, or *sinuses* in the ethmoid, sphenoid, frontal, and superior maxillary bones communicating by narrow apertures.

The external portion of this organ may be described as a triangular pyramid which projects from the centre of the face, immediately above the upper lip. Its summit or root is connected with the forehead by means of a narrow bridge, formed on either side by the nasal bone and the nasal process of the superior maxillary bone. Its lower part presents two horizontal elliptical openings, the nostrils, which overhang the mouth, and are separated from one another by a vertical septum. The margins of the nostrils are usually provided with a number of stiff hairs (*vibrissæ*), which project across the openings, and serve to arrest the passage of foreign substances which might be drawn up with air intended for respiration. The skeleton or framework of the nose is partly composed of the bones forming the top and sides of the bridge and partly of cartilages, there being on either side an upper lateral and a lower lateral cartilage, to the latter of which are attached three or four small cartilaginous plates, termed sesamoid cartilages; there is also the cartilage of the septum which separates the nostrils, and is in association posteriorly with the perpendicular plate of the ethmoid, and with the vomer, forming a complete partition between the right and left nasal fossæ. It is the lower lateral, termed by some writers the alar cartilage, which by its flexibility and curved shape forms the dilatable chamber just within the nostril. The nasal cartilages are capable of being slightly moved, and the nostrils of being dilated or contracted by various small muscles, which it is unnecessary to describe.

The *nasal fossæ*, which constitute the internal part of the nose, are lofty, and of considerable depth. They open in front by the nostrils, and behind they terminate by a vertical slit on either side in the upper part of the pharynx, above the soft palate, and near the orifices of the Eustachian tubes, which proceed to the tympanic cavity of the ear.

The mucuous membrane lining the nose and its cavities is called pituitary, from the nature of its secretion, or Schneiderian, from Schneider, the first anatomist who showed that the secretion proceeded from the mucous membrane, and not, as was previously imagined, from the brain; it is continuous with the skin of the face at the nostrils, with the mucous covering of the eye through the lachrymal duct (see EYE), and with that of the pharynx and middle ear posteriorly. On the septum and spongy bones bounding the direct passage from the nostrils to the throat, the lining membrane is comparatively thick, partly in consequence of a multitude of glands being disseminated beneath it, and opening upon it, but chiefly, perhaps, from the presence of ample and capacious submucous plexuses of both arteries and veins, of which the latter are by far the more large and tortuous. These plexuses, lying as they do in a region exposed more than any other to external cooling influences, appear to be designed to promote the warmth of the part, and to elevate the temperature of the air on its passage to the lungs. In the vicinity of the nostrils, the mucous membrane exhibits papillæ and a scaly epithelium, like the corresponding parts of the skin. In the sinuses, and in all the lower region of the nose, the epithelium is of extreme delicacy, being of the columnar variety, and clothed with cilia. In the upper third of the nose—which, as the proper seat of the sense of smell, may be termed the olfactory region—the epithelium changes from ciliated to columnar, and assumes a more or less rich sienna-brown tint, and increases remarkably in thickness, so that it forms an opaque soft pulp upon the surface. It is composed of an aggregation of nucleated particles, of nearly uniform appearance throughout, except that the lowest ones are of a darker color than the rest, from their containing a brown pigment in their interior. The olfactory region abounds in glands, apparently identical with sweat glands, which dip down in the recesses of the submucous tissue among the ramifications of the olfactory nerve. They are named Bowman's glands.

The nerves of the nose are the first pair or olfactory, which are specially connected with the sense of smell; branches of the fifth pair, which confer ordinary sensibility on its skin and mucous membrane; and motor filaments, from the facial nerves to the nasal muscles. The olfactory nerve on each side is connected with the inferior surface of the brain by an external, a middle, and an internal root, which unite and form a flat band (or, more correctly, a prism), which, on reaching the cribriform plate of the ethmoid bone, expands into an oblong mass of grayish-white substance, the olfactory bulb. From the lower surface of this bulb are given off the olfactory filaments, fifteen or twenty in number, which pass through the cribriform foramina, and are distributed to the mucous membrane of the olfactory region. The branches of the fifth pair (or trifacial) given to the nose are the nasal nerve (derived from the ophthalmic division), which supplies the skin and mucous membrane in the vicinity of the nostrils, and the naso-palatine nerve (derived from Meckel's ganglion, which is connected with the superior maxillary division), which supplies the mucous membrane on the spongy bones and on the septum. Whatever may be the nature of the odorous matter, it is necessary that it should be transmitted by a respiratory current through the nostrils to the true olfactory region, and dissolved or suspended in the fluid with which the olfactory membrane is normally covered. The proper condition of this fluid is one of the essential conditions of the perception of odors. If the membrane is too dry, or if there is an inordinate excretion of fluid from its surface (both of which conditions occur in catarrh or cold in the head), smell is impaired or lost, in consequence of the necessary penetration of the stimulating odor to the nervous filaments being prevented.

It has been observed that when the nostrils are filled with rose water or eau de Cologne, no odor is perceived, and simply filling the nostrils with distilled water suspends for a time the sense of smell. If, on the other hand, the scent be dissolved in 'normal saline solution,' which closely resembles the natural secretion, the odor is perceived.

The sense of taste is often confused with that of smell. We speak of 'tasting' an odoriferous substance, such as an onion, or a savory dish, or a wine, when in reality we perceive it through the olfactory nerves. This is proved by the fact that the taste for these substances is lost when the smell becomes impaired.

The acuteness of the sense of smell is far greater in many of the lower animals (dogs, for example) than in man, and they employ it in guiding them to their food, in warning them of approaching danger, and for other purposes. To civilized men the utility of this sense is comparatively small; but it is occasionally much increased when other senses are deficient. Among many savage tribes the sense is almost as acute as in many of the lower mammals. See NOSTRILS; SMELL.

NOSE, COMPARATIVE ANATOMY OF THE. In the ordinary usage of the word, no animals but mammals have noses; but in the widest sense of an organ of smell, the nose is found in all vertebrates and in some lower animals. Owing to the close relation that exists between the sense of taste and the sense of smell, it is impossible to determine beyond question the function of certain organs among the lower animals, but in several cases evidence has been produced to show that ciliated pits or patches have a function similar to, if not identical with, that of smell in vertebrates. Thus as low as the ctenophores and some medusæ, there occur special areas covered with cilia, to which the sense of taste or smell has been assigned. In many flatworms, in nemerteans, and in many true worms, ciliated grooves, pits, and prominences occur, which are certainly sensory and probably olfactory. Whether organs of smell occur among crustaceans and insects is not beyond doubt, but short processes, open at the point and with special nerve connections located on the antennæ, are regarded as organs of smell. There is much evidence in support of the belief that insects smell, and the antennæ are almost certainly the seat of whatever such sense they possess. Among echinoderms there are isolated cases of organs which may be olfactory, notably the sensory cups on the inner surface of the tentacles in Synapta. Among the mollusks, the patches of densely ciliated epithelium in the mantle-cavity, known as 'osphradia,' are very probably organs of smell. In Amphioxus and the cyclostomes there is a single pit or sac, lined with an epithelium consisting of ciliated and sensory (olfactory) cells. In the elasmobranch fishes the olfactory sacs lie on the under surface of the snout, but in all the vertebrates they are situated somewhere between the eyes and the end of the snout, on the upper surface.

In all animals above cyclostomes the nasal sacs are inclosed in cartilaginous or bony cases, forming a prominent part of the skull. The nostrils of bony fishes are divided into two parts by a septum, which is sometimes so wide as to give rise to four wholly distinct nostrils. The mucous membrane lining the nasal sacs of fishes is raised up into a number of complex radial folds, thus increasing the sensory surface. The dipnoid fishes differ from the other true fishes in that the nasal sacs communicate with the cavity of the mouth as well as with the exterior, just as they do in all higher vertebrates. In amphibians we find for the first time turbinal bones which serve to increase the sensory surface of the nasal cavities. There are also glands present in the sensory epithelium, serving to keep it moist. Moreover, there is a canal connecting the anterior angle of the orbit with the nasal cavity, known as the naso-lachrymal duct, which is of use in conveying surplus lachrymal secretion (tears) into the nasal cavity and thence into the pharynx through the posterior nares. This duct is present in all the higher vertebrates also. In reptiles the olfactory organ is rather simple, especially in lizards and snakes; there is only a single turbinal, though crocodiles have on the outer side of the cavity a second prominence called the pseudo-turbinal. Birds also have only a single true turbinal, but two pseudo-turbinals are present, and the true turbinal is often more or less rolled on itself. In mammals the nasal cavity is large, and the turbinals are extended to form a spongy labyrinth, the projections of which, known as olfactory scrolls, are normally five in number, though they sometimes become more or less fused in pairs. Thus there is sometimes one, but usually two, superior or upper turbinals, and there is usually one, but sometimes two, middle turbinals. The so-called superior and middle turbinals of man are somewhat different in their origin, but the inferior turbinal is derived from and corresponds to the single turbinal of reptiles and birds.

The external nose of mammals is formed by an extension outward of the nasal bones, supported and strengthened by a cartilaginous outgrowth of the ethmoid. The size and appearance of the nose depends chiefly upon its function, for it is often elongated for some special purpose.

NOSE-APE. See PROBOSCIS MONKEY.

NOSEBLEED. See EPISTAXIS.

NOS′ELITE (named in honor of K. W. Nose, a German chemist), or NOSEAN. A mineral made up of the sulphates and silicates of sodium and aluminum. It crystallizes in the isometric system, is translucent, and has a gray, blue, or brown color. It occurs in certain igneous rocks such as phonolite and nepheline syenite. It is found chiefly in Germany, and on the Canary and Cape Verde Islands.

NOSOL′OGY (from Gk. *νόσος*, *nosos*, disease + *-λογία*, *-logia*, account, from *λέγειν*, *legein*, to say). The branch of medical science which treats of the classification and nomenclature of diseases. The old idea was that diseases could be divided into classes, orders, genera, and species. Many systems have been proposed, used, and abandoned. Some of these have been based upon theories of causation, others upon the symptoms manifested, the part or system of the body affected, or the pathological effects observed.

For statistical purposes the system devised by Dr. William Farr, a distinguished medical statistician of London, has been more recently used in Great Britain and America, its most complete development being the nomenclature of diseases issued by the Royal College of Physicians and Surgeons in 1884, the latest revision being in 1894.

This system divides all diseases into two great classes, namely, general and local diseases. The first class includes all those maladies which affect the whole body, or which may affect several parts at one time, and is divided into four groups. The first group includes diseases due to morbid poisons or specific infections, such as scarlet fever, measles, etc. The second group embraces diseases which are dependent upon external agencies other than the specific infections, as parasites, chemical poisons, climate, etc. The third group includes the so-called developmental diseases, such as malformations and old age. The fourth group embraces a number of unclassified affections, as rheumatism, gout, leprosy, cretinism, etc. The second great class, that of local diseases, includes those peculiar to the various systems of the body, such as the nervous system, the circulatory system, etc.

It is evident that no single scheme of classification will answer every purpose. It is equally obvious that every system must be subject to constant modification by the advances in medical knowledge. This is notably true of the recent discoveries in bacteriology. Among writers of the present day the tendency is toward a very simple classification, and the following arrangement of diseases may be accepted as the one which, with modifications, is in general use:

(1) *Specific infectious diseases*, represented by the exanthemata, syphilis, tuberculosis, and malaria.

(2) *Constitutional diseases*, for example, gout, rheumatism, and diabetes.

(3) *Diseases of the digestive system*, e.g. gastritis, jaundice, and enteritis.

(4) *Diseases of the respiratory system*, as nasal catarrh, laryngitis, bronchitis, and pneumonia.

(5) *Diseases of the circulatory system*, as endocarditis, aneurism, and arterio-sclerosis.

(6) *Diseases of the blood and ductless glands*, as anæmia, leucocythæmia, Addison's disease, and goitre.

(7) *Diseases of the kidneys*, as Bright's disease, uræmia, and pyelitis.

(8) *Diseases of the nervous system* (including the brain, spinal cord, and nerves), as epilepsy, chorea, myelitis, and sciatica.

(9) *Diseases of the muscles*, the muscular atrophies and distrophies.

(10) *The intoxications:* alcoholism, the drug habits, lead and arsenic poisoning.

(11) *Diseases due to animal parasites:* tapeworm, trichiniasis, and pediculosis.

To these must be added the diseases peculiar to special organs, the eye, ear, skin, and generative organs.

NOSSI-BÉ, nôs′sē′bā′. An island off the northwest coast of Madagascar, from which it is separated by a narrow channel. It has an area of 111 square miles, is volcanic and mountainous, and well wooded. Parts of it are well cultivated, and produce sugar-cane, coffee, rice, and vanilla. The chief town is Hellville, on the south coast, an important port of call with shipping amounting to more than half a million tons annually. The population of the island in 1901 was 9500, chiefly Sakalavas of Madagascar. The island was ceded to France by Madagascar in 1840, and in 1896, when the latter became a French possession, Nossi-Bé was placed under the authority of the Governor-General of Madagascar.

NOSTAL′GIA (Neo-Lat., from Gk. *νοσταλγία*, from *νοσταλγεῖν*, *nostalgein*, to be homesick, from *νόστος*, *nostos*, return + *ἄλγος*, *algos*, grief, distress). A feeling of melancholy, caused by grief on account of absence from one's home or country, of which the English equivalent is *homesickness*. Nostalgia represents a combination of psychic and bodily disturbances, and must be regarded as a disease. It may lead to melancholia and even death. It is more apt to affect persons whose absence from home is forced than those whose absence is voluntary.

NOS′TRADA′MUS (MICHEL DE NOTREDAME) (1503-66). A French astrologer of Jewish descent, born at Saint-Remy in Provence. He entered the College of Avignon, and after completing his course there went to Montpellier, where he studied medicine. At this time a terrible pestilence desolated the southern part of France, and during the four years that it continued

(1524-29) Nostradamus went from one city to another giving his aid to the stricken. After the pestilence had subsided he returned to Montpellier to finish his studies. He traveled for a number of years, and in 1544 settled at Salon. The next year a new epidemic of the pest swept over the country and he accepted the formal invitation of the authorities to visit Aix and Lyons, where he treated his patients with a secret remedy which worked marvelous cures. This gave him a great reputation, and a few years later his claim that he had the power of reading the future attracted widespread attention and became the subject of much controversy. In 1550 he began to write his famous *Centuries*, mystic prophecies in rhymed quatrains, the first series of which was published at Lyons in 1555. Catharine de' Medici invited their author to Court, where he reached the height of his fame. Soon afterwards he returned to Salon. Besides his *Centuries*, Nostradamus wrote: *Traité des fardements* (1552); *Le remède très utile contre la peste et toutes fièvres pestilentielles* (1561); and *Opuscule de plusieurs exquises receptes* (1572); and from 1550 to his death published an *Almanach* that had a wide circulation. Consult: Jaubert, *Vie de M. Nostradamus* (Amsterdam, 1656); Guynaud, *La concordance des prophéties de Nostradamus avec l'histoire* (Paris, 1693); and Bareste, *Nostradamus* (ib., 1842).

NOSTRILS (AS. *nosþyrl, næsþyrl*, from *nosu, nasu*, nose + *þyrl, þyrel*, hole, from *þyrel*, OHG. *durihhil, durchil*, perforated, from AS. *urh*, OHG. *durnh*, Ger. *durch*, through), DISEASES OF THE. This classification is no longer used, and diseases formerly appearing under this head will be found under their respective titles. (See CATARRH; OZENA; EPISTAXIS; RHINITIS; POLYPUS; NOSE.) Foreign bodies are often inserted into the nostrils by children, and become impacted. They may usually be extracted by a small scoop, a bent probe, or forceps. If they cannot be removed by these means, they must be pushed back into the throat through the posterior nares. Children are occasionally born with imperforate nostrils. This congenital malformation may, however, usually be remedied by surgical means.

NOSTRUM (Lat., our own). A term applied to patent or quack medicines whose ingredients are kept secret by the inventor for the purpose of controlling the manufacture of them; hence the term has come to be used in a derogatory sense.

NOTA, ALBERTO, Baron (1775-1847). An Italian dramatist, born at Turin. He was educated for the bar, practiced law, and finally obtained the position of secretary to the future King Charles Albert. He afterwards was appointed administrator of the district of Bobbio (1820), and of San Remo (1823), and still later general intendant at Casale and Cuneo. He wrote comedies in imitation of Molière and Goldoni. His thirty or more plays have little originality. The best of them are: *La fiera*, *Rivoluzioni in amore*, *Il benefattore*, *La pace domestica*, *L'irrequieto*, *Il progettista*, *La vedova in solitudine*, and *L'amor timido*. His works were very popular, and went through ten editions between 1816 and 1829.

NOTABLES (OF., Fr. *notable*, from Lat. *notabilis*, noteworthy, from *notare*, to note, mark, from *nota*, mark, from *noscere*, to know; ultimately connected with Eng. *know*). The name given in France before the Revolution of 1789 to persons of noble birth, social distinction, or political importance, who were summoned to meet in the Assembly of Notables. The States-General (q.v.) was too great a check on the despotism of the monarchy, and beginning with Charles V., the French kings adopted the expedient of calling in their stead Assemblies of Notables, composed of those who were likely to be in favor of the projects of the Crown. Their whole proceedings were guided by the King or his ministers. They showed a particular readiness in granting subsidies, from which they themselves, as belonging to the privileged classes, were exempt. An Assembly of Notables, convened in Paris by Richelieu in 1626, and presided over by Gaston d'Orléans, brother of Louis XIII., consisted of only 35 members. In 1878, when the state of the finances threatened the country with bankruptcy, Louis XVI., at the instigation of Calonne (q.v.), had recourse to an Assembly of Notables, which assembled on February 22, 1787. In spite of their readiness to accept certain reforms in the administrative and financial system, they showed themselves jealous of their ancient privileges and were inclined to shift the responsibility for the difficult state of affairs on the Government. Some of the Notables even advocated the summoning of the States-General in the expectation, probably, that the latter would devise some way of relieving the distressed conditions of the country without interfering with the prerogatives of the privileged orders. On May 25th the Notables were dismissed. Necker, who was later placed at the head of affairs, assembled the Notables for the last time on November 6, 1788, to consult with them concerning the form in which the States-General should be convened. The Notables declared against every innovation which they had sanctioned the year previous, and were especially opposed to the double representation of the Third Estate. This opposition compelled the Court to resort to half measures, which helped to prepare the way for the Revolution. The Notables were finally dissolved December 12, 1788. See FRANCE; FRENCH REVOLUTION.

NOTARY PUBLIC (Lat. *Notarius*, one who writes, from *nota*, mark). An officer duly authorized to attest or certify legal instruments, and to perform certain other official acts, usually of a ministerial character. The office is created by statute, and the functions of a notary public vary in different jurisdictions. Notaries were known in England before the Conquest, and in all the countries of Europe at an even earlier time. They were appointed by the popes at Rome, and acted as officials in the ecclesiastical courts, in addition to exercising certain secular powers. In England the authority to appoint notaries was finally delegated by the Roman See to the Archbishop of Canterbury, and after the Reformation a statute was enacted (25 Hen. VIII., c. 21, § 4) confirming the right in the Archbishop as a high prelate in the English Church.

With the development of the commerce of England and the 'law merchant' the office of notary public increased in importance very rapidly. Notaries were employed to protest commercial paper, to witness certain papers under the maritime law, and were gradually vested with the powers which they exercise generally to-day. In the United States, notaries are appointed by the Governors of the States; and the authority of a notary to act, therefore, does not extend beyond the limits of the particular territory in a State for which he is appointed. This territory is usually a county, and he cannot perform any acts in another county unless he complies with certain prescribed formalities, such as filing a certificate and paying an additional fee. In many States a notary may thus extend his official powers to all the counties of his State, but he cannot exercise his powers except for the county in which he is personally present at any given time.

In general, any male citizen is eligible to appointment as a notary. In most States, in order to qualify, a notary must take an oath of office, and in some he must give a bond to secure the faithful performance of the duties of his office; and a breach of his official duties is punished criminally. A notary's seal must be affixed to many legal instruments authenticated before him. The statutes of the different States vary as to the necessity of a notarial seal.

As notaries are State officers, their acts in matters in which the Federal Government is involved are not valid except in cases where their authority is specially recognized by the acts of Congress. These Federal statutes provide that a notary may administer all oaths and take all acknowledgments which a justice of the peace may do, and the authority of notaries to take depositions, affidavits, etc., for use in the United States courts is also expressly authorized. The notarial seal must be affixed to all documents intended to be used in the courts or any department of the Federal Government. The United States statutes in this regard are very strictly construed.

The general powers of a notary as a State officer are as follows: to take acknowledgment of legal instruments, such as deeds, mortgages, bills of sale, etc.; to take affidavits; to take depositions (q.v.); to protest commercial paper; and, in some States, to exercise the powers of a justice of the peace.

A notary may be disqualified to act by reason of his financial interest in a matter brought before him. Thus where a notary is a grantee in a deed, he cannot take the acknowledgment of the grantor, or person conveying the property. Relationship to one of the parties to a deed or other legal instrument will not ordinarily disqualify a notary from taking the acknowledgment of that party, as it is a ministerial act; but where the notary is commissioned to take depositions, it is considered more in the nature of a judicial act, and if he is a near relative to one of the parties to the suit, in most jurisdictions he is disqualified for that reason. The fees of notaries are fixed by statute in each State, and generally it is a misdemeanor for a notary to demand and receive more than the statutory fee for an act. By statute in most jurisdictions certain other officials, such as judges, justices of the peace, mayors of cities, etc., are vested with notarial powers. See Evidence; Acknowledgment; Affidavit.

NOTATION (Lat. *notatio*, designation, from *notare*, to mark, from *nota*, mark). In arithmetic, a term applied to a system of designating numbers by figures, or *notæ*, as they were often called in the Middle Ages. The chief number notations of the early races, before the perfecting of the position system, conform to one of three systems, the repeating, the alphabetic, and the initial-letter systems, although these are not mutually exclusive. By the repeating system is meant the plan of repeating a chosen symbol, especially for 1, 10, 100—on the additive principle, so as to represent other numbers twice, or three or more times as great. Thus, in the Egyptian system, the symbol ∩ stands for 10, and the combination ∩∩∩ stands for 30. By the alphabetic system is meant the plan of representing numbers by letters in alphabetic order. And by the initial-letter system is meant the plan of representing numbers by the initial letters of the corresponding language forms. These tendencies are exhibited in the following tables:

REPEATING SYSTEMS.

Egyptian	I, ∩, 𓍢, ---
Babylonian	𒁹, 𒌋, 𒈨, ---
Early Greek	I, Δ, H, M, ---
Early Roman	I, X, Θ, ↀ, ---
Late Roman	I, X, C, M, ---

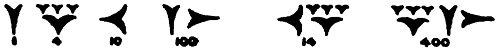
ALPHABETIC AND INITIAL-LETTER SYSTEMS.

Hebrew	א, ב, ג, ד,
Hindu	—, =, ≡, and the initial letters.
Late Greek	α, β, γ, ---

The Hebrew system was used by Hebrew writers as late as the twelfth century, in connection with zero, after contact with the Arabic system.

Among the Egyptians numbers were written running from right to left in the hieratic writing, with varying direction in the hieroglyphics. In the latter the numbers were either written out in words or represented by symbols for each unit, repeated as often as necessary. In the hieratic symbols the figure for the unit of higher order stands to the right of the one of lower order. The Phœnician system contained twenty-two characters, derived from the symbols of the Egyptians.

The Babylonian cuneiform inscriptions proceed from left to right, which must be looked upon as exceptional in a Semitic language. The units of higher order stand on the left of those of lower order. The symbols used in writing are chiefly a horizontal wedge, a vertical wedge, and a combination of the two at an angle. The symbols were written beside one another, or, for ease of reading and to save space, over one another. The symbols for 1, 4, 10, 100, 14, 400, respectively, are as follows:



For numbers exceeding 100 there was also used, besides the mere juxtaposition, a multiplicative principle; the symbol representing the number of hundreds was placed at the left of the symbol for hundreds, as in the case of 400, already shown. The Babylonians probably had no symbol for zero.

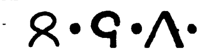
The oldest Greek numerals (aside from the written words) were, in general, the initial letters of the fundamental numbers, I for 1, Π for 5 (πέντε), Δ for 10 (δέκα), and these were repeated as often as necessary. These numerals are described by the Byzantine grammarian Herodianus (c.200 A.D.), and hence are spoken of as Herodianic numbers. Shortly after B.C. 500 two new systems appeared. One used the 24 letters of the Ionic alphabet in their natural order for the numbers from 1 to 24. The other arranged these letters apparently at random, but actually in an order fixed arbitrarily; thus, $\alpha = 1$, $\beta = 2$, ... $\iota = 10$, $\kappa = 20$, ..., $\rho = 100$, $\sigma = 200$, etc. For 6, 90, and 900 exception was made, and the symbols ϛ ϙ ϡ were used respectively. Here, too, there is no special symbol for the zero.

The Roman numerals were probably inherited from the Etruscans. The noteworthy peculiarities are the lack of the zero; the subtractive principle whereby the value of a symbol was diminished by placing before it one of a lower order (IV = 4, IX = 9, XL = 40, XC = 90), even in cases where the language itself did not signify a subtraction; and finally the multiplicative effect of a bar over the numerals ($\overline{\text{XXX}} = 30{,}000$, $\overline{\text{C}} = 100{,}000$). Also for certain fractions there were special symbols and names. According to Mommsen, the Roman number-symbols I, V, X represent the finger, the hand, and the double hand, but they are more probably from old Etruscan letter forms. The use of the bar (*vinculum* or *titulus*) was very uncertain. Thus in the tenth century we find it used over the I and X (as among later Romans) to increase the value 1000-fold, but over the M it had no significance. The symbols, too, were carelessly used. Thus, X $\overline{\text{II}}$ $\overline{\text{M}}$ $\overline{\text{M}}$ meant 10. 1000^4 and C $\overline{\text{M}}$ meant 100. 1000. The subtractive principle, although known to the later Romans, was little used until very recently, as witness IIII for IV, continued from the early clock faces to those of to-day.

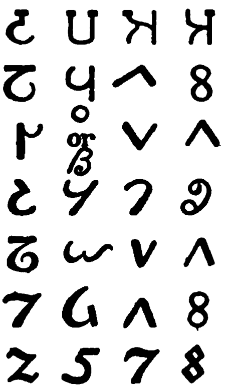
The number system of the Hindus is of special interest, because it is to these Aryans or to the Arabs that we owe the valuable position system now in use. Their oldest symbols for the numbers from 4 to 9 seem to have been merely the initials of their number-words, and the use of letters as figures seems to have been quite prevalent from the third century B.C. The zero is of later origin, and its introduction is not proved with certainty until after 400 A.D. The writing of numbers was carried on, chiefly according to the position system, in various ways. One plan, which Aryabhatta records, represented the numbers from 1 to 25 by the twenty-five consonants of the Sanskrit alphabet, and the succeeding tens (30, 40....100) by the semivowels and sibilants. A series of vowels and diphthongs formed multipliers consisting of powers of ten, *ga* meaning 3, *gi* 300, *gu* 30,000, *gau* 3. 10^{16}. In this there is no application of the position system, but it appears in two other methods of writing numbers in use among the arithmeticians of Southern India. Both of these plans are distinguished by the fact that the same number can be made up in various ways. The first method consisted in allowing the alphabet, in groups of nine symbols, to denote the numbers from 1 to 9 repeatedly, while certain vowels represented the zeros. If in the English alphabet, according to this method, the numbers from 1 to 9 be denoted by the consonants *b*, *c*, ..., *z*, so that after two countings one finally has $z = 2$, and zero be denoted by every vowel or combination of vowels, the number 60502 might be indicated by *siren* or *heron*, and might be introduced by some other words in the text. The second method employed type-words. Thus *abdhi* (one of the 4 seas) = 4, *surya* (the sun with its 12 houses) = 12, *açvin* (the two sons of the sun) = 2. The combination *abdhisuryaçvinas* denoted the number 2124.

In the eighth century (c.772) the Arabs, whose numerals consisted of abbreviated number-words of an inferior type, the *Divani*, became acquainted with the Hindu system. From these figures there arose, among the Western Arabs, the *Gubar* numerals (dust numerals). These Gubar numerals, almost entirely forgotten to-day among the Arabs themselves, are the ancestors of our modern numerals. These primitive Western forms, used in the abacus-calculation, are found in the West European manuscripts of the eleventh and twelfth centuries, and owe much of their prominence to Gerbert, afterwards Pope Sylvester II. (q.v.), and to Leonardo Fibonacci (q.v.).

The arithmetic of the Western nations, cultivated to a considerable extent in the cloister schools from the ninth century on, employed, besides the abacus, the Roman numerals, and consequently did not use a symbol for zero. In Germany, up to the year 1500, the Roman symbols were called German numerals, in distinction from the symbols of Arab-Hindu origin, which included the zero (Arabic, *as-sifr;* Sanskrit, *sunya*, the void). The latter were called ciphers (*Ziffern*). From the fifteenth century on these Arab-Hindu numerals appear more frequently in Germany on monuments and in churches, but at that time they had not become common property. A frequent and free use of the zero in the thirteenth century is shown in tables for the calculation of the tides at London, and of the duration of moonlight. In the year 1471 there appeared in Cologne a work of Petrarch with page-numbers in Hindu figures at the top. In 1478 the first printed arithmetic appeared at Treviso, and in 1482 the first German arithmetic at Bamberg, and these explained the system. Besides the ordinary forms of numerals everywhere used to-day, the following forms for 4, 5, 7 were used in Germany at the time of the struggle between the Roman and Hindu notations:



The derivation of the modern numerals is illustrated by the examples below, which are taken in succession from the Sanskrit, the figures used by Gerbert (latter part of the tenth century), the Eastern Arab, the Western Arab Gubar numerals, the numerals of the eleventh, thirteenth, and sixteenth centuries:



In the sixteenth century the Hindu position arithmetic and its notation first found complete introduction among all the civilized peoples of the West. By this means was fulfilled one of the indispensable conditions for the development of common arithmetic in the schools and in the service of trade and commerce.

SCALES OF NOTATION. The explanation of the fact that 10 is almost everywhere found as the base of the system of counting is seen in the common use of the fingers in elementary calculations. In all ancient civilizations finger reckoning was known, and even to-day it is carried on to a remarkable extent among savage peoples. It is evident that any integer may be made the base of a scale of notation, the number of symbols being the same as the number of units in the base. Some languages contain words belonging fundamentally to the scales of 5 and 20, without these systems having been completely elaborated. In the Roman and Babylonian systems 12 and 60 appear as bases. The New Zealanders have a scale of 11, their language possessing words for the first few powers of 11, and consequently 12 is represented as 11 and 1, 13 as 11 and 2, 22 as two 11's, and so on. (See NUMERATION.) What has been said concerning the delevopment of the number symbols illustrates the power of a well-arranged number system and its necessity for progress in mathematical science. For reasons already stated, the world has generally adopted the decimal notation. In this system each place has a value ten-fold that of the place at its right, the general form of the integers being $10^n \cdot m + 10^{n-1} \cdot l + \ldots\ldots\ldots 10^3 \cdot d + 10^2 \cdot c + 10b + a$, and that of the fractions being $10^{-1} \cdot a' + 10^{-2} \cdot b' + 10^{-3} \cdot c' + \ldots . 10^{-n} \cdot m'$. The decimal fraction was a relatively late development of the system. During the Middle Ages the sexagesimal fractions (see FRACTIONS), inherited from the Babylonians through the later Greeks, had been generally used by physicists and astronomers, and had therefore received the names 'physical' and 'astronomical fractions.' We have the remains of the system in our degrees, minutes, and seconds. The mediæval fractions were not limited to seconds, however, but extended to 'thirds,' 'fourths,' and so on. For example, $12^\circ\ 5'\ 3''\ 16'''\ 18^{iv}$ means in modern symbols $12 + \frac{5}{60} + \frac{3}{60^2} + \frac{16}{60^3} + \frac{18}{60^4}$. To distinguish the fractions of trade from the 'fractiones astronomicæ,' the former were called 'fractiones vulgares,' from which come the English 'vulgar fractions' and the American 'common fractions.'

The constant advance of science, calling for larger numbers and more elaborate fractions, finally demanded some improvement on the sexagesimal system. As early as the latter part of the fifteenth century some indications of the approach of the decimal fraction are seen. During the sixteenth century several efforts were made in the same direction, notably that by Stevin (q.v.). But it was the advent of logarithms at the opening of the seventeenth century that made the necessity apparent and gave to decimal fractions a general recognition in the scientific world. It was, however, fully a century later that they began to be recognized in business; the establishment of the metric system (q.v.) and the decimal coinages of the various countries finally compelled their general use. A comparison of the three systems is seen in the following representation of one-tenth: $\frac{1}{10}$ (common), 0.1 (decimal), 6′ (sexagesimal).

Index notation may also be mentioned as a recent example of the power of symbolism. Astronomers and physicists, having to employ both exceedingly large and small numbers in calculation, find it advantageous in approximations to introduce powers of ten. Thus 284,000.000,000 may be expressed by $284 \cdot 10^9$, and 0.00000000035 by $3.5 \cdot 10^{-10}$. If these numbers are to be multiplied, the process is simply $284 : 3 : 5 \cdot 10^{9-10}$ or $994 \cdot 10^{-1} = 99.4$.

Consult: Cantor, *Vorlesungen über Geschichte der Mathematik* (Leipzig, 1880; 2d ed. 1894); Unger, *Die Methodik der praktischen Arithmetik* (ib., 1888); Günther, *Geschichte des mathematischen Unterrichts im deutschen Mittelalter bis zum Jahr 1525* (Berlin, 1887); Woepcke, *Sur l'introduction de l'arithmétique indienne en Occident* (Rome, 1859); "Mémoirs sur la propagation des chiffres indiens," in *Journal Asiatique* (VIème série, part i., Paris, 1863); Friedlein, *Die Zahlzeichen und das elementare Rechnen der Griechen und Römer* (Erlangen, 1869); Pihan, *Exposé des signes de numération usités chez les peuples orientaux* (Paris, 1860). For the history and bibliography, consult: Treutlein, *Geschichte unserer Zahlzeichen* (Karlsruhe, 1875); and Cantor, *Geschichte der Mathematik* (Leipzig, 2 editions, 1880-98), both of which give extensive tables showing the development of the forms of the numerals.

NOTATION, MUSICAL. See MUSICAL NOTATION.

NOTE (OF., Fr. *note*, from Lat. *nota*, mark). In music, a character which by the degree it occupies on the staff represents a sound, and by its form the period of time or duration of that sound. The notes commonly in use in modern music are the semibreve, 𝅝; minim, 𝅗𝅥; crotchet, 𝅘𝅥; quaver, 𝅘𝅥𝅮; semiquaver, 𝅘𝅥𝅯; demisemiquaver, 𝅘𝅥𝅰; and semi-demisemiquaver, 𝅘𝅥𝅱. Taking the semibreve as a unit, the minim is $\frac{1}{2}$ its duration, the crotchet $\frac{1}{4}$, the quaver $\frac{1}{8}$, the semiquaver $\frac{1}{16}$, the demisemiquaver $\frac{1}{32}$, and the semi-demisemiquaver $\frac{1}{64}$. Notes of greater length than the semibreve were formerly in use—viz. the breve, twice the duration of the semibreve; the long, four times; and the large, eight times the semibreve. Of these, the breve, ▭ or |𝅝|, is still sometimes met with in ecclesiastical music. According to their numerical proportions, it is customary to speak of notes as whole, half, quarter, eighth, sixteenth, etc. See LEADING TONE; MUSICAL NOTATION.

NOTE (in Law). See PROMISSORY NOTE.

NOTHING TO WEAR. A humorous poem by William Allen Butler (q.v.), which appeared anonymously in *Harper's Weekly* in 1857. The heroine is Miss Flora McFlimsey. Many editions of this popular satire on dress have been issued.

NOTHNAGEL, nōt′nä′gel, HERMANN (1841-1905). A German physician, born at Alt-Lietzegöricke. He studied medicine at Berlin, taught at Königsberg, Berlin, and Breslau, and was appointed professor at Freiburg (1872), at Jena (1874), and at Vienna (1882). Besides his *Topische Diagnostik der Gehirnkrankheiten* (1879), and *Beiträge zur Physiologie und Pathologie des Darms*, Nothnagel wrote *Handbuch der Arzneimittellehre* (1870; 7th ed. 1894), and contributions to *Spezielle Pathologie und Therapie* (1894 et seq.), of which he was an editor.

NOTHOMB, nŏ'tôN', JEAN BAPTISTE, Baron (1805-81). A Belgian statesman and diplomat, born at Messancy. He studied law at Liège, and entered politics in Brussels as a contributor to the *Courrier des Pays-Bas.* He played an important part in the Revolution of 1830, and in November of that year was appointed by the Provisional Government a member of the Diplomatic Committee. In 1837 he received the portfolio of Public Works, and in that department founded the Belgian railway system, and in 1842 became Minister of the Interior. He formed a new Cabinet in 1843, but his moderate policy was not long successful, and he was forced to retire by the coalition of 1845. He was Minister at Berlin from 1843 until his death. His chief works include *Essai historique et politique sur la révolution belge* (1833; 4th ed. 1876). Consult Juste, *Le baron Nothomb* (Brussels, 1874).

NOTICE (Lat. *notitia*, knowledge, idea, from *noscere*, to know). Notice in law denotes existing knowledge of a fact based upon information communicated by another, which knowledge has the effect of fixing the rights and liabilities of the party giving and the party receiving the information. The term is also sometimes applied to the act of giving the information which constitutes the notice. Unless otherwise stated, the term will here be used as first defined. Notice may be either (a) actual or (b) constructive.

Actual notice is knowledge of a fact based upon information communicated by either written or spoken language.

Constructive notice is knowledge which may not in fact exist, but which the law may presume to exist upon grounds of policy, as where notice to an agent is deemed to be notice to the principal, although in fact the information is never communicated to the principal; or where notice of pendency of action affecting real estate is constructive notice of the action to any one dealing with the title to the real estate, whether he has actual notice of the action or not (see LIS PENDENS); or where notice to the purchaser of negotiable paper of facts by which he is 'put upon inquiry' as to its validity may be constructive notice of a defense of the maker to any action founded upon the paper, or where one accepting a conveyance containing a reference to some other deed is deemed to have constructive notice of the other deed, although he may never have read it.

The doctrine of notice as a means of fixing rights and liabilities has many applications at common law, the more important of which are:

Liability of an indorser of negotiable paper, or of a promissory note, or a bill of exchange, is fixed by a notice of dishonor. The notice in order to charge an indorser must be given with due dispatch after dishonor or protest, usually on the day following; it must describe the bill or note and the nature of the dishonor. It may be oral, although usually in writing, and may be served personally or by mail. If the holder or prior indorser is unable after due diligence to find the indorser or serve him with notice, necessity of notice to charge the indorser is dispensed with. See NEGOTIABLE INSTRUMENTS.

In general any one purchasing property with actual notice of any equitable claims or rights that there may be with respect to the property, or with notice of facts sufficient to put him upon inquiry, takes the property subject to such claims; as, for example, an equitable defense to negotiable paper, or fraud in the contract by which the vendee obtained title to the property, although a purchaser for value without notice would acquire the property free of claims. See FRAUD.

Notice by the landlord is necessary to terminate the tenancy of a tenant at will or by sufferance, or of a tenant from year to year. In the latter case the landlord must give notice at least a reasonable length of time before the end of any year of his election to terminate the lease. This time is now fixed by statute in some States. The landlord may, however, waive his right acquired by notice given, and continue the tenancy by expressly giving his consent, or by continuing to accept payment of rent.

When a creditor assigns his claim against his debtor without notice to the debtor, the debtor may pay the assignor and may thus discharge the debt. If, however, the assignee give the debtor notice of the assignment, the debtor is bound to pay the assignee; and if he pays the assignor, notwithstanding the notice to pay the assignee, he may nevertheless be compelled to pay the amount due to the assignee. See ASSIGNMENT.

The right of an insured to abandon the property insured to the insurer upon the happening of a partial loss is fixed by notice given by the insured to the insurer. If a proper case for abandonment, the mere giving of notice is sufficient. If not a proper case for abandonment, the insured may not abandon unless the notice is accepted by the insurer. See INSURANCE.

In addition to the various general rules of common law requiring notice to be given, notice may be required in special cases, as where statutes require notice to be given as a condition of fixing rights and liabilities; or where the parties to a contract stipulate expressly or impliedly for notice as a means of defining their rights under the contract.

Whether notice must be personally served upon the person to be notified depends upon the particular kind of notice. In general all notices, except those required in the course of litigation, must be personally served. Notice required between litigants may be served upon the attorneys in the case. When notice is required by statute, it must be served upon the person to be notified, unless otherwise specified in the statute. When the giving of notice is a condition precedent to creating a legal liability, a plaintiff seeking to enforce the liability must allege the giving of notice in his declaration or complaint. And in general it may be said that the party relying upon notice as a part of his cause of action or defense must plead and prove it. When, however, the condition is in the nature of a condition subsequent, it is not a part of the pleader's cause of action, and need not be pleaded by him. See PLEADING. Consult: Wade, *Treatise on the Law of Notice as Affecting Civil Rights and Remedies* (San Francisco, 1886); Bennett, *Treatise on the Law of Lis Pendens* (Chicago, 1887); and for the rules affecting notice in cases of motions in actions or proceedings at law, notices of protest of negotiable paper, etc., consult the authorities referred to under PROCEDURE; PLEADING; NEGOTIABLE INSTRUMENTS, etc.

NOT'KER. The name of two monks of the Swiss Monastery of Saint Gall. Notker Balbulus (c.840-912) did much for church music by perfecting the 'sequence' (q.v.). More than thirty melodies and about forty arrangements of words are ascribed to Notker, who was canonized in 1513.—Notker Labeo, the 'Thick-Lipped' (c.950-1022), was a great teacher, and it is probably to his school rather than to him individually that we should ascribe the many translations which bear his name. Among these are versions in German of Boëthius's *On the Consolation of Philosophy*, Aristotle's *Categories* and *Hermeneutics*, and the Latin Psalter. These works have great value from the philological point of view as examples of Old High German. They are edited by Piper, *Notkers und seiner Schule Schriften* (1883-84). Consult Kelle, *Die Sankt Galler deutschen Schriften und Notker Labeo* (Munich, 1888).

NOTO, nō'tō. A city in the Province of Syracuse, Sicily, 17 miles southwest of the city of Syracuse, and three miles from the Mediterranean (Map: Italy, K 11). It is a handsome town with rich churches, beautiful palaces, and broad straight streets, and is the see of a bishop. Its academy has a library and a collection of antiquities. A trade is carried on in corn, wine, and oil. Noto was built in 1703 near the site of an older town of the same name (the ancient *Netum*), destroyed by an earthquake in 1693. Population (commune), in 1881, 18,239; in 1901, 22,564.

NO'TOCHORD (from Gk. *νῶτος*, *nōtos*, back + *χορδή*, *chordē*, cord). A cellular, cartilage-like rod, arising in the embryo as an axial thickening of the hypoblast. It forms the basis of the vertebral column, i.e. the segmented axial skeleton of vertebrate animals. It is composed of a peculiar form of cellular tissue, called notochordal tissue, formed of large vacuolated cells extending from side to side of the notochord and having the nuclei confined to its dorsal and ventral regions. Around these tissues is a 'notochordal sheath' of connective tissue, which is produced dorsally into a canal for the nervous system. In all except the lower vertebrates, Amphioxus (q.v.), lampreys, sharks, and certain armored fishes, the notochord is a transitory embryonic structure, replaced later by the permanent vertebral column. Its presence in embryonic or adult structures is the primary characteristic of the phylum Chordata (q.v.); and the traces of it in ascidians, Balanoglossus, etc., led to the inclusion of those worm-like forms in this phylum as Adelochorda and Urochorda. See Plate of Ascidians.

NOTOGÆA, nō'tō-jē'ȧ (Neo-Lat., from Gk. *νότος*, *notos*, south + *γαῖα*, *gaia*, earth). A term in zoögeography used as the name of a great faunal region in two different senses: (1) as embracing the whole Southern Hemisphere except Africa, and opposed to 'Arctogæa' or the Holarctic Region; and (2) as the equivalent of Neotropical Region (q.v.; see also Distribution of Animals). The first use of the term was proposed by Huxley in 1868, to reconcile certain striking resemblances between Australasia and South America—such, for instance, as the presence of marsupials in both, and not elsewhere; he also applied the synonymical name Austro-Columbian Region. The implication of this collocation in the same category of two continents, now so remote from one another, was that in ancient times there was a land-connection between them.

The secondary use of 'Notogæa' for South and Central America and the Antilles has not come into general use; nor has the term 'Dendrogæa,' proposed by Sclater.

NO'TONEC'TA. See Water-Bug.

NOTOR'NIS (Neo-Lat., from Gk. *νότος*, *notos*, south + *ὄρνις*, *ornis*, bird). A genus of large flightless rails or gallinules now nearly extinct. Only one living species is known, *Notornis Mantelli*, of the southern island of New Zealand, which was first described by Owen from remains found with those of various moas. A living specimen, however, was taken in 1849, a second in 1851, a third in 1879, and a fourth, now well preserved at Dunedin, New Zealand, in 1898. A second, purely white species, has become extinct within historic times on Norfolk Island, a single skin in Vienna being its sole remnant. See Extinct Animals; Flightless Birds.

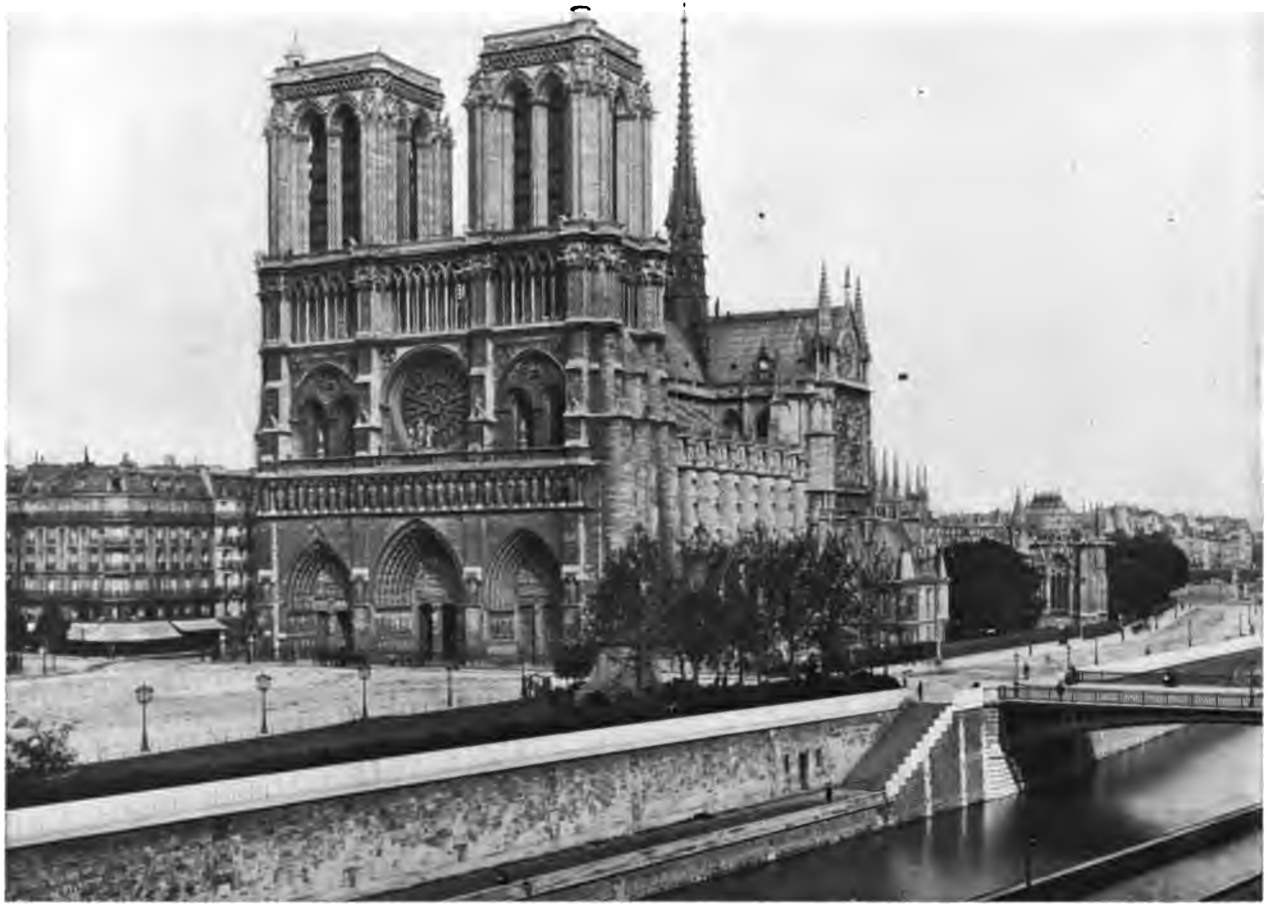
NOTOSUCHUS, nō'tō-sū'kŭs (Neo-Lat., from Gk. *νότος*, *notos*, south + *σοῦχος*, *souchos*, sort of crocodile). A small unarmored crocodile found fossil in Patagonian formations regarded as of Cretaceous age. It had a short, broad skull, blunt nose, mesosuchian palate, and the teeth few, small (except the unusually large canines), and laterally compressed.

NO'TOTHE'RIUM (Neo-Lat., from Gk. *νότος*, *notos*, south + *θηρίον*, *thērion*, diminutive of *θήρ*, *thēr*, wild beast). A fossil marsupial mammal of the suborder Diprotodontidæ, found in the Pleistocene beds of Australia. See Diprotodon; and Mammalia.

NÔTRE, nō'tr', André le. A French architect and landscape gardener. See Le Nôtre, André.

NOTRE DAME (nō'tr' dȧm) **DE PARIS,** Cathedral of. A church in Paris, the most celebrated among the many churches dedicated to the Virgin in France. It is situated on the Ile de la Cité. The remains of a temple of Jupiter Cernaunus and the image of a horned god were found on the spot about 375, when a church was erected on the same site. In the sixth century there were two churches there, dedicated to Saint Stephen and the Virgin. Childebert rebuilt the latter about 520 in a Roman style, considered very grand. The first glass window now known of in France was placed in it. Fragments of mosaic and precious marbles supposed to be from the floor and columns of this church were discovered in excavations in 1847, and are now in the Musée de Cluny. This church was pillaged and partly destroyed by the Normans in 857, but it was repaired by Bishop Anseric. In 1140 the Abbé of Saint Denis put in a glass window of great beauty. It was then called the *église neuve*, to distinguish it from Saint Etienne, called *le vieux*. In the twelfth century both were falling into ruins, though they had for centuries been used for the great religious ceremonies and royal pageants of France.

About 1160 Bishop Maurice de Sully resolved to replace both old churches with a single edifice worthy of the capital of the kingdom, and in 1163 the foundation of the present majestic pile was begun, its corner stone being laid by Pope Alexander III., then a refugee in France. The choir was the first part begun and the work was pushed



CATHEDRAL OF NOTRE-DAME, PARIS

rapidly, so that in 1182 the great altar was consecrated by a legate of the Pope. In 1185 Heraclius, Patriarch of Jerusalem, came to Paris to officiate with the Bishop in the dedication of the choir. Henry II., King of England, was interred before its high altar in August, 1189. The choir, transepts, and adjoining bays of the nave were completed in about 1196. The lower part of the nave was then run out to the main façade, which, with its two towers and three portals, was only begun by Bishop Pierre de Nemours in 1208. The portal of the south transept façade was built still later, as shown by an inscription of the architect Jean de Chelles, who began work upon it in 1257, in the reign of Saint Louis. The chapels in the rear of the transepts were not a part of the original design, and were added in the last part of the thirteenth century, about which time, also, the towers of the west front were completed. In 1699 Louis XIV. was seized with the ambition to place in the cathedral an altar piece in the Renaissance style, and removed the original altar to give place to it. Other alterations were made by Soufflot in 1771-78. During the Revolution the statues of the old kings of France, which were upon the gallery of the main façade, were destroyed, and in 1793 the cathedral became, by law of the Revolutionists, the Temple of Reason. Victor Hugo's literary masterpiece, *Notre Dame de Paris* (1830), attracted popular attention to the venerable edifice, and in 1845-55 it was subjected to a thorough and successful restoration, under the architects Lassus and Viollet-le-Duc. From 1182 to the present its nave, its altars, and its chapels have been the scenes of the most important ceremonies of Church and State in France.

The architecture is the noblest expression of simple early Gothic before its richer flowering in Amiens, Rheims, and Bourges cathedrals, and for simple majesty of expression its façade has no superior in France. The plan of Notre Dame is exceedingly compact; there is no break in the line of radiating chapels in the choir and the transepts do not project beyond the chapels. The inner narthex, of a double bay, is beneath the line of towers; the body of the church consists of a high central nave and four aisles flanked by an outer continuous line of chapels and cut by transepts almost in the centre. The vaulting is superb. The early features of sexpartite vaulting, heavy round pillars, and high triforium gallery characterize the interior. The beginnings of tracery are illustrated by its lack in the earliest parts at the choir end and in its use in simpler forms in the windows and details of nave and façades. The portals, instead of being, as in the more developed cathedrals, projected from the façade, are recessed in its mass, and of their rich sculptures, one tympanum is an interesting survival of the earlier church (c.1140), the rest, barring restorations, dating from between 1215 and 1225. The extreme length of the cathedral is 430 feet; width at transept, 170 feet; across nave and aisles, 124 feet; area covered by it, 64,108 square feet; height of towers, 223 feet; height of vault, 108 feet.

NOTRE DAME DU LAC, dụ lȧk, UNIVERSITY OF. A Roman Catholic institution at Notre Dame, Ind., founded in 1842 and chartered in 1844. The university comprises schools of arts and letters, science, engineering, pharmacy, architecture, and law, and a large preparatory department. In 1902 a branch was established at Portland, Oregon, under the name of Columbia University. There are other branches at Austin, Tex., New Orleans, La., Cincinnati, Ohio, and Watertown, Wis. In 1902 the faculty numbered 70, and the attendance was 872, of whom 348 were preparatory students. The library contained 60,000 volumes. The college property was valued at $2,700,000, of which sum $2,200,000 was represented by the buildings and grounds.

NOTT, ELIPHALET (1773-1866). An American educator. He was born at Ashford, Conn., June 25, 1773. He was left an orphan at an early age, and had to earn his own support while striving for an education. Nevertheless he received the degree of M.A. from Brown University in 1795, and the same year was licensed to preach. He was missionary and school teacher at Cherry Valley, N. Y., in 1796-97, and pastor of the Presbyterian church in Albany (1798-1804). In the latter year he was elected president of Union College at Schenectady, N. Y., and filled the position for more than sixty-two years. He found the college without funds, buildings, or library, and in debt, but he soon provided for its needs, and during his presidency more than 4000 students were graduated. He possessed no small mechanical genius, and among about 30 patents granted to him was one for the first stove to burn anthracite coal. He was considered one of the most finished pulpit orators of his time. Besides sermons, addresses, etc., he published *Counsels to Young Men* (1810) and *Lectures on Temperance* (1847). Consult his *Life* by Van Santvoord, revised by Tayler Lewis (New York, 1876).

NOTT, JOSIAH CLARKE (1804-73). An American physician and ethnologist, born in Columbia, S. C. He graduated at the South Carolina College in 1824, and at the medical school of the University of Pennsylvania three years later. After practicing for a time in Columbia, he went in 1835 to Europe, and spent a year in the hospitals of Paris. On his return he settled at Mobile, where in 1858 he founded a medical school, which became a part of the University of Alabama. He served for a time on the staff of General Bragg during the Civil War. He was much interested in ethnology and kindred sciences, and published, besides many contributions to medical journals and other periodicals: *Two Lectures on the Connection Between the Biblical and Physical History of Man* (1849); *The Physical History of the Jewish Race* (1850); *Types of Mankind* (1854); and *Indigenous Races of the Earth* (1857). The last two books he wrote in conjunction with George R. Gliddon (q.v.), an English scientist, and one of the aims of the authors was to disprove the unity of the human race. Some of Nott's theories have been severely criticised, and they are perhaps more original than profound.

NOTTEBOHM, nŏt'te-bōm, GUSTAV (1817-82). A German musician and writer, born at Lüdenscheid, Westphalia. After he had studied for a year in Berlin with Berger and Dehn, he went to Leipzig (1840), where he became the friend and pupil of Mendelssohn and Schumann. He then studied under Sechter in Vienna (1846), and afterwards taught music himself in that city. He became famous through his editions of musical classics, and his critical reviews of the lives and works of great composers, notably Beethoven. His publications include: *Ein Skizzenbuch von Beethoven* (1865); *Thematisches Verzeichnis der im Druck erschienenen Werke von Beethoven* (1868); *Beethoveniana* (1872-87); *Beethovens Studien* (1873); *Thematisches Verzeichnis der im Druck erschienenen Werke Franz Schuberts* (1874); *Mozartiana* (1880); and *Ein Skizzenbuch von Beethoven aus dem Jahre 1803* (1880).

NOTTINGHAM, nŏt′tĭng-*a*m. An inland county of England, between Lincolnshire on the east and Yorkshire and Derbyshire on the west (Map: England, E 4). Area, 826 square miles. The eastern portion is comparatively level, the western undulating; in the south are the upland moors and pasture lands, and in the west are remains of the royal forest of Sherwood. The soil is fairly productive; the agricultural industries include market gardening and hop-raising. There are important domestic manufactures and some coal-mining. The principal river is the Trent, connected by canals with the Witham. Population, in 1891, 445,823; in 1901, 514,537. Capital, Nottingham.

NOTTINGHAM. A municipal borough and county, the capital of Nottinghamshire, England, on the Leen, at its junction with the Trent, 130 miles north-northwest of London (Map: England, E 4). It is built principally on the slope and at the foot of a rocky eminence crowned by an ancient castle. The market place, 5½ acres in extent, is surrounded by fine buildings. The Exchange, the town and county halls, the house of correction, Saint Mary's Church, the Roman Catholic Chapel, the new free grammar school, erected in 1868, and the University College, with its fine buildings, are edifices worthy of special mention. The free grammar school was founded in 1513. There are numerous hospitals for the poor and infirm, a public park of 150 acres, a common, called Bulwell Forest, of 135 acres, and a fine arboretum of 17 acres. The municipality owns property which returns a revenue of $150,000 yearly, namely, the water, gas, and electric lighting plants, markets, free libraries, baths, cemeteries, parks, garden allotments, tramways, artisans' dwellings, hospitals, lunatic asylums, and a large sewage farm. It is the sole municipality in England that maintains a university college. Connected with the college are well-equipped technical schools, including an agricultural department and a natural history school. It is one of England's leading educational institutions. In 1874 the town acquired Nottingham Castle and installed art galleries and a museum. Nottingham is an important industrial centre, the principal manufactures being bobbinet and lace, and cotton and silk hosiery. Cotton, silk, and flax mills, iron, wire, bicycle, basket, brass, and bleaching works are in operation. Formerly the city was noted for its manufactures of woolens.

As the Snottengaham, 'home of the caves,' of the Saxons, the place first became important in the ninth century. It was one of the five Danish boroughs. Nottingham Castle was built by William the Conqueror, and was the seat of parliaments and other important historical events. Charles I. set up his standard at Nottingham, and the castle was held at times by both Royalists and Parliamentarians. It was dismantled by Cromwell in 1644, rebuilt after the Restoration, and suffered severe damage from fire during the Reform Bill riots of 1831. Nottingham has been a manufacturing town for over 600 years. Its oldest charter, dated 1155, confirmed privileges granted by former kings. Its latest royal charter of 1897 conferred the rank and title of city under the designation of "City of Nottingham, and the County of the same City," in commemoration of Victoria's diamond jubilee. Nottingham is the seat of a suffragan bishopric to Lincoln, and of a United States consulate. It sends three members to Parliament. Population, in 1851, 57,400; in 1891, 213,900; in 1901, 239,750. Consult Bailey, *History of Nottinghamshire* (London, 1853-65).

NOTTINGHAM, Heneage Finch, Earl of (1621-82). An English lawyer and statesman, the son of Sir Heneage Finch, Speaker in Charles I.'s first Parliament. He was educated at Christ Church, and then studied law. He sat in the Convention Parliament, and in 1660 he was appointed Solicitor-General and created a baronet. In religious affairs he was a conservative, insisted on the maintenance of bishops as a part of the Church establishment, and opposed all toleration of dissenters. In 1670 Finch became Attorney-General, and from 1673 to 1676 he was Chamberlain of Chester. Having gradually become the spokesman of the Court in the House of Commons, he was appointed on November 9, 1673, Lord Keeper of the Seals, and the following year was raised to the peerage as Baron Finch of Daventry. The same year he resigned as Lord Keeper of the Seals to become immediately Lord Chancellor, and as such presided over the many important political trials of the day. On May 12, 1681, he was created Earl of Nottingham. He died December 18, 1682. In a time of violent partisanship Finch is remarkable in that in his long career he never was attacked by either the Court or Parliament, and always enjoyed the full confidence of both, though he was chairman of nearly every important committee while he sat in the House of Commons.

NOT'TOWAY. An Iroquoian tribe, formerly living upon the river of the same name in southeastern Virginia. In language and alliances they were closely connected with the Tuscarora of North Carolina. When the English first occupied Virginia, the Nottoway seem to have been one of the strongest tribes in the region, but in the later colonization period they were already hastening to swift decay. In 1701 they occupied a palisaded village on the west bank of the river, where they still numbered about 500 souls in 1722. In 1785 they held a reservation of 27,000 acres, very little of which, however, was under cultivation. In 1825 there were still 47 persons bearing the name, although their blood was probably more negro than Indian.

NO'TUS (from Gk. *νότος*, south). The southwest wind, called by the Romans Auster (q.v.).

NOUMÉA, nōō-mā′ȧ. The capital of New Caledonia, situated near the southern extremity of the island (Map: Australasia, J 5). It is a railroad terminus and has a good harbor. The population, in 1898, was 6968.

NOUN (OF. *noun*, *non*, *nun*, Fr. *nom*, from Lat. *nomen*, name: connected with Gk. *ὄνομα*, *onoma*, Ir. *ainm*, OPruss. *emnes*, OChurch Slav. *imen*, Goth. *namo*, OHG. *namo*, Ger. *Name*, AS.

nama, Eng. *name;* and probably ultimately with Lat. *gnoscere*, *noscere*, Gk. *γιγνώσκειν*, *gignōskein*, Skt. *jñā*, AS. *cnāwan*, Eng. *know*). In grammar, a word denoting a thing. Of the eight so-called parts of speech (see GRAMMAR) the noun is one of the four primitive ones, the other three being the interjection (q.v.), pronoun (q.v.), and verb (q.v.). The noun is sharply distinguished both from the verb and from the pronoun, not only by its function, but by its inflection (q.v.), although the pronoun and noun show frequent similarities, and in certain languages, as in Hottentot and in the Polynesian dialects, the noun and the verb coincide in form. Traces of these points of contact survive in Semitic and Indo-Germanic, especially in the verbal nouns, i.e. the infinitives, which are nouns in form and verbs in force. Moreover, in the Indo-Germanic languages there are many instances in which, on account of the similarity of function of nouns and pronouns, pronominal inflection has been extended by analogy (q.v.) to the nouns and nominal inflection to the pronouns. Nouns are inflected for gender (q.v.), number, and case. Conventionally they are divided into common, proper, abstract, and collective. Common nouns denote material, concrete things, as *table*, *cat;* proper nouns denote particular individuals and personifications, as *John*, *Liberty;* abstract nouns denote qualities, as *goodness*, *pleasure;* and collective nouns denote masses of units, as *army*, *bundle*. This classification is valuable in certain grammatical and logical analyses, but from a philological point of view it is worthless. It should also be noted that in many instances the adverb (q.v.), and by implication the preposition (q.v.) and conjunction (q.v.), were originally a stereotyped case-form of a noun, as in the French adverbial suffix *-ment*, which is derived from the Latin *mente*, ablative of *mens*, mind, as *aimiablement*, 'amiably,' from Latin *amabili mente*, 'with lovable spirit.' Consult: Fr. Müller, *Grundriss der Sprachwissenschaft*, vol. i., part i. (Vienna, 1876); Brugmann, *Vergleichende Grammatik der indogermanischen Sprachen*, vol. ii. (Strassburg, 1889-92); Delbrück, *Vergleichende Syntax der indogermanischen Sprachen*, vol. i. (ib., 1893); Zimmern, *Vergleichende Grammatik der semitischen Sprachen* (Berlin, 1898); Audouin. *Déclinaison dans les langues indo-européennes* (Paris, 1898).

NOUVELLE FRANCE, nōōvĕl′ fräNs (Fr., New France). The early name of Canada.

NOUVELLE HÉLOÏSE, ā'lō'ĕz', LA. See JULIE.

NOVACULITE (from Lat. *novacula*, razor, from *novare*, to renew, from *novus*, new; connected with Gk. *νέος*, *neos*, Skt. *nava*, OChurch Slav. *novŭ*, Ir., *Gael. nuadh*, Goth. *niujis*, OHG. *niwi*, *niuwi*, Ger. *neu*, AS. *nīwe*, *neowe*, Eng. *new*). The name given to a fine-grained rock composed of minute quartz particles—probably a consolidated siliceous ooze. A variety of novaculite called 'Arkansas stone,' from its occurrence in Arkansas, is much used for whetstones.

NOVAIA PRAGA, nȯ'vȧ-yȧ prä'gȧ. A town in the Government of Kherson, South Russia, situated about 200 miles north of Kherson (Map: Russia, D 5). It carries on some trade in timber, and had a population of 12,400 in 1897.

NOVÁKOVIC, nō-vä'kō-vĭch, STOJAN (1842—). A Servian statesman and philologist, born at Shabatz, and educated at the University of Belgrade. In 1871 he was chosen professor of Servian philology in the University of Belgrade. Between 1873 and 1883 he was three times Minister of Education, in which post he reorganized Servian education; and in 1886 resigned from the Ministry of Interior, which he had occupied for two years, and received the appointment of Minister to Turkey, which he held until 1892. From July, 1895, to December, 1896, he was Prime Minister and Minister of Foreign Affairs, and then became once more Minister to Turkey. In 1900 he was transferred to Saint Petersburg. He wrote *Istorija sprske književnosti* (1867) and a Servian grammar (1879).

NOVALIS, nō-vä'lĭs (Lat., fallow land). A name assumed by Friedrich von Hardenberg (1772-1801), a German romantic author, once of cosmopolitan renown. He was born in Prussian Saxony. His parents were Moravians, and he was much influenced by that mystic religion. He studied at Jena, Leipzig, and Wittenberg, and in 1794 went to Tennstädt to further his legal training. There he fell in love with a delicate thirteen-year-old girl, who died as his betrothed in 1797. Novalis was then auditor at the Weissenfels salt works. He thought he was a blighted being, but presently he went to Freiburg to continue technical studies and became again betrothed. He returned to Weissenfels in 1799, but was obliged by disease of the lungs to postpone his marriage and died in 1801. His writings were soon collected by the Schlegels and issued in two volumes, often reëdited, with a third volume in 1846. They are mainly fragmentary. Noteworthy among them is an unfinished romance, *Heinrich von Ofterdingen*, the mawkish Knight of the Blue Flower Poesy, whose 'apotheosis' Novalis tells us he intended the novel to be. Carlyle recommended its 'persual and reperusal.' Individual passages in it are charming, and good lyrics are interspersed in the narrative. Earlier in time than *Ofterdingen* is a romance, *Die Lehrlinge zu Sais*, wherein the 'Disciples' discover that "the secret of Nature is nothing else than the fulfilled longing of a loving heart." Famous also in their way are the *Hymnen an die Nacht*, sentimentally morbid musings on his quickly consoled bereavement, mingled with impressions of Young's *Night Thoughts* and Fichte's lectures at Jena. Some of the fragments are political and reveal an exaltation of patriotic idealism. Other fragments deal with natural science in the same dreamy spirit. His religious lyrics have an emotional tenderness and a nebulous charm. The rest of his work is all but forgotten. Consult: Haym, *Friedrich von Hardenberg* (2d ed., Gotha, 1883); id., *Die romantische Schule* (Berlin, 1870).

NOVARA, nō-vä'rȧ. The capital of the Province of Novara, Italy, and a railway centre, 30 miles west of Milan (Map: Italy, C 2). It commands fine Alpine views from the boulevards on the site of its dismantled fortifications, and has several notable churches, chief of which are the Romanesque cathedral, dating from the fourteenth century, and rebuilt between 1860 and 1870, with its fine frescoes and sculptures and grand high altar, and the Church of San Gaudenzio, surmounted by a high dome. The city has a lyceum, museum, and bishop's seminary, with a library of 30,000 volumes. The principal industries are the spinning of silk, cotton, and linen cloths, weaving, and dyeing. The town is the centre of a fertile district, producing grapes, rice, and corn. Population (commune), in 1881, 33,077; in 1901, 45,248. Novara is the ancient Novaria. The town passed successively into the possession of Milan, Spain, Austria, and Sardinia. It was the scene of a battle March 23, 1849, between the Sardinians and the Austrians, which resulted in the complete defeat of the Sardinians, and led to the abdication of Charles Albert in favor of his son, Victor Emmanuel.

NOVA SCOTIA, nō′vȧ skō′shȧ. A province of the Dominion of Canada, bounded on the northwest by New Brunswick and the Bay of Fundy, on the north by the Strait of Northumberland (separating it from Prince Edward Island) and the Gulf of Saint Lawrence, and on the other sides by the Atlantic Ocean. It consists of two portions, Nova Scotia proper (a large peninsula connected with New Brunswick by an isthmus about 15 miles in width) and the island of Cape Breton (q.v.). The peninsula, about 280 miles in length, and from 50 to 100 miles broad, extends in a northeast and southwest direction. Cape Breton lies northeast of Nova Scotia proper, and is separated from it by a narrow strait called the Gut of Canso, 16 miles long and from half a mile to two miles wide. Sable Island (q.v.) is a dependency of the province. The area of the province is 20,600 square miles.

TOPOGRAPHY. The surface of Nova Scotia is undulating, and traversed by broken ranges of hills, whose direction is in general that of the long axis of the province. The direction of these uplifts, together with their rock-formation, identifies the region as a part of the Appalachian system. The highlands of the province may roughly be grouped into three sections: first, those running along the Atlantic coast, constituting the backbone of the peninsula, and forming a wide plateau narrowing to the northeast, where they represent the projection of Cape Canso; second, the Cobequid Hills, which form the isthmian projection into the Bay of Fundy, and run thence southeast, until, in the eastern end of the peninsula, they meet the first named range; third, a very narrow and detached range of trap rock on the coast of the Bay of Fundy, separated from the main plateau by Saint Mary's Bay and the valley of the Annapolis River.

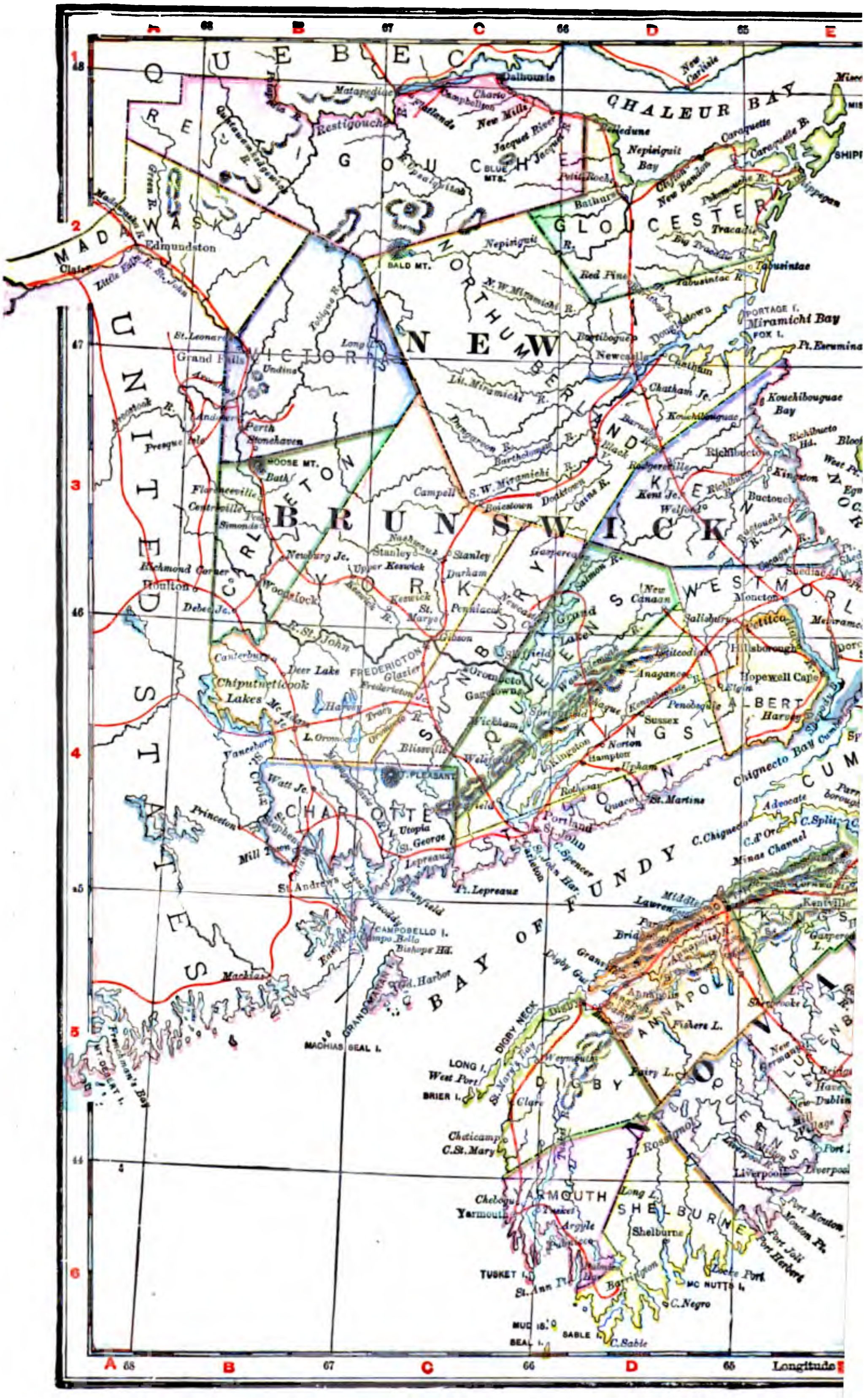
The great plateau of the peninsula seems to have been originally a vast upheaval of Devonian age, probably as high as 10,000 feet. This has been denuded by the action of wind and water to its present condition of a peneplain not more than 600 to 1000 feet high. Some residual hills of hard rock have been left, and in many places the igneous granite core of the former mountain has been laid bare. The remaining rocks covering the core on either side belong chiefly to the Cambrian system, especially along the eastern coast. There are some outcroppings of the Algonkian group, and along the northern and western edge of the plateau there are remnants of highly fossiliferous Devonian and Upper Silurian strata. The triassic lowlands to the north and west of the plateau around the Basin of Minas were probably formed by submarine denudation. They are underlaid by very thick strata of Carboniferous rock. The Cobequid plateau, which rises from the midst of these lowlands, has lately been shown to be of late Devonian origin.

The greater portion of the province drains to the southward, through numerous short rivers. Small lakes are also numerous, Lake Rossignol in the south being the largest on the peninsula. The large body of water in Cape Breton Island, called Bras d'Or Lake, is more properly an inland sea.

CLIMATE. The insular position of Nova Scotia renders its climate different from that of the other Canadian provinces. For instance, it is not subject to great extremes of heat and cold, but has, on the other hand, a larger amount of cloudy and foggy weather. The presence of the gulf current off the south coast lessens the severity of the winters, and the interior portions of the province are greatly protected by the ranges of hills which border the coasts. The northern hills are especially useful in warding off the north winds, and the range which borders the Bay of Fundy protects the Annapolis Valley from the winds and fogs, which are common to the bay region. The temperature seldom falls below zero, and the summer maximum in the region of Halifax (latitude 44° 38′ N.) is about 86°, being somewhat higher than this in the interior. The annual precipitation averages about 45 inches.

MINERALS. The province is rich in mineral resources, and mining is a growing industry. The Carboniferous rocks of Northern Nova Scotia and Cape Breton Island contain coal seams of great thickness, the coal being a superior quality of the bituminous variety, and well adapted for coking. From 1890 to 1898 the annual production fluctuated between two and three million tons, but exceeded the latter figure in 1899 and 1900. This exceeds the combined production for all the rest of Canada, and constitutes the main source of supply for the Maritime Provinces. Gold is found in the quartzites and slates of the Cambrian Age that parallel the Atlantic coast of the peninsula. The vein ores (they have been worked since 1860) were formerly very rich, but have now become nearly exhausted. However, conditions favor a minimum cost of mining and milling the coarser gold ores, and they are being rapidly exploited. Prior to 1897 the product had fluctuated under $500,000 in annual value, but rose to over $600,000 in 1899 and 1900. Rich deposits of iron ore are found. Only small quantities of iron ore are now being mined, but the possibilities are great. Small quantities of gypsum and manganese are mined in Cape Breton Island, and antimony is exported from the region north of Halifax.

FISHERIES. Fishing is one of the leading industries. The province surpasses all other provinces and States of the continent in the annual value of its fish output. For a long period the value of this output has run from $6,000,000 to $8,000,000. The catch includes deep sea, inshore, and river varieties. The first two, however, are most important. Sea-fishing is encouraged by a bounty offered since 1882 by the Dominion Government. About two-thirds of it—$100,000—has gone annually to the 18,000 Nova Scotia fishermen. The cod and lobster fisheries surpass in



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Shediac
Moncton
Salisbury
Hillsborough
Hopewell Cape
Harvey
Edmundston
Clair
Grand Falls
St. Leonards
Andover
Perth
Stonehaven
Presque Isle
Houlton
Debec Jc.
Richmond Corner
Florenceville
Centreville
Woodstock
Newburg Jc.
Stanley
Upper Keswick
Boiestown
Doaktown
Campbell
Durham
Gibson
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Canterbury
Chiputneticook Lakes
McAdam Jc.
Deer Lake
Harvey
Tracy
Vanceboro
Watt Jc.
Princeton
St. Stephen
Mill Town
St. Andrews
St. George
Utopia
Lepreaux
Pt. Lepreaux
Musquash
St. John
Carleton
Portland
Rothesay
Hampton
Norton
Sussex
Quaco
St. Martins
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Welsford
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Mt. Desert I.
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Brier I.
West Port
Digby
Digby Neck
St. Mary's Bay
Weymouth
Annapolis
Bridgetown
Kentville
Middleton
Lawrencetown
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Liverpool
Port Mouton
Port Joli
Port Herbert
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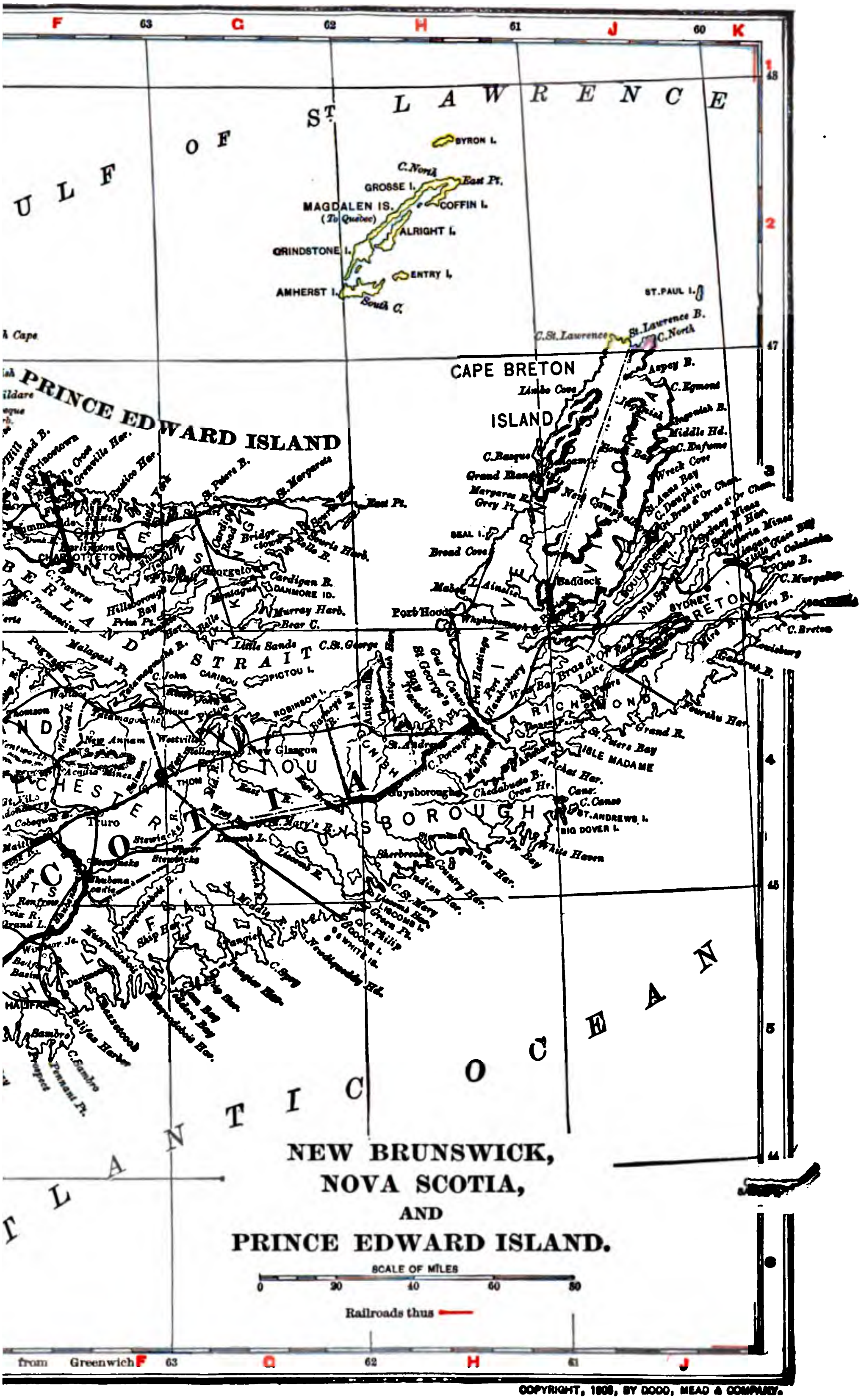

NEW BRUNSWICK,
NOVA SCOTIA,
AND
PRINCE EDWARD ISLAND.

SCALE OF MILES
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Railroads thus ——

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importance, the annual product being about $2,500,000 and $1,500,000 respectively.

AGRICULTURE AND GAME. The valley lands of Nova Scotia are exceedingly fertile. Even the reckless method of cultivation often indulged in has failed to exhaust this fertility. The hill lands are more rocky and less fruitful. The flora is much the same as is found in other sections of Canada south of the Saint Lawrence. As a result of its somewhat insular climate, however, a few species are found which are unknown in other parts of the continent. Forests originally covered the greater portion of the province, the varieties of trees being well divided between the hard and soft woods, the former being more common in the protected valleys. At many points the original forests have been removed, resulting in a noteworthy climatic change—noteworthy because different from that which usually follows forest removals—namely, the moist coast air gains a more easy access to the interior, increasing the degree of moisture of both atmosphere and soil. Tamarack, spruce, balsam, and other soft woods have taken the place of the beech, maple, elm, walnut, and other hard woods, where these have been removed. Furthermore extra drainage is required and the agricultural industry has been materially modified.

The per acre yield of almost every crop raised is scarcely exceeded in any part of the continent. The cultivation of the soil, however, is confined to the valleys and has not more than held its own for a long time. Oats and potatoes are the most favored crops; hay, barley, wheat, buckwheat, and rye are next in importance. The root crops—especially turnips—receive much attention. The greatest agricultural activity centres in the protected Annapolis and Cornwallis valleys, which have become renowned for their production of fine fruits. Fruit-raising is receiving increased attention, and apples constitute one of the principal articles of export, their reputation having been won both by virtue of their flavor and their keeping qualities. The broken land is well adapted to grazing and the usual varieties of domestic animals are bred. Cattle, however, are the only species which has received much attention. Cattle were formerly raised chiefly for the butcher, but more recently for dairy purposes. The butter and cheese products are becoming important sources of revenue, and dairy farming will apparently control the industrial activity of the future.

In many districts birds and wild animals—bears, foxes, wolves, deer, and smaller varieties—are in sufficient numbers to afford excellent hunting.

MANUFACTURES AND TRANSPORTATION. The maritime situation of Nova Scotia is most favorable for purposes of trade with European and Atlantic seaboard States. The coast line (about 1000 miles long) has an unusual number of indentations, which offer exceptional harbor facilities. The harbors on the Atlantic and the Bay of Fundy coasts are accessible the year round. Halifax (q.v.), on the Atlantic coast, is the harbor most frequented. The registered vessels built by the province number 155 steamers and 1966 sail boats. The tonnage for both the oversea and coastwise vessels which enter and leave the harbors is rapidly increasing, amounting in 1900 to a total of 3,700,000 and 6,000,000 respectively. The Intercolonial Railroad, with terminals in Halifax on the east and in Sydney on the north coast, connects Nova Scotia with the other Canadian provinces. Other lines traverse the southern part of the peninsula, making a total of 943 miles for the province in 1901. As in the other provinces, Government subsidies have greatly aided in railroad construction. The largest items of export are fish, coal, lumber, and minerals, while the imports consist largely of West India produce and British and American manufactured products.

No industry of the province has so bright a prospect as manufacturing. Aside from shipbuilding, which has greatly declined, manufacturing has never been important. Nova Scotia has the exceptional advantage at home of the iron ore, coal, and limestone (used as flux), and therefore seems destined to be a seat of iron and steel manufacturing industries. Coke is being manufactured, and at Sydney in Cape Breton the iron and steel industry is being developed on an extensive scale. The forests afford a large supply of tanning barks. This has given rise to the tanning industry. Another natural advantage to manufacturing is the great water power afforded by the streams of the province. There are a number of cotton mills. Sugar is manufactured at Halifax. Extensive fruit-raising explains the number of canning factories. Butter and cheese factories are increasing in number.

BANKS. In 1899 the chartered bank branches numbered 69. The clearing-house transactions in Halifax in 1900 amounted to $77,600,000. The post-office savings banks numbered 56 (1900), with 13,125 depositors and an average deposit of $261.44. There were also (1900) 15 Government savings banks, having 15,479 depositors, with an average deposit of $306.64.

GOVERNMENT. Nova Scotia was incorporated with the Dominion of Canada in 1867, and is represented in the Canadian Parliament by 10 Senators and 20 members of the Lower House. It has also its own local Legislature and a Lieutenant-Governor. This official is appointed by the Governor-General of the Dominion and his Council. The Legislature consists of a Council and a House of Assembly elected by the counties—which are 18 in number—and by the cities, the municipal units of government being counties and towns. The people elect a county council—each polling district having one representative—which in turn appoints the other county officers. It is necessary to secure the sanction of the people in order to borrow money, and the Lieutenant-Governor of the province has a right of veto upon the money-borrowing powers, as well as the by-laws passed by the Council. The capital of the province is Halifax.

The principal sources of revenue for the Provincial Government consist of the Dominion subsidy of about $432,000 annually and the mine royalties. These royalties are becoming almost as great as the Dominion subsidies. The total receipts for 1900 exceeded $1,000,000, and the expenditures were $937,000. The same year the net debt of the province amounted to $2,713,000.

In 1900 the charitable institutions cost the province $128,000. These consist of a deaf and dumb institution, a blind institution, a general hospital, and 24 poor-houses. Persons sentenced for crime are sent to the Dominion penitentiary, maintained for the Maritime Provinces at Dorchester, N. B.

Population. The returns of the population for 1891 and 1901 were respectively 450,396 and 459,574. Nearly all of the inhabitants are of British origin, the Scotch being in the majority. There is not so much unoccupied territory as in the other provinces (excepting Prince Edward Island), and the density of population—22 per square mile—is accordingly greater. Halifax, the seventh largest city of the Dominion, had a population in 1901 of 40,700. Sydney, in Cape Breton Island, had a population of 9900, a gain of 75 per cent. during the decade.

Religion and Education. While the Catholic Church is numerically the strongest, it contains but a little over one-third of the church following in the province. The Presbyterians, Baptists, Episcopalians, and Methodists follow in the order named. The great interest in education is shown by the fact that 1 out of every 4.4 of the population attends school. The schools are free and undenominational; there are no separate Catholic or Protestant schools maintained by the public system, as in Ontario and Quebec. The members of the Executive Council constitute the Council of Public Instruction, which, together with the Superintendent of Education, is at the head of the school system. The schools are carefully superintended, and gradation and uniformity of methods are generally maintained. There is one academy in each county. The province maintains a normal school, but no university. The total cost of the school system in 1901 was $8.58 per enrolled child. About two-fifths of this is borne by Government grants and municipal aid, the rest by local taxation. The following are the denominational colleges: Acadia University, at Wolfville (Baptist); King's College (Episcopalian), at Windsor, the oldest chartered university in Canada; Saint François Xavier College, and Saint Anne's College (Catholic); and Dalhousie University, at Halifax—the last being undenominational, but receiving the support of the Presbyterian Church.

History. Nova Scotia is believed to have been first discovered in 1497 by John Cabot, who sailed under the English flag. It is probable that the Portuguese navigator Cortereal explored the coast in 1500. The first settlers, however, were the French, who took possession of the country in virtue of the explorations of Verrazano, Cartier, the Marquis de la Roche, and Champlain. French fishermen frequented this locality, and in 1598 Henry IV. of France granted Acadia, as the country was called, to De la Roche. In 1604 the first settlement was made by the Sieur de Monts, Samuel de Champlain, and the Baron de Poutrincourt on the island of Saint Croix. This was removed in the following year to Port Royal (Annapolis). Throughout the French tenure the colonists of New England made attempts to obtain possession of the country, and in 1621 Sir William Alexander (q.v.) obtained from James I. of England a grant of Acadia, which was now named Nova Scotia. In 1710 the English captured Port Royal, and in 1713, by the Treaty of Utrecht, France gave up its claim to the country, except to Cape Breton or Isle Royale, which was ceded in 1763. In order to destroy the French influence, which continued to predominate, the English Government in 1755 deported a large number of the French Acadians, estimated at more than 6000 (probably about half of the total population of French descent), and scattered them among English colonists from Massachusetts to Georgia. This act forms the theme of Longfellow's *Evangeline*. A blow was also struck at the French influence by the founding in 1749 of Halifax, which became a distinctly English centre. The development of the country was greatly aided by the arrival of Scotch settlers and by the large number of loyalists who left the United States at the time of the Revolution. Until 1758 the control of the colony was almost completely in the hands of the Governor appointed by the King, but in that year the first Legislature was created. The country increased in population to such an extent that in 1784 the Province of New Brunswick was formed from a part of its territory. The history of Nova Scotia since 1784 forms a part of the general history of Canada (q.v.).

Consult: Haliburton, *Papers on the History and Resources of Nova Scotia* (Halifax, 1862); Dawson, *Handbook of the Geography and Natural History of Nova Scotia* (6th ed., Pictou, 1863); Selwyn and Dawson, *Descriptive Sketch of the Physical Geography and Geology of the Dominion of Canada* (Montreal, 1884); *Nova Scotian Institute of Science Proceedings and Transactions* (Halifax, 1870 et seq.); Morley, *Record of Travel in Nova Scotia* (New York, 1900); and the authorities referred to under Canada.

NOVATI, nô-vä'tê, Francesco (1859—). An Italian philologist, born in Cremona. He was made professor at the Academy of Milan in 1883, and went thence to Palermo (1886), to Genoa (1889), and to Milan (1892). By the establishment of the *Giornale storico della letteratura italiana* (1883, with Graf and Renier), and by constant contributions to the *Giornale storico* and the *Studj di filologia romanza*, he did much to spread the knowledge of his special branch of study throughout his own country and Europe. He devoted his attention especially to the Renaissance. A number of his critical essays are collected in the volume *Studj critici e letterari* (1889). He also published the *Correspondence* of Coluccio Salutati (1891-96).

NOVATIAN. A Roman presbyter of the third century, noted chiefly for the schism to which he gave his name. According to a late account, he was born in Phrygia, but it is more probable that he was a native of the West. He was converted in mature life, during an illness, and received only 'clinical' baptism (an incomplete form of the rite, sometimes administered to the sick), which was afterwards charged against him as a canonical defect, yet did not hinder his ordination to the priesthood. During the vacancy in the Roman See caused by the Decian persecution (250-251), when the presbyters directed the affairs of the Church, Novatian quickly assumed the leadership among them. It was he who wrote two of the letters addressed by the Roman clergy to Cyprian. In the discussion about the lapsed (i.e. apostates in the persecution), Novatian insisted upon excluding them from fellowship, in opposition to the milder discipline advocated by the newly elected Bishop, Cornelius. Many of the clergy sympathizing with Novatian, he was put forward as rival bishop, whereupon he was pronounced schismatic by a Roman synod, and excommunicated (251). This action, however, failed to check the movement he had inaugurated. The Novatianists, or

Cathari, as they were called (i.e. *the pure*), displayed increasing strength, and churches of their order sprang up all the way from Spain to Asia Minor. In Africa they were especially strong. They flourished for a long time, and traces of them are found as late as the seventh century. Of Novatian's end little is known. A late account (by Socrates, fifth century) says that he died a martyr in the reign of Valerian (254-c.260).

The difference between Novatianists and Catholics related to the theory of the Church. Both parties agreed that the Church was 'holy,' as asserted in the creed, but the Novatianists interpreted this to mean a holy membership, to be maintained by strict discipline, while the Catholics believed the Church was holy because of its sacraments, especially penance, by which holiness, if lost through sin, might be restored. The issue was similar to that raised by Montanus and Hippolytus (qq.v.), and it appeared again in the fourth century in the Donatist controversy. (See DONATISTS.) The Novatianists pushed their theory to its limit by insisting that even Catholics entering their communion should first be rebaptized.

Novatian's most important surviving work is *On the Trinity*. The tract entitled *Jewish Meats* relates to ceremonial questions. Some of the treatises formerly attributed to Cyprian are probably the work of Novatian, e.g. *Concerning Shows*, the *Value of Modesty*, and the *Praise of Martyrdom*. The anonymous treatise *Against Novatian* is held by Harnack to be from the Roman Bishop Sixtus II. (257-58). Consult: Migne, *Patrol. Lat.*, vol. iii.; *The Ante-Nicene Fathers*, ed. by Roberts and Donaldson, vol. v. (New York, 1896); Harnack, *Geschichte der altchristlichen Litteratur* (Leipzig, 1893); id., *History of Dogma*, vol. ii. (London, 1896); Benson, *Cyprian* (ib., 1897).

NOVATION (Lat. *novatio*, renewal, from *novare*, to renew). In law, the substitution of one legal obligation for another. Novation may be accomplished by the substitution of a new for an old party to a legal obligation, which is in effect the creation of a new obligation, or it may be accomplished by the substitution of a new obligation for an old one by the same parties. When the old obligation is extinguished by a new one without change of parties, the transaction is sometimes spoken of as a merger of the old obligation into the new. See MERGER.

At common law, as under the civil law, there are three important classes of novation, as follows: (1) Novation by substitution of debtors. By mutual agreement a substituted debtor may assume payment of a debtor's obligation upon agreement of the creditor or obligee to accept him as a debtor, and to discharge the original debtor or obligor.

(2) Novation by substitution of creditors. By mutual agreement of all the parties a creditor may agree to discharge his debtor upon the debtor's agreement to accept a third party as a new creditor and to pay the debt to him.

(3) A new debt or obligation may be substituted for the old by mutual agreement between the same debtor and creditor.

The first class is of the most frequent occurrence at common law, but as all novations are dependent upon the substitution of a new obligation for an old by mutual agreement between an obligor and obligee, or between an obligor and obligee and a third party, it is evident that there may be as many particular forms of novation as there may be combinations by agreement among the parties specified.

As the essential element of novation is the agreement or contract between the parties, it is necessary that the essential elements of a contract, including meeting of the minds, promise, and consideration, should all exist in order to establish the relationship. In general the promise of the obligee to release the first obligor is sufficient consideration for the promise of the new obligor, and vice versa, and as the promise of each party to the novation is given in exchange for the promise of each of the others, it is necessary that the several promises should be contemporaneous. In order that the promise to give up rights under the earlier obligation may be a sufficient consideration for the new obligation, it is essential that the earlier obligation should be valid. There can be no novation of a void obligation. See CONSIDERATION.

As the result of a novation is the extinction of the earlier obligation, it follows that all liens attaching to it are extinguished unless expressly preserved or continued by the new obligation.

Properly any new obligation which is created by the parties to an old obligation and operates merely to suspend the old obligation for a certain period, instead of extinguishing it, is not a novation, but a merger.

New collateral agreements entered into as security for a preëxisting obligation do not effect a novation, as the original obligation continues in full force and effect.

Upon analogous classes of contracts, see MERGER; ACCORD AND SATISFACTION; SECURITY. See also ASSIGNMENT.

In the case of novation by the substitution of debtors, the substance of the transaction is that the new debtor pays the obligation of the old debtor, and is thus within the express language of the Statute of Frauds. As, however, the purpose of the Statute of Frauds was to require contracts which were in effect contracts of suretyship, or contracts in the nature of suretyship, to be in writing, the courts have uniformly held that contracts of novation are not within the statute and need not be committed to writing. See FRAUDS, STATUTE OF. Consult the authorities referred to under CONTRACT.

NO'VA ZEM'BLA (Russian *Novaya Zemlya*). The name of a group of two large and numerous small islands in the Arctic Ocean, forming a crescent-shaped chain extending from 70° 30′ to 77° north latitude, and separating Kara from Barents Sea (Map: Asia, E 1). It is separated by Kara Strait, 30 miles wide, from Vaigatch Island at the northeastern extremity of European Russia, and forms a part of the Russian Government of Archangel. The length of the two large islands, including the narrow strait between them, is about 740 miles; their average width is 60 miles, and their combined area about 34,500 square miles. The coasts are indented by numerous deep and narrow fiords, and the islands are rocky and mountainous, rising to a height of 3600 feet. The climate is cold throughout the year, and vegetation is dwarfed. Animals, however, are numerous, and include bears, wolves and foxes, reindeer, ermines, and other fur-bearing animals, and large numbers of aquatic birds, while whales and seals are found in the surrounding seas. The islands are practically uninhabited, but are visited in summer by fishermen and hunters.

NOVEL (OF. *novelle, nouvelle*, Fr. *nouvelle*, from Lat. *novella*, fem. of *novellus*, new, diminutive of *novus*, new), THE. To designate modern prose fictions there are current two terms: *romance* and *novel*. The term romance (from the Latin adverb *romanice*), originally employed in Italy, Spain, and France (in other words, in the Romanic lands) to distinguish the common speech, i.e. the *lingua romana*, from the Latin of the learned, came in time to denote a composition in the vernacular—and finally any verse-tale of intrigue and adventure. The word 'romance' was established in English usage by the time of Chaucer. At first the word 'novel' was probably the name given to some new story. In the twelfth and thirteenth centuries it was common among the Provençal poets for a verse-tale of intrigue realistic in treatment. It was popularized in Italy by Boccaccio as the title of a short narrative in prose. When these Italian tales came into English, the word came with them. It first occurs (so far as has been discovered) in Painter's *Palace of Pleasure* (1566). In the hands of several English writers the Italian *novella* was by degrees expanded, until by the eighteenth century it filled a duodecimo volume. Then came Richardson and Fielding with their larger delineations of contemporary life, which with some hesitancy they and their public called novels. Somewhat after this fashion the word novel became in English the generic term for prose fiction. Up to March, 1766, the *Monthly Review* placed works of fiction under the head of "Miscellaneous Publications." In that month it made the subdivision "Novels." From the Renaissance down to the eighteenth century the word 'romance' was not much used in English. Then it began to appear as the explanatory title of the wild Gothic stories of Ann Radcliffe and her school. Since that time it has denoted a novel which represents men and women in strange, improbable, or impossible situations. Owing to very different literary conditions on the Continent, romance (French and German, *roman;* Italian, *romanzo*) is there the generic term, and novel still means a short tale. As its name by chance signifies, the novel as an easily recognizable literary species is a new thing. It hardly has a date before Defoe. And yet, in its genesis, the novel is as old as either the epic or the drama. Common to all peoples is the beast-tale, in which animals are made to speak and conduct themselves as men and women. Popular stories of this kind were taken up by scholars of a later period, trimmed, moralized, and preserved in writing. Fairy tales and anecdotes of every-day life undergo a similar process until transformed into the verse or the prose story possessing an art of its own. In Egypt story-telling belongs to the oldest times. Indeed, Egypt was the source of many a tale that long afterwards charmed Europe. (See EGYPT, section *Literature and Science.*) The Sanskrit collection of tales known as the *Panchatantra* or *The Fables of Bidpai* (composed about 300 A.D.), and the fables attributed to Æsop, likewise Eastern in origin, found their way into Western Europe, and, blending with native incidents, became the basis of many a mediæval fiction in verse and prose. Very interesting is the Oriental device for stringing together a long series of tales, as in the *Seven Wise Masters*, widely diffused in the Middle Ages, and the better known *Arabian Nights*. This manner was adopted by Boccaccio in the *Decameron* and by Chaucer in the *Canterbury Tales*.

In India the novel, in the technical sense of the word, began probably with the *Adventures of the Ten Princes* (*Daśakumāracarita*) by Dandin (q.v.) in the latter part of the sixth century A.D. This is a romance of roguery. The three remaining novels are in a totally different vein. They are the *Vāsavadattā* of Subandhu (q.v.), and two romances by Bana (q.v.), the *Kādambarī* and the *Adventures of Harsha* (*Harshacarita*), an historical novel. Bana's works were influenced and in great part modeled on Subandhu. These three novels all belong probably to the seventh century A.D. In plot they show little action, but they abound in detailed description. The impression of both style and content, although monotonous to Occidentals, is sweet and smooth. The Pahlavi or Middle Persian literature has an interesting romance on the early Sassanian hero Ardashir Papakan. See SASSANIDÆ.

In China the novel did not develop until the Mongol dynasty (c.1260-1368). The Chinese classify their novels under four heads: usurpation and plot; intrigue and love; superstition; and roguery. These romances abound in action, but characterization is less developed. As examples of Chinese fiction, which is of vast extent, there may be mentioned the *San kuo chih yen i* of Lo Kuan-chung, which is historical; the *Shui Hu Chuan* of Shih Nai-an (?), a picaresque novel; and the *Hsi yu Chi*, which is based on the travels of Hiouen-Thsang (q.v.) in India. The Ming dynasty, which followed the Mongol, produced many romances, most of which are by unknown authors.

Fiction developed in Japan earlier than in China. The first novel of importance is the *Genji Monogatari*, a long romance of love, containing much valuable information regarding society about A.D. 1000. Before this there had been a number of *Monogatari*, or narratives, many of them novelistic in character, such as the *Taketori, Ise, Utsubo*, and *Yamato*. In the seventeenth century Japanese fiction revived after a long period of decline, and though pornographic in the writings of Saikaku, was purified in the romantic novels of Kioden, Bakin, and Tanehiko. The masterpiece of Kioden is the *Inadzuma Hioshi*, a romance of roguery. Greatest of all was Bakin, who achieved his best in his *Yumibaritsuki*, published in 1805, although his work is disfigured by extravagancies and impossibilities—a statement which holds good of another work of his, perhaps the most famous of all Japanese novels, the *Hakkenden*, which recounts the adventures of eight heroes of semi-canine birth, who typify the eight cardinal virtues.

The ancient Greeks had their popular tales, about which little is known. After the glory of their art had departed, there arose in the first centuries of the Christian Era a class of rhetoricians who composed long romances in prose. They belonged not to Greece proper, but to Alexandria and the cities of Asia Minor. The basis of their romances is an erotic tale. According to the usual plot, boy and girl lovers are separated, and after countless perils on land and sea among pirates and thieves, they are finally united. There is no attempt at likeness to truth; all is governed by chance. Such are the loves of Theagenes and Chariclea, in the *Æthiopica* (fifth century ?), written by a certain Heliodorus. The *Æthiopica* is one of a group of romances to which belongs *The Marvellous Things Beyond Thule*, by Antonius Diogenes (second century), containing an account of a voyage to the North Pole, travels in the sun and moon, and of a descent into Hades; the *Babylonica*, by Jamblichus the Syrian (second century); the *Ephesiaca*, containing the germ of the story of Romeo and Juliet, by Xenophon of Ephesus (third century ?); *Apollonius of Tyre* (existing in a Latin version of the fifth century), the original of Shakespeare's *Pericles;* and *Clitophon and Leucippe*, by Achilles Tatius of Alexandria (fifth century), abounding in marvels and horrors duly explained, as in the romances of Ann Radcliffe. Standing by itself is the pastoral *Daphnis and Chloe* of unknown authorship, sweet, decadent, and sensuous. The extravagances of Eastern Greek romance, which must have been similar to those of Antonius Diogenes, were satirized by Lucian (born c.120 A.D.) in his *True History*. Lucian takes his hero into the belly of a whale, on to the morning star, and to the Elysian Fields. A more pronounced realistic aim is found in the *Golden Ass* of the African Apuleius (q.v.), written in Latin. Imbedded in its sensuality is the beautiful fairy tale of *Cupid and Psyche*. Ancient realistic fiction threw off all restraint in the *Satiricon* of Petronius Arbiter, which describes the debauchery of Roman society under the first emperors. To sum up, antiquity gave to the new nations of Western Europe a moralized prose tale, a romance constructed on the lines of the epic, an artificial pastoral, the burlesque, and the sketch of contemporary manners.

Through Arabic literature, as well as through other channels still obscure, Christian Europe became acquainted with Oriental fiction. The first finished Arabic stories were based on Persian models. Even during Mohammed's life-time, Nadr ibn Harith recounted at Mecca tales told by Persian merchants, and under the early Abbassides the poet al-Lahiqi rendered into Arabic verse the Iranian tradition of Ardeshir and Anosharvan. To the same period belong the lost translation of Bidpai by Rozbih (also called Ibn ab Mugaffa), an ancient version by al-Kisravi of the Sindbad story, which version has not been preserved, and ibn Babuya's rendering of the Buddhist legend of Barlaam and Josaphat (q.v.), which has come down to us. The native Arabic short story was not, however, altogether neglected, although the books of al-Jahiz (died 869), Abu Bekr ibn abi 'd-Dunya (died 894), and Muhsin al-Tanukhi (died 997) are of little importance for the history of the novel. The novelettes in Arabic were more remarkable for quantity than for quality, and the erotic poems and stories of al-Sarraj (died 1106) summed up this class of literature during the Ommiad and early Abbasside periods. Arabic fiction culminated in the thirteenth century in the collection of *The Thousand Nights and One Night*, usually called the *Arabian Nights* (q.v.), and in the romance of *Antar* (q.v.).

THE MIDDLE AGES IN EUROPE. Among the new peoples after the fall of Rome, just as among the Greeks, the epic flourished long before romance. But by the end of the twelfth century the epic impulse which had created *Beowulf* and the *Chanson de Roland* had spent its force, and the age of romance had begun. Around characters and events, historical in truth or believed to be historical, the trouvères were weaving strange and marvelous incidents. Inexhaustible themes they found in Charlemagne, Arthur, Alexander, and the siege of Troy. Out of 'the Celtic matter' especially, they created permanent character types—Arthur, Lancelot, Percival, Guinevere, and Iseult. These verse tales began to yield in the thirteenth century to the romances of adventure, which frequently laid no claim to historical truth. The choicest extant specimen of them is the 'chantfable' *Aucassin et Nicolette*, in prose and assonanced verse, meant to be sung. By the side of romance were cultivated the *fabliaux* (q.v.), which depicted the intrigues and the humorous side of life. The leading types of mediæval fiction received their highest finish from the hand of Chaucer. The *Canterbury Tales* and *Troylus and Cryseyde* mark important steps from romance to the novel. There were already signs of the age of prose, soon to demand a printing press. The Arthurian romances were turned into prose in the thirteenth century. The *Gesta Romanorum*, a Latin collection of stories, first got into print in 1472, but these stories are doubtless of a much earlier origin. By 1353 Boccaccio had published the *Decameron*. About two centuries later the *Decameron* furnished the plan of the *Heptameron* of Margaret of Navarre. Through the Greeks in Southern Italy and the Crusaders, Greek fiction reached Western Europe in the twelfth century and earlier. The boy and girl separated by pirates or some chance, and brought together in a pretty recognition scene, became a common type in the romances of adventure. Eastern tales, coming likewise through Italy and also through the Moors in Spain, were mingled with native incident in the *Gesta Romanorum*, the French *fabliaux*, and the Italian *novelle*, and from these sources they spread still more widely.

MODERN TIMES, FROM CAXTON TO RICHARDSON IN ENGLAND. The invention of printing (fifteenth century) meant the end of the verse tale except as a survival. Of course, the transition from verse to prose was not sudden. A prose style suitable to orderly narrative had to be created, and the audience of the minstrel had to be taught to read. Both processes were slow. The first schoolmasters and the founders of English prose were Caxton and the learned printers who followed him. The first book printed in the English language was a collection of stories in which the divinities of ancient Greece are transformed into the lords and ladies of feudal society. It is known as the *Recuyell of the Histories of Troy*, and was printed by Caxton, probably in 1474, at the press of Mansion in Bruges. After Caxton had set up his own press in Westminster, he issued many romances, which were commonly prose expansions of mediæval tales and legends. Most significant of all is the *Morte d'Arthur* (1485), compiled from various sources by Sir Thomas Malory in 1469-70. The result was not a well-constructed romance: the matter was too heterogeneous for that. But it was a fiction "pleasant to read" and "written for our doctrine." Of especial interest, too, are *Reynard the Fox* (1481), the *Four Sons of Aymon* (1489), and *Blanchardin and Eglantine* (1489). The great labors of Caxton in translating, editing, and printing were continued by his noble followers in the sixteenth century. Perhaps the finest work done by or for them was *Huon of Burdeux*, a half-fairy tale translated by Lord Berners out of the French. To this time belongs also the *Utopia* (c.1515), by Sir Thomas More. A full list of the romances issued by the English press before 1550 would be a revelation as to the spread of the taste for reading marvelous tales.

But the redactors employed by the printers in compiling bulky volumes lost sight of plot. The *Morte d'Arthur* is a series of biographies loosely connected with the career of King Arthur. Before there could be a novel, chaos had to be reduced to order. That service was performed after a fashion by Spain. *Amadis of Gaul* (q.v.), with its typical Greek story of the separation and the final union of the hero and heroine, thus becomes the first prose romance of chivalry. The pastoral, partly in verse and partly in prose, which had assumed a tenuous form in the Italian *Aracadia* (1504), by Jacopo Sannazaro, was developed by the Spaniard Montemayor in his *Diana* (1560). Still further, an unknown Spaniard transformed the tricks of mediæval tales into the short novel of manners. A merry scamp is put behind the scenes and permitted to relate what he sees there. The earliest of these so-called picaresque, or rogue, stories is *Lazarillo de Tormes* (1554). It was followed by a host of others, from which we rightly date the beginnings of the modern realistic novel. But the glory of Spain is *Don Quixote* (q.v.). To outward appearances merely a burlesque of the romances of chivalry, it also contains a careful delineation of manners and two character-types —Don Quixote and Sancho Panza—who, as has been said again and again, are a summary of human nature.

To the Elizabethans, everything of importance that had been done in fiction abroad was well known. And yet in this age of the drama there was no very marked advance in the art of fiction. Sidney's *Arcadia* (1590) is an attempt to unite the pastoral and the romance of chivalry, and to give them the structure of the *Æthiopica* of Heliodorus. The pastoral as written by Greene, Lodge, and many others, was the old romance of adventure reduced to prose and put in a new setting. What its possibilities were, had it been cultivated by a great literary artist, we may imagine from Shakespeare's *As You Like It*, founded on Lodge's *Rosalynde*. The most popular Elizabethan fiction was Lyly's *Euphues* (1579), a romance of high life. For the enchantments of the romance of chivalry, Lyly substituted a wondrous natural history, which he derived from beast-books or made up as he went along. As a realist great powers were displayed by Thomas Nash in his ill-constructed *Unfortunate Traveller*, or *Jack Wilton* (1594). Indeed, Nash anticipates the manner of Defoe.

Puritanism was a check to the imagination. From Elizabeth to the Restoration, the only notable fiction is the *Argenis*, by John Barclay, composed in Latin (1621) and soon translated into French and English. Mainly a political romance framed to the Greek story of adventure, it is significant as an attempt also at history. It seems to be an important link between antiquity and the French *roman de longue haleine* cultivated by Gomberville, La Calprenède, and Mlle. Scudéry. Of this type the best examples are Scudéry's *Grand Cyrus* and *Clélie*, each in ten octavo volumes. The extravagances of Scudéry were turned to finer issues by Madame de la Fayette in the *Princesse de Clèves* (1678), often regarded, because of its sane analysis of passion, as the first French novel. To this period belongs also a famous pastoral, the *Astrée*, by Honoré d'Urfé (1610-27), which was burlesqued by Charles Sorel in the *Berger extravagant* (1627). There were, moreover, many realistic novels, as Sorel's *Francion* (1622), Scarron's *Roman comique* (1651-57), and Furetière's *Roman bourgeois* (1666). Akin to the Spanish picaresque novel, they all give a humorous description of middle and low-class life.

After the Restoration, novel-writing was resumed in England. French romance was imitated; and a long series of low adventures was put together by Richard Head under the title *The English Rogue* (first part 1665). Of more interest is *Oroonoko* (1696; written much earlier), by Mrs. Aphra Behn (q.v.). In this short novel, founded on real events, there is some attempt at local color. But of all writers of this time John Bunyan (q.v.) did most for fiction. Bunyan spoke from the heart. And, however impossible might be the tale he undertook to tell, he knew how to add the minute details that make fiction seem truth. Bunyan's successor was Daniel Defoe (q.v.). In narrative power Defoe was Homeric. His style is all movement; even description is turned into narrative. Because of its style, its interesting incidents so treated as to give the illusion of reality, and its ethical import, *Robinson Crusoe* (1719) is rightly regarded as the first worthy treatment of adventure. It has been asserted that Defoe was forestalled by Grimmelshausen's *Simplicissimus* (about 1669). This German story of adventure, however, belongs to the old order. In France, Lesage had already published the first part of *Gil Blas* (1715), in which the picaresque novel was used as a vehicle of large satire on contemporary manners. Defoe took advantage of the immediate popularity of *Robinson Crusoe*. The succeeding novels possess all the qualities of the first except interesting subject matter. In *Gulliver's Travels* (1726), Swift at once gave the satirical romance its perfect finish.

THE REALISTS. After Defoe and Lesage, the novel was in danger of becoming plotless. It was Richardson who made the novel dramatic. *Pamela* (1740) is an expansion of the current bourgeois comedy such as Steele wrote. *Clarissa Harlowe* (1747-48) is an expansion of bourgeois tragedy such as Otway wrote. *Sir Charles Grandison* (1753) is likewise a comedy with its scene shifted to high life. Richardson's drama is not thus merely formal. He creates character-types, and he develops them in act and conversation before the mind's eye. Fielding, with his experience as a playwright, was able to improve upon Richardson's clumsy epistolary method. *Joseph Andrews* (1742) contains the matter of the comic romances, such as Cervantes and Scarron wrote, but is molded to the form of ancient comedy. His masterpiece, *Tom Jones* (1749), is a clever union of many types of comedy for many effects. *Amelia* (1751) is the pathetic drama of family life, then common in France and England. Fielding makes no use of letters (except for burlesque) or of journals and memoirs. His characters speak directly, and the narrative, though hampered at times by episodes, is mostly in the third person. All the essentials of the novel were thus worked out by Richardson and Fielding. Since their time the advance in structure has been only in details. The novel left their hands a well-ordered literary species. They both aimed, each in his own way, to depict the inner and the outward life as it is. They were realists. True, a good deal that was traditional in fiction found its way into their work. The dastardly scenes in Richardson, which now so shock readers, were survivals from Greek romance. And Fielding appropriated the old picaresque escapades. Later realists, having mostly rid themselves of all this material, depend rather upon their own experience and observation. And though few novelists have dared discard love altogether as a motive, it is now treated less in its physical aspects. In spite of all this, which is indicative of the later development of fiction, probably no novel takes to itself more of human life than *Tom Jones*. No characters stand in clearer outline than its hero and Squire Western.

Richardson's work ended with *Sir Charles Grandison*, and Fielding died in 1754. Tobias Smollett survived them. Much under the influence of the picaresque writers, he was careless in manner, and his imagination delighted in coarse and brutal scenes. He, however, created many caricature types at once professional and national —the Irishman, the Welshman, and the Scotchman. *Roderick Random* (1748) is the first novel of the sea from the pen of a seaman. *Humphrey Clinker* (1771) is, said Thackeray, "the most laughable story ever written." In distinction from the humor of Fielding, Smollett is comic. His formlessness and audacity became affectations with Laurence Sterne. *Tristram Shandy* (1759-67), beginning nowhere and ending nowhere, is hardly a novel, but it contains passages of the highest beauty, and a brotherhood of fools unequaled outside of Shakespeare. At this time Oliver Goldsmith wrote the *Vicar of Wakefield* (1766), the source of many idyls of village life.

The novel thus began at once to break up into several varieties. This process, owing to social conditions, went on apace. In the next generation there was a numerous class of writers who resorted to the novel for the purpose of popularizing theories of education and government. They were inspired by Rousseau and other French philosophers. Among them were Robert Bage, Charlotte Smith, Elizabeth Inchbald, Thomas Holcroft, and William Godwin. It may be claimed for them that they founded the didactic novel. Fielding had depicted his characters through *what* they said in dialogue. Except in the case of Squire Western, little stress was placed upon *how* they spoke. Here was another lesson to be learned from the drama or rather from the actor. And as soon as it was learned, we had the novel of manners. Frances Burney was the pioneer with her *Evelina* (1778) and *Cecilia* (1782). In the Irish tales of Maria Edgeworth, as *Castle Rackrent* (1800) and *The Absentee* (1812), the interest centres wholly on the speech and appearance of the characters. They are the first dialect stories. The novel of manners reached its highest art in the work of Jane Austen, well represented by *Pride and Prejudice* (1813) and *Mansfield Park* (1814), admirable in structure, movement, and tone. Here first the drama and the epic became perfectly fused. The sentimental novel has perhaps had its greatest exponent in Goethe, whose *Leiden des jungen Werther* (1773-74) set half of Europe to pondering over suicide and other morbid themes. *Wilhelm Meister* (1795, begun some twenty years earlier), on the other hand, is an autobiographic and to some extent a didactic novel.

ROMANCE AND SIR WALTER SCOTT. The old romances never became quite dead. As late as 1752, Charlotte Lennox thought it worth while to ridicule them in the *Female Quixote*. Under the impulse of the romantic spirit which was pervading all literature, a short ghostly romance was published by Horace Walpole in 1764. His *Castle of Otranto* set the standard for many writers, among whom were Clara Reeve, Ann Radcliffe, William Beckford, M. G. Lewis, C. B. Brown, William Godwin, and Mary Shelley. Perhaps the most typical specimen of their work is Mrs. Radcliffe's *Mysteries of Udolpho* (1794), which definitely marks an interest in scenery for its own sake. Godwin's *Caleb Williams* (1794) is the first detective story. These romances of the eighteenth century are forerunners of the tales of terror and wonder by Poe and Hawthorne. But Poe gave them a new art in the *Fall of the House of Usher* (1840) and the *Masque of the Red Death* (1842). To Hawthorne they suggested a dress for psychological problems. Walpole and his school commonly placed their scenes in mediæval times; hence, their romances were known as 'Gothic,' and they are, in a manner, historical in setting. It was a natural step for an innovator to make history the main interest. Such a step was taken by Sophia Lee, whose *Recess* (1783-86) is an historical fiction of the time of Queen Elizabeth. Her example was followed by many others, among whom were James White, W. H. Ireland, and, most noteworthy of all, Jane Porter, author of *The Scottish Chiefs* (1810). Nothing could be more preposterous than the way in which these writers dealt with history. Characters and incidents of different periods they introduced into the same scene. But they rarely employed the historical allegory; and they made possible *Waverley* (1814). To the amazement of his contemporaries, Scott poured forth during the next sixteen years about thirty novels, covering English and Scotch history, with some gaps, from William Rufus to 1800. Among his English followers were Horace Smith, G. P. R. James, Harrison Ainsworth, and James Grant. He inspired Manzoni in Italy, Freytag in Germany, and Hugo and Dumas in France. His *Pirate* suggested to James Fenimore Cooper the brilliant tales of the sea beginning with *The Pilot* (1824); and for his Leather-Stocking Series, containing *The Last of the Mohicans*, *The Pathfinder*, and *The Deerslayer*, Cooper became known as the American Scott.

THE RETURN TO THE NOVEL OF CONTEMPORARY LIFE. Scott's influence on the novel is not summed up by giving a list of his imitators or of those writers who discovered new romantic themes. He is in Thomas Hardy's woodland scenes as much as in Stevenson's *Master of Ballantrae.* He depicted the showy virtues, vices, and scenes in his outer plot, but beneath there was always careful observation of common life. Throw off the outer covering, and you have the realistic novel. This was done by several writers, as Susan Ferrier, John Galt, and D. M. Moir, who wrote capital sketches of Scotch manners. Throw out the historical setting, and you have once more the novel of contemporary manners. The transition is well marked by the work of Bulwer-Lytton. Likewise Charles Kingsley romanced the sea and ancient history (*Westward Ho!* and *Hypatia*) and dealt with the social conditions of his own time (*Yeast* and *Alton Locke*). But the immediate vogue of romance and history had already been checked. In France, Balzac was insisting, in theory and in practice, that the novel should be a document based upon experience and observation. Balzac's vast *Comédie humaine,* aiming to represent every phase of French life, worked mightily in England, and gave fiction everywhere an encyclopædic character. In England the novel returned to the humors of society with *Pickwick* (1836-37). In this novel of great scope (for it contains more than 350 characters) appear the London cockneys. Having discovered London, Dickens went on to illustrate it in all its phases, and to include in his canvas much from the provinces, until he had created caricature types running into the thousands. Thackeray wrote *Vanity Fair* (1847-48). Instead of a Little Nell, he took as heroine Becky Sharp, and made her adventures the medium for depicting the ways of the middle class. This novel was followed by *Pendennis, The Newcomes, Esmond, The Virginians,* and *The Adventures of Philip.* All possess exquisite humor and irony. In their somewhat loose structure they lean to the epic. But the method of procedure is dramatic. No other novelist has ever come near Thackeray in making his characters develop from page to page; witness both Becky Sharp and Rawdon Crawley.

At this time George Borrow was writing his eccentric gypsy novels, *Lavengro* (1851) and *Romany Rye* (1857), and Charles Reade was winning popularity. The way in which Reade and Dickens put together the novel of social satire was very displeasing to Anthony Trollope, who accused them of creating vices in the upper and middle classes merely to attack them. His ideal of a novel Trollope presented in the Chronicles of Barsetshire (1853-67), comprising *The Warden, Barchester Towers, Doctor Thorne, Framley Parsonage, The Small House at Allington,* and *The Last Chronicle of Barset.* In this imaginary shire, he describes the clergy and their friends with a pleasing humor, running now and then into farce. Trollope brings his characters directly before the reader and lets them play out the drama. No one ever forgets characters like Septimus Harding, Mrs. Proudie, and Archdeacon Grantley.

THE PSYCHOLOGICAL NOVEL. Corresponding with the sequence of incident there is a sequence of thought and emotion. Lay the stress on incident and you have the romance or the novel of manners; lay it on the inner life and you have the psychological novel. Since Defoe, the novel had to an extent swung between these two methods. But the psychological novel hardly became aware of itself before the middle of the nineteenth century. Hawthorne comes to the fore. Alike in his longer and shorter tales, as *The Scarlet Letter* and *The Great Stone Face* (1850), he probes the conscience. Emily Brontë's *Wuthering Heights* (1848) is an intense lyric. Likewise in Charlotte Brontë's *Jane Eyre* (1847) and *Villette* (1853) what holds one spellbound is the spiritual life externalized in incident. Here, too, the work of Elizabeth Gaskell, best known as the author of *Cranford,* has significance. In her *Ruth* (1853) she employed for unifying the plot an ethical formula which may be styled the doctrine of the act and its consequences. But the memorable date in the history of the psychological novel is 1859. In that year appeared George Eliot's *Adam Bede* and George Meredith's *Ordeal of Richard Feverel.* In her first long story George Eliot kept in harmony the inner and the outer life; and each added to the interest of the other. Certainly after *The Mill on the Floss* (1860), incident was no longer able to sustain the philosophy. And yet *Romola* (1863) and *Middlemarch* (1871-72) are her most relentless studies in moral decay. All her novels are constructed on some variant of the doctrine of the deed and its consequences. George Meredith selects a small group of characters in a clearly defined situation—as in *The Egoist* (1879) and *Diana* (1885)—and then studies minutely their behavior. His view is less comprehensive than George Eliot's, but his analysis is more subtle.

RECENT PHASES. In 1903, for the time being, psychology seemed to have run its course in English fiction. True, some of the characteristics of Henry James connect him with Meredith; but James is master of several manners. The best contemporary work in psychology is represented by Paul Bourget, at the head of a French group. From the older psychology sprang the philosophic novel. The psychologists had their ethical formula, but it was not all-important. The philosophers thrust to the front determinism, an ethical theory whereby conduct is made to depend wholly upon heredity and environment; man is no longer a free moral agent. On this theory was planned the entire series of Emile Zola (q.v.), called *Les Rougon-Macquart* (1871-93). Thomas Hardy now stands for the very best type of the newer realism. The philosophical novel belongs rather to the past, and its place has been taken largely by the novel of a more distinct purpose, often called the problem novel, for it aims at the solution of some social problem. Such, for example, is Hardy's *Jude the Obscure* (1895). This kind of novel is in part an inheritance from Dickens and in part a natural development from George Eliot. It discusses, by turn, creeds, heredity, class distinctions, agrarian conditions, labor and capital, municipal government, tenement house reform, the enfranchisement of woman, the failure of marriage, the grounds for divorce, etc. The last three topics on the list have been favorites with many woman novelists. To this kind of fiction dignity has been given by three writers, artists as well as thinkers, each belonging to a different country and each possessing his own methods: Tolstoy in Russia, Björnson in Scandinavia, and Mrs. Humphry Ward in England.

Other novelists, though equipped with ideas, have depicted contemporary manners with a less obvious purpose. Somewhat in line with Trollope were the many stories by Margaret Oliphant, as the *Chronicles of Carlingford,* including *The Doctor* and *Salem Chapel* (1863). Henry James and W. D. Howells, beginning as romancers, worked their way out to a delicate realism; the first under the influence of Turgenieff and Daudet; the latter under the influence of Tolstoy and of Spanish fiction as represented by Valdes and Galdós. James may fairly be said to have created the international novel. His field has been successfully invaded now and then, as by DuMaurier in *Trilby* (1894). In his later work James has studied the English drawing-room. Howells has confined himself to illustrating American types, as in *A Modern Instance* (1883) and *The Rise of Silas Lapham* (1885). From national types, the novel both in England and in the United States has run into provincial types, and consequently into dialect. J. M. Barrie and John Watson spread knowledge of the Scotch parish. Jane Barlow has described with much sympathy the Irish village. The tragic aspects of life in Devon, Somerset, and London have been presented with much force respectively by Zack (Gwendoline Keats), Walter Raymond, and George Gissing; some phases of South Africa by Olive Schreiner, and both picturesquely and psychologically by Joseph Conrad; and of Australia by Tasma (Madame Couvreur) and Ada Cambridge. Likewise various sections of the United States have been treated by novelists. To New England belong Elizabeth Stuart Phelps, Mary Wilkins, Sarah Orne Jewett, and many others; to the Mississippi Valley, Mark Twain; to the Far West belong Bret Harte, Owen Wister, and Hamlin Garland; to the South, Mary Murfree, G. W. Cable, Hopkinson Smith, and T. N. Page. The society novel holds its own. Two notable successes in the last decade were E. F. Benson's *Dodo* (1893) and Anthony Hope Hawkins's *Dolly Dialogues* (1894).

Of wider amplitude is the work of Rudyard Kipling, who made known an India that had escaped the observation of other Europeans. Manners and customs he describes, and he has sketched a few types of character. But with him the energy goes mainly to telling a good story. That he has thus restored to fiction interesting incident is perhaps his great distinction.

These and other realists have greatly modified the outer form of the novel. Very generally the three-volume novel has been cut down to one volume. This has rendered necessary the excision of long descriptive passages and moral comments. The characters are now developed by what they do and say, as much as by what somebody else says about them. Indeed, it has been found possible to write a novel wholly in dialogue. The short story of a few pages has also found its readers. To this discovery France and the United States for a period contributed most, though the short story is far older than Boccaccio. In France the cultivation of the short story is encouraged by the literary character of the press. Of this genre, there is nothing superior to the work of Daudet and Maupassant. The short story had another master in Gottfried Keller (q.v.), and found an expert also in Paul Heyse (q.v.). In the United States the short story, which has existed by right since Poe and Hawthorne, is best adapted to the magazine. It has assumed various forms under the hand of many writers. England has held rather to the serial. But in Kipling she has found an innovator, who has brought into vogue a tale of from twenty-five to fifty pages. In the nineteenth century many short stories, and sometimes even the long novel, were devoted to the portrayal of animals other than man. By Joel Chandler Harris, in his stories of *Uncle Remus* (1880), animal life is treated fantastically, but with a never absent consciousness that the adventures of Brer Rabbit, Sis Cow, Mr. Wolf, and their fellows are fantastic. Thus we get the humorous animal story based on folklore, as in the *Roman de Renard.* Kipling's *Jungle Books* (1894-95) gather Indian folklore about animals into short stories of great power. Herein the animals are again not wholly natural, but they act more naturally than in the stories of Uncle Remus. The tales of the Canadian C. G. D. Roberts range from the slightly fanciful to the wholly real. In *Bob, Son of Battle,* the Englishman Ollivant wrote an entertaining novel about the rivalry between two sheep-dogs, Bob and Wullie. W. Fraser, who wrote *Mooswa of the Boundaries,* is esteemed highly by naturalists and lay readers, for his imaginative yet truthful stories of wild life. Ernest Thompson-Seton's earlier work portrays the life and death of wild animals with some accuracy. His stories distinctly belong to fiction and not to artistic zoölogy.

Since Scott, romance and adventure have never been absent from English fiction. Wilkie Collins became everywhere known by his *Woman in White* (1860), which was followed by many similar mystifications, as the *Moonstone* (1868). For the detective story he is the connecting link between Poe and Conan Doyle. In 1869 appeared *Lorna Doone,* the first of R. D. Blackmore's picturesque fictions, historical in setting and written in rhythmic prose. Then came the numerous romances of William Black, of which the type is *A Princess of Thule* (1873); the beautiful fancies of Richard Jefferies, as *Wood Magic* (1881) and *After London* (1885); and the tales of William Morris in verse and in prose. But the romancer of most pronounced influence on the English novel was Robert Louis Stevenson. In *Treasure Island* (1883) he gave style and a new form to the tale of adventure. In *Dr. Jekyll and Mr. Hyde* (1886) he fashioned the old story of wonder to an ethical purpose. In *Kidnapped* (1886) and *The Master of Ballantrae* (1889) he revived after his own way the historical romance. In *Prince Otto* he wove a dream into the semblance of history. And in *Ebb Tide* (1894) adventure was carried to the South Seas. From Stevenson there are several lines of development. Among those who have followed him in history are Conan Doyle, S. R. Crockett, Stanley Weyman, S. Weir Mitchell, and Winston Churchill. In Great Britain and her colonies, as well as in the United States, historical fiction enjoyed great popularity and often considerable intelligent esteem throughout the nineteenth century. In France historical fiction has been waning almost since the time when the elder Dumas announced that he had raised history to the dignity of fiction. Stevenson's fanciful history was transformed into delightful extravagance by Anthony Hope Hawkins in *The Prisoner of Zenda* (1894) and its sequel, *Rupert of Hentzau* (1898). Further removed from Stevenson are the more extravagant fictions of H. G. Wells with his time-machines. Adventure wilder than Stevenson's is now represented by Joseph Conrad and the Australasian novelists Louis Becke and Guy Boothby.

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NOVELDA, nô-vâl′dȧ. A town of Southeastern Spain, in the Province of Alicante, 15 miles west of Alicante, on the railway between that city and Madrid (Map: Spain, E 3). The town has oil mills and brandy distilleries, and there are sulphur springs in the neighborhood. Population, in 1900, 11,442.

NOVELLÆ (Lat., novels, nom. pl. fem. of *novellus*, new, diminutive of *novus*, new). In Roman law, the ordinances issued by Justinian after the *Institutes*, *Pandects*, and *Codex*. They were written for the most part in Greek, although the Latin version alone has survived. No official compilation of them was made, but they were preserved in several private collections of varying comprehensiveness. One of these, the *Authenticum*, or *Liber Authenticorum*, was later regarded as the authoritative text, and in the twelfth century was incorporated, together with the other Justinian codes, in the *Corpus Juris Civilis*. See Civil Law; Justinian I.; Pandects.

NOVELETTE, nŏv′el-ĕt′ (diminutive of *novel*). In music, a term invented by R. Schumann to characterize certain compositions (op. 21) in free form. A novelette is of some length and characterized by a great number of short themes introduced without regular succession. Schumann chose the name because in those works he made use of entirely novel effects both rhythmically and harmonically. Since then the form has been imitated by many composers.

NOVELLINO, nō′vĕl-lē′nô (It., the little novel), Il, or the Cento Novelle Antiche. The oldest collection of tales in Italian, belonging to the thirteenth century. The subject matter comprises traditions of all kinds, biblical, classical, and chivalrous, stories based on historical fact or wholly fictitious. The tales seem to have been gathered from various sources; from oral tradition, from the books of chivalry, from the French *fabliaux*, and from other earlier collections in Latin. As might be expected at this early period, the prose is rather simple; it has, however, a remarkable spontaneity. Consult the first edition of the *Novellino* by Gualteruzzi (Bologna, 1525); that by Carbone (Florence, 1868); and that by Donin (Turin, 3d ed. 1890); A. d'Ancona, *Le fonti del Novellino*, in the *Studi di critica e storia letteraria*; Biagi, *Le Novelle Antiche* (Florence, 1880).

NOVEL′LO, Vincent (1781-1861). An English musician and editor, born in London, of an Italian father and English mother. At the age of sixteen he was organist in the chapel of the Portuguese Embassy. He was one of the founders of the Philharmonic Society, and of the great music-publishing house in London, Novello & Co., established in 1811. His musical compositions, which are very numerous, and chiefly sacred, are considered to have contributed much to the improvement of cathedral music. As a painstaking editor of unpublished works of eminent musicians, he has accomplished much for musical literature. He died in Nice, France.

NOVEMBER. See Month.

NOVERRE, nô′vâr′, Jean Georges (1727-1810). A French dancer and reformer of the ballet, born at Saint-Germain-en-Laye. He was a pupil of the ballet master Dupré, and began as a dancer in the Royal Theatre. His ballets gave him such a reputation that Frederick II. invited him to Berlin. He then went to London on the invitation of Garrick, as master of the ballet in the Drury Lane Theatre (1755-57). Afterwards, he was equally successful at Stuttgart, Vienna, and other European cities. He was made ballet master at the Academy of Music in Paris in 1775, and there had the fullest opportunity to introduce those reforms which make him the real inventor of the modern ballet. His theory of the dance was that dress, music, and action must interpret one another. These ballets were often elaborated pantomimes of classical subjects treated in a serious manner. He also prepared the ballets in operas, notably that in

Gluck's *Iphigenia in Aulis*. His *Lettres sur les arts imitateurs en général et sur la danse en particulier* (1807) remain the authority on his art.

NOVGOROD, nôv′gô-rôd. A government of Russia, bounded by the governments of Olonetz, Vologda, Yaroslav, Tver, Pskov, and Saint Petersburg (Map: Russia, D 3). Area, about 47,300 square miles. The southern part belongs to the Valdai plateau and is mostly hilly. In the northeast are found a large number of lakes and immense impassable marshes—the beds of former lakes—covered with thin forests. The northwestern part slopes toward Lake Ladoga and is thickly wooded. The district is watered by numerous rivers, which connect it with the Baltic, the Caspian, and the White Sea. The chief of them are the Volkhov (connecting the lakes Ilmen and Ladoga), the Sheksna and the Mologa, tributaries of the Volga, the Syas, flowing into Lake Ladoga, and the Msta, belonging to Lake Ilmen. Among the larger lakes may be mentioned the Byeloe and the Vozhe in the northeast. Many of the rivers are navigable and connected with each other and the lakes by an extensive system of canals.

The climate is severe, the yearly temperature at Novgorod averaging only 39° F. Farming is the leading industry, although its returns are so small as to oblige a large proportion of the population to engage in some other occupation, such as lumbering, or to emigrate for a part of the year to Saint Petersburg, where artisans from Novgorod are very numerous. The house industry is only slightly developed, the chief item of production being nails of an inferior kind. Wood, live animals, and hay are the chief exports, and there is a considerable traffic on the rivers and canals. Population, in 1897, 1,392,933, chiefly Russians belonging to the Greek Church. There are also a number of Non-Conformists. For history, see the article on Novgorod, the capital.

NOVGOROD, or Novgorod-Veliki, vĕ-lē′kē (Great Novgorod). One of the oldest and most celebrated cities of Russia, capital of the government of the same name, situated on both banks of the Volkhov, about two miles from Lake Ilmen and 120 miles south of Saint Petersburg (Map: Russia, D 3). It is divided by the Volkhov into two parts, of which that on the left bank, with the Kremlin, is known as Saint Sophia, while that on the opposite bank is called the commercial side. There is very little in the insignificant and somnolent town to remind one of the ancient Great Novgorod, with its vast wealth, great foreign trade, and highly developed republican institutions. The Kremlin is surrounded by a stone wall dating from the fourteenth century and occupies a considerable area. Within the walls are situated the eleventh-century Cathedral of Saint Sophia, with a treasury of valuable relics, the twelfth-century Church of Saint Nicholas, and the Yaroslav Tower.

The churches of Novgorod are of the usual Russian style of architecture (see Moscow), having numerous round cupolas and dark and profusely embellished interiors. In 1862 a fine, massive monument was erected at Novgorod to commemorate the one thousandth anniversary of the foundation of the Russian monarchy. There are two gymnasia, a theological seminary, a *Realschule*, and two museums of antiquities. Economically, Novgorod is insignificant. There is some manufacturing of paper, flour, glass, trimmed lumber, etc., and agricultural products are exported to Saint Petersburg. A railway line, 45 miles long, connects with Tchudovo on the Moscow-Saint Petersburg line. Population, in 1897, 26,095.

History. The origin of Novgorod is usually connected with the story of the first appearance of the Varangians in Russia, and the town is supposed to have been the residence of Rurik (862) (q.v.) and his successor Oleg. With the rise of Kiev (q.v.), Novgorod became to some extent its dependency, and these relations continued until the end of the tenth century. In the eleventh century Novgorod was completely independent, electing its own princes. In the zenith of its prosperity the dominions of Novgorod the Great comprised the northern part of the present Russia above latitude 57° N., excluding Finland and the Baltic region. In its political institutions Novgorod then presented a striking contrast to the other principalities of Russia. Without an hereditary line of princes, and geographically isolated from the rest of the country, it was guided in the selection of its rulers chiefly by its economic interests. The supreme authority was the vyetche, or popular assembly, which was participated in by all freemen. This assembly elected the prince and the posadnik (mayor), as well as the commander of the army. At the height of its prosperity the city contained probably not fewer than 100,000 inhabitants, some authorities placing the number as high as 400,000. The Church of Novgorod was essentially a native church. The archbishop was elected by the vyetche, and there was the closest intimacy between the State and the Church. Commerce was the chief occupation and was carried on by corporations so as to embrace a very large part of the population. The advantageous location of the city rendered it well adapted for the trade with the Scandinavian and Hanseatic cities. Novgorod joined the Hanseatic League about the middle of the fourteenth century. It contained many foreign merchants, or 'guests,' to whom were accorded special privileges. Hungarian and English coins circulated freely.

In the middle of the thirteenth century Novgorod was under the rule of the national hero Alexander Nevski (q.v.). It held out the longest of Russian States against the tide of Mongol conquest, but was finally compelled to submit at the end of the thirteenth century. After the weakening of the Mongol power, Novgorod, although politically independent, was often compelled, for economic reasons, to take its princes from the House of Suzdal (Vladimir). With the rise of the principalities of Moscow and Lithuania, Novgorod became too weak to struggle against their encroachments, and was soon reduced to the necessity of paying tribute in order to retain its independence and republican institutions. In 1478 it succumbed to the arms of the Muscovite ruler, Ivan III., and was deprived of its liberties. Many of the prominent families were transferred to Moscow and replaced by families from the capital. The inhabitants having excited the wrath of Czar Ivan the Terrible, that monarch in 1570 wreaked a fiendish vengeance upon the city, putting thousands to the sword. This completed the downfall of Novgorod.

NOVGOROD-SEVERSK, syâ′vĕrsk. An historic town of Russia, situated in the Government of Tchernigov, on the Desna, 148 miles northeast of Tchernigov (Map: Russia, D 4). It has an old monastery and a gymnasium. At the end of the eleventh century it became the capital of an independent principality and subsequently was annexed to Lithuania. Population, in 1897, 9185.

NOVI, nō′vė, or **NOVI LIGURE.** A town in the Province of Alessandria, Italy, 33 miles north-northwest of Genoa, by rail (Map: Italy, C 3). It has several churches, a lyceum, museum, and public library. The town carries on manufactures of silk and woolen goods, and is the centre of a considerable trade. Novi was the scene, August 15, 1799, of a battle in which the Austrians and Russians defeated the French, the French General Joubert being slain. Population (commune), in 1881, 13,783; in 1901, 17,588.

NOVIBAZAR, nō′vė-bȧ-zär′, or **NOVIPAZAR.** (Turk. *Yenibazar*). The capital of a sanjak of the same name, in the Vilayet of Kossovo, Turkey, on the Rashka, an affluent of the Ibar, 120 miles southeast of Bosna-Seari (Map: Balkan Peninsula, C 3). The town, situated in a fertile district, has important fairs and an active agricultural trade. There are remains of an ancient citadel and in the vicinity rises the Church of Saints Peter and Paul, the scene in 1143 of Stephen Nemanya's conversion from the Roman to the Greek Church. Novibazar is an important strategic point between Servia and Montenegro, and, under the Treaty of Berlin, is garrisoned by Austria. The district about the town is the Rassia of the Byzantine historians. Population, about 12,000, chiefly Slavs.

NOVIE DUBOSSARY, nō′vyȧ dōō′bŏs-sä′rė. A town of Russia. See Dubossary.

NOVIKOFF, nō′vė-kôf, Nikolai Ivanovitch (1744-1818). A Russian journalist and philanthropist, born at Avdotyino, Government of Moscow. He entered the civil service at eighteen, and was conspicuous in Catharine II.'s Reform Commission (1767), but retired in 1768 to devote himself to literature. In his satirical magazines, *The Drone* (1769-70) and *The Painter* (1772-73), he ridiculed Gallomania and combated serfdom and other evils of social and private life. A controversy with Catharine's satirical journals brought him into disfavor, and his periodicals were stopped. He retired to Moscow, where he leased the Moscow *Gazette* with its printing plant for ten years (1779-89) and endeavored to spread a love for literature by printing cheap books. His devotion to Freemasonry and his very extensive philanthropic work brought him into trouble, but not until the French Revolution did Catharine take anv severe measures. In 1792 he was arrested on his estate and imprisoned in Schlüsselburg. All his property was confiscated, and the hospitals, schools, libraries, book-stores, etc., opened by him, were closed. Released bv Paul I., he was confined to Avdotyino until his death. He published, in 1772, *An Attempt at a Lexicon of Russian Authors*, and in 1773-75 a collection of historical materials called *The Old Russian Library* (2d ed., 1788-89, republished by Myshkin, 1894). Consult a monograph by Nezelenoff (Saint Petersburg, 1875), and Luginoff, *Novikoff and the Moscow Martinists* (Moscow, 1867).

NOVIKOFF, Olga (1840—). A Russian journalist and political agent, who lived long in England. She was born in Moscow of noble parents named Kireyeff, and married General Novikoff at the age of nineteen. Under her maiden initials, 'O. K.,' she wrote much in the newspapers of the two nations, hoping to promote an alliance between them, and she made warm friends among British statesmen and historians, notably Gladstone, Froude, Kinglake, and Carlyle. Gladstone reviewed her *Russia and England* (1880) in the *Nineteenth Century*. She published, also: *Is Russia Wrong?* (1877); *Friends or Foes* (1878); and *Skobeleff and the Slavonic Cause* (1884). After her husband's death, Madame Novikoff spent more of her time on her son's estates near Tambov, Russia.

NOVI LIGURE, nō′vė lē′gōō-rȧ. A town in Italy. See Novi.

NOVOCHERKASK, nô′vô-chĕr-kȧsk′. A city of Russia. See Novo-Tcherkask.

NOVOGEORGIEVSK, nô′vô-gȧ-ôr′gė-yĕfsk. A town in the Government of Kherson, Russia, on a tributary of the Dnieper, 250 miles north of the city of Kherson (Map: Russia, D 5). Milling, tallow-boiling, and brewing constitute the chief industries. In the vicinity of the town are granite and limestone quarries. Population, in 1897, 11,200.

NOVOGEORGIEVSK, nô′vô-gyôr′gyĕfsk. A strong fortress of Russian Poland, situated in the Government of Warsaw, at the confluence of the Bug with the Vistula, nine miles northwest of Warsaw. The principal fortifications, on the right bank of the Vistula, consist of a citadel and barracks surrounded by strong walls. The left bank of the Vistula and the banks of the Bug are also fortified. The place was originally fortified by Charles XII. of Sweden, and the fortifications were extended by Napoleon. The Russians captured it in 1813, and it was occupied by the Poles during the insurrection of 1830. The site of the fortress was formerly occupied by the town of Modlin, and the fortress is still known to the Poles under that name.

NOVOGRAD-VOLHYNSKI, nō′vô-grȧd-vô-lĭn′skė. A town in the Government of Volhynia, Russia, situated on the Slutch, 55 miles northwest of Zhitomir (Map: Russia, C 4). It manufactures leather, soap, and brick. Population, in 1897, 16,900, about one-half Jewish.

NOVOMOSKOVSK, nô′vô-môs-kôfsk′. A town in the Government of Ekaterinoslav, Russia, situated on the Samara, 19 miles northeast of Ekaterinoslav (Map: Russia, E 5). It is known for its horse fairs, and manufactures leather. Population, in 1897, 12,862.

NOVOROSSIYSK, nô′vô-rŏs-sēsk′. A seaport town in the District of Tchernomorsk, Caucasus, on the Black Sea (Map: Russia, E 6). It lies on an extensive bay protected by a large mole. There is a considerable traffic in grain and naphtha. Population, 16,208.

NOVOSYBKOV, nô′vô-sĭp′kôf. A town in the Government of Tchernigov, Russia, situated 101 miles north of Tchernigov (Map: Russia, D 4). It lies in a marshy region and is unhealthful. It has numerous tanneries, slaughter houses, and tallow-melting establishments. Population, in 1897, 15,480.

NOVO-TCHERKASK, chĕr-käsk′, or **NOVO-CHERKASK.** The capital of the territory of the Don Cossacks, South Russia, situated near the right bank of the Don, 20 miles by rail northeast of Rostov-on-the-Don (Map: Russia, F 5). The educational institutions include two gymnasia, a *Realschule*, a cadet corps, a theological seminary, a seminary for teachers, and a technical school. There are two theatres, a museum containing the archives, and many antiquities found in the vicinity, and a public library. Distilling is the principal industry, and here are held two annual fairs of considerable importance. About 19 miles north of the town are the Grushev mines, producing one of the best kinds of anthracite in the world. Novo-Tcherkask is the seat of the ataman of the Don Cossacks as well as of the central administration of the territory. Population, in 1897, 52,000.

NOVO-UZENSK, -ōō-zĕnsk′. A town in the Government of Samara, Russia, situated on the river Uzen, 242 miles south-southwest of Samara (Map: Russia, G 4). Its annual fairs are of considerable importance in the trade with the Kirghiz Steppe. Population, in 1897, 13,475.

NOVOYE VREMIA, nŏ′voi-å vrā′myȧ (Russ., new time). The largest political daily in Russia, founded in 1868 and published at Saint Petersburg. After several years of precarious existence it was acquired by the prominent publicist A. S. Suvorin in 1876, and for a time counted among its contributors Nekrasoff, Shtchedrin, and Sophia Kovalevskaya. It took a leading part in the Panslavic movement of the seventies, and gradually lost its liberalism, so that at present it is moderate-conservative in tendency.

NO′VUM OR′GANUM (Lat., new instrument). The name of Francis Bacon's great work which led the way to the development of modern inductive logic. See BACON, FRANCIS.

NOWANAGAR, no-wä′nŭ-gŭr′, **NAWANAGAR**, or **NOWANUGGUR.** A seaport and capital of a native State of the same name, in the peninsula of Kathiawar, Gujarat, India, at the mouth of the Nagna, a small river on the south shore of the Gulf of Cutch, 160 miles southwest of Ahmedabad (Map: India, B 4). It is the terminal of a branch railway line from Rajkot, 54 miles to the east. The town is encircled by a fortified wall, four miles in length, and the buildings generally are of stone. It has pearl fisheries, manufactures of cloth and silk, and enjoys a considerable coastwise and inland trade. Population, in 1891, 48,530; in 1901, 53,844.

NOWELL, nō′ĕl, INCREASE (1590-1655). An American colonist, born in England. He was one of the patentees of the Massachusetts Bay Company, was chosen an assistant, and accompanied John Winthrop to America in 1630. He became one of the leading spirits of the little colony, was the most important man among the thirteen who founded Charlestown, and was chosen ruling elder of their church. He was at various times secretary of the colony, treasurer of Harvard College, town clerk, and chaplain to the forces employed against the Narraganset Indians. Consult Budington, *History of the First Church, Charlestown* (Boston, 1845).

NOX (Lat., night). The personification of night, conceived as a still, dark figure, covering the world with her huge wings, and in her kindness bringing rest to men. In Hesiod's *Theogony* she and Erebus are the offspring of Chaos, and from their union spring Æther (air) and Hemera (day). Of herself she produces Sleep and Death, and a multitudinous progeny, some friendly like the Hesperidæ, others grievous to men, as the Mœræ, or Fates, Ker, the goddess of violent death, Nemesis, the dreams, Momos, the faultfinder and mocker, while in Æschylus the Furies hail her as mother. The vagueness of the personification and the transparency of the name prevented Nox from becoming prominent in the cult, and for the same reason the type in art is not distinct, though the figure is found on some vases and sarcophagi.

NOYA, nō′yȧ. A town of Northwestern Spain, in the Province of Coruña. It is situated at the head of a fiord-like inlet surrounded by wooded mountains, 45 miles southwest of Coruña (Map: Spain, A 1). It is a second-class port of entry, and has some local trade. The town has two secondary schools and a bull-ring, and manufactures paper, leather, soap, cosmetics, and pottery. Population, in 1900, 10,321.

NOYADES, nwä′yȧd′ (Fr., drownings). A name applied to the atrocities practiced at Nantes during the French Revolution (1793-94), by Carrier, the Deputy of the Convention, who put to death over 800 persons by penning them in scows and scuttling the vessels in the Loire. This mode of execution was also known as 'vertical deportation.' **See CARRIER.**

NOYAU, nwä′yō′ (Fr., kernel), or CRÊME DE NOYAU. A liqueur commonly made from white brandy, flavored with bitter almonds, or the stones of the cherry, peach, or apricot. In Dominica it is flavored with the bark of the noyau tree (*Cerasus occidentalis*), and in France sometimes with the leaves of a small convolvulus-like tropical plant, called *Ipomœa dissecta*. It is colored white and pink.

NOYES, noiz, ARTHUR AMOS (1866—). An American chemist, born at Newburyport, Mass. He received his education at the Massachusetts Institute of Technology, and went to the University of Leipzig in 1888. In Germany he devoted himself, under the direction of Wilhelm Ostwald, to research in physical chemistry. In 1890 he was made instructor in chemistry at the Massachusetts Institute of Technology; in 1893 he was appointed assistant professor there, and in 1899 received the full professorship of organic and theoretical chemistry. He became known as a lecturer of uncommon ability, full of sincere enthusiasm for his subject. Dr. Noyes contributed the results of his researches mostly to the *Zeitschrift für physikalische Chemie*, his papers dealing mainly with the application of the law of mass action to the solubility of mixtures of salts. Practically all our knowledge on this important subject of physical chemistry is due to the researches of Dr. Noyes. Several of his papers deal with synthetic problems in the chemistry of the compounds of carbon. His book-form publications include the following: *A Detailed Course of Qualitative Chemical Analysis of Inorganic Substances* (1895); *Laboratory Experiments on the Class Reactions and Identification of Organic Substances* (jointly with Dr. Mulliken, 1899); *General Principles of Physical Science* (1902).

NOYES, Henry Drury (1832-1900). An American ophthalmologist. He was born in New York City; graduated from New York University in 1851, and from the College of Physicians and Surgeons in 1859; and in 1866 became professor of otology and ophthalmology in the Bellevue Hospital Medical College. Dr. Noyes was one of the founders of the American Ophthalmological Society. He introduced into the United States the use of cocaine as a local anæsthetic. Among his works are *A Treatise on Diseases of the Eye* (1881) and *A Text-Book on Diseases of the Eye* (1890, and after).

NOYES, John Humphrey (1811-86). The founder of Oneida Community (q.v.). He was born September 6, 1811, at Brattleboro, Vt.; studied theology at Andover and Yale, and became a Congregational minister. In 1834 he founded the sect known as Perfectionists or Bible Communists at his parents' home, Putney, Vt. He married one of his converts, and thus secured the means to establish a community in which all things were held in common. Religious rites were given up and 'complex marriage' supplanted monogamy. Noyes sought to introduce what he believed to be the communism of the early Church. Internal dissensions and external opposition dissolved the community, but about 150 of the members soon assembled again at Oneida, N. Y. Noyes remained the leader of the society until the latter part of the seventies, when he was obliged to flee to Canada to escape prosecution because of his marriage system. He died in Canada, April 13, 1886. He wrote: *The Berean* (1847); *Bible Communism* (1848); *History of American Socialism* (1870).

NOYES, William Albert (1857—). An American chemist, born near Independence, Iowa. He received his education at Iowa College, and then studied chemistry at the Johns Hopkins University in Baltimore. From 1883 to 1886 he was professor of chemistry at the University of Tennessee, and in 1886 was appointed to a similar post at the Rose Polytechnic Institute, at Terre Haute, Ind. He wrote *Organic Chemistry for the Laboratory* (1897) and *Qualitative Analysis* (1898), and carried out a number of researches in organic chemistry, the most important of which have served to throw much light on the constitution of camphor and allied compounds.

NOYES, William Curtis (1805-64). An American lawyer, born at Schodack, Rensselaer County, N. Y. He began to practice law in 1827, in Oneida County, where he quickly took high rank. He removed to New York in 1838, immediately took a place among the eminent lawyers, and in 1857 was appointed, with A. W. Bradford and David Dudley Field, to codify the laws of the State. In politics he was at first an anti-slavery Whig, and afterwards joined the Republican Party. In 1861 he was a member of the Peace Conference. He bequeathed a valuable law library to Hamilton College.

NOYON, nwä'yôɴ'. A town in the Department of Oise, France, on the Verse, 67 miles by rail northeast of Paris (Map: France, J 2). Its cathedral, founded by Pepin the Short and rebuilt in 1150, is interesting for its transitional phases from Romanesque to Gothic. The principal industries are sugar refining and the manufacture of cloth, laces, leather, and chemicals. Population, in 1901, 7443. Noyon, ancient Noviodunum Veromanduorum, was prominent in Merovingian and Carolingian times. John Calvin was born at Noyon.

NOZZE ALDOBRANDINI, nŏt'sȧ äl'dô-brän-dē'nē (It., Aldobrandini Marriage). One of the finest ancient pictures extant, preserved in the Vatican Library. It is a mural painting, copied from a fine Greek original, and was found in 1606 near the Arch of Gallienus. It was first owned by Cardinal Aldobrandini, after whom it is named. The painting represents the preparations for a wedding, and is soft and harmonious in coloring, though of only average technical execution.

NOZZE DI FIGARO, dē fē'gȧ-rô, Le (It., Marriage of Figaro). An opera, the music by Mozart (1786), and words adapted by Da Ponte from Beaumarchais's *Mariage de Figaro*.

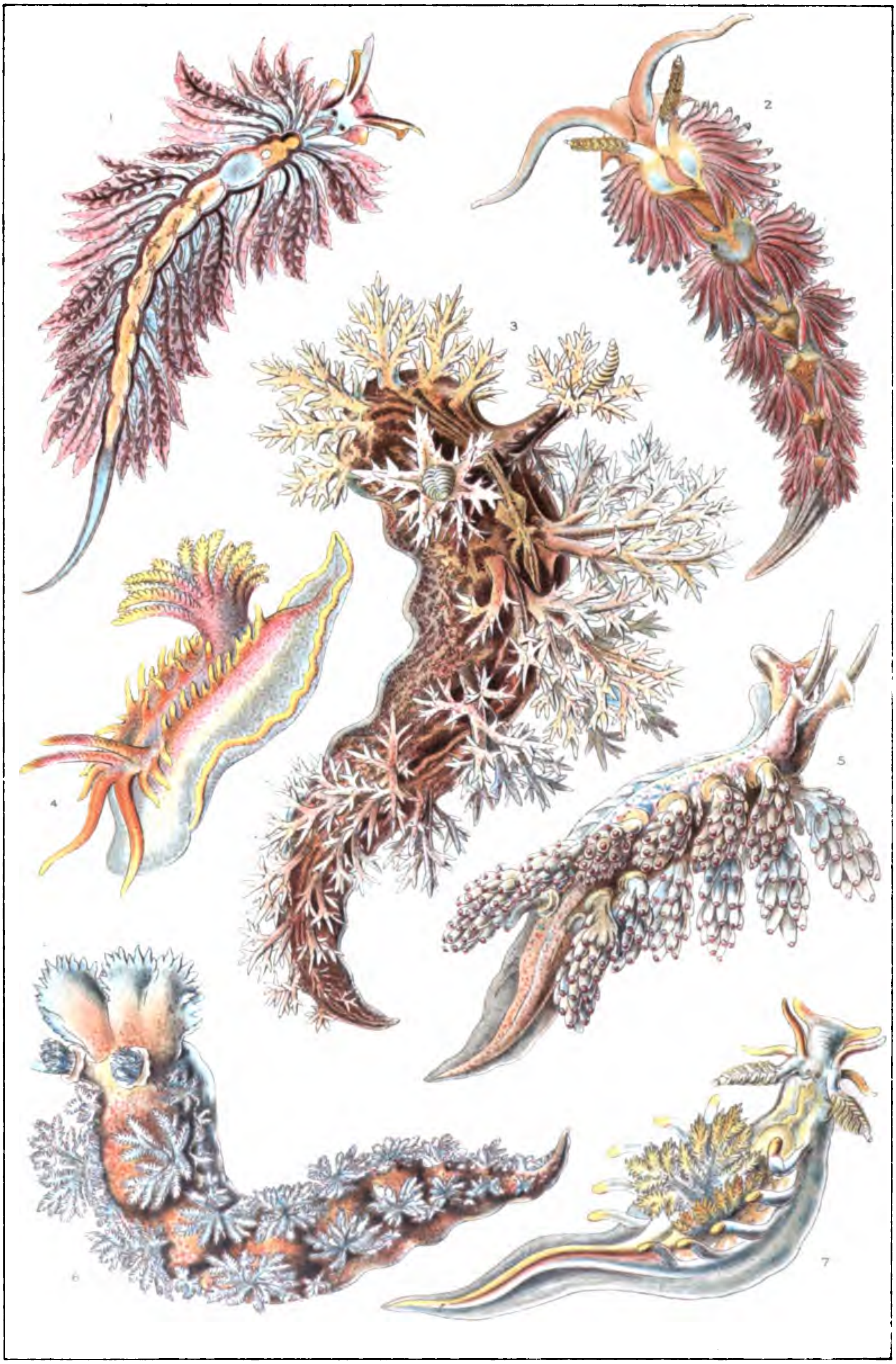
NÛ, nōō, or **NUU**, nōō (later form Nûɴ). An Egyptian deity personifying the primeval waters whence the sun-god Rê emerged to govern the world. Nû was regarded as the father of all the gods and the ultimate source of all created things. In a later phase of Egyptian theology, he was considered to represent, along with his spouse Nût, the waters of the Nile. This Nût, whose name is merely the feminine of Nû, must not be confounded with Nût (q.v.), the goddess of the sky. Consult: Wiedemann, *Religion of the Ancient Egyptians* (New York, 1897); Lepsius, *Ueber die Götter der vier Elemente* (Berlin, 1856); Brugsch, *Religion und Mythologie der alten Aegypter* (Leipzig, 1888-90).

NUANCES, nụ'äɴs' (Fr., shades). In music, the various shadings and means of expression in the interpretation of a composition. The term includes everything that enters into the finished rendering of a composition, such as acceleration or retarding of tempo, the degree of loudness of different tones, the execution of embellishments, rhythmic accentuation, phrasing, etc. It is these nuances that constitute the individuality of the style of various interpreters.

NUBA, nōō'bȧ. A term brought into prominence in ethnology by Friedrich Müller in association with Fulah in his Nuba-Fulah linguistic family. The Nubas are true negroes, having their home in Kordofan, Eastern Sudan, whence they spread into Darfur and Wadai. They are classified as: (1) Nubas proper (*Nuba*, *Kargo*, *Kulfan*, *Kolaji*, *Tumali*), living in Central and Southern Kordofan, Dar-Nuba (Arab. *dar*, land, and *Nuba*), and (2) Nilotic Nubas, forming an important ingredient in the people of Nubia (q.v.). See Stanford, *Africa*, vol. i. (London, 1895); Müller, *Allgemeine Ethnographie* (Wien, 1879).

NUBAR PASHA, nōō'bär pȧ-shä' (1825-99). An Egyptian statesman, born in Smyrna and brought up as a Christian. He was educated in Europe, and, beginning with his early entry into the public service, constantly sought to introduce European culture and administrative methods into his native land. After having been sent on frequent diplomatic missions, he was appointed in 1854 Ambassador at Vienna. The first Egyptian railway was built under his direction, and he concluded with the Powers negotiations for the construction of the Suez Canal (1864). He was Minister of Foreign Affairs in 1867-74 and again in 1875 and 1876, and Premier in

SEA SLUGS



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1 ÆOLID - HERMÆA BIFIDA
2 ÆOLID - ÆOLIS CORONATA
3 DENDRONOTID - DENDRONOTUS ARBORESCENS.
4 DORID - IDALIA ELEGANS
5 DOTONID - DOTO CORONATA
6 TRITONID - TRITONIA HOMBERGII.
7 DORID,- ANCULA CRISTATA.

1878-79, 1884-88, and 1894-95. As Minister of Foreign Affairs he organized mixed courts for the adjudication of causes between Europeans and Egyptians.

NU'BIA. An extensive region in Northeastern Africa, lying between Egypt proper and Kordofan. Its boundaries are now without political significance; the portion lying north of the 22d parallel of latitude has recently been incorporated with Egypt, while the remainder belongs to Egyptian Sudan (q.v.). Its limits have always been indefinite, and it may be roughly described as lying between the parallel of Khartum and that of the First Cataract and extending from the Red Sea to the Libyan Desert (Map: Africa, H 3). Vegetation is confined to a few scattered oases and to the very narrow valley of the Nile, which traverses the region in an extremely tortuous course, receiving the Bahr-el-Azrek, or Blue Nile, in the south, and, farther down, the Atbara. The remainder of the country consists of the sandy and rocky wastes known as the Nubian Desert, which toward the south begins to be covered with euphorbias and aloes as it merges into the tropical savanna-lands. The chief products of the oases are dates and gums, the latter derived chiefly from the acacias. The population consists partly of Hamitic and Arabian elements, partly of Nubians. The chief towns of the region are Omdurman, Khartum, Berber, and El-Ordeh on the Nile, and the port of Suakin on the Red Sea.

History. Nubia was a part of the ancient Ethiopia. The name seems to have been derived from the Egyptian and Coptic *noub*, gold, a name still retained in Wady Nouba. The dominion of the Pharaohs, when most extended, reached to the isle of Argo, the last place where the monuments of the Egyptians have been found. Under these monarchs Nubia was governed by a royal scribe, entitled Prince of Cush or Ethiopia, till the Twentieth Dynasty, when it appears to have been recovered by a series of native rulers, who ultimately conquered Egypt; and although driven back finally extended their rule from Meroë to Syene (Assuan), the most southern city held by the Egyptian monarchs and the Romans. Diocletian removed a negro tribe, called Nobatæ, to the district above Syene, to oppose the Blemmyes, who inhabited the western desert, now held by the Ababde and Bisharin Arabs. The Nobatæ and the Blemmyes intermingled, forming a negroid race which about the middle of the sixth century was converted to Christianity, and under Silko a powerful Christian State was established with Dongola as its capital. The Arabs made little headway against the rulers of the Christian kingdom until the fourteenth century, when Dongola fell, and the country was divided into a number of petty States. It was subdued by Mehemet Ali of Egypt in 1820-22 and remained under Egyptian control until it fell into the hands of the Mahdists in 1884-85. (See Mahdi.) The victories of the Anglo-Egyptian army under Lord Kitchener (1896-98) reëstablished the authority of the Egyptian Government over Nubia. See Egypt; Sudan. For a description of the peoples of Nubia see Nubia; Negro; Hamites; and Africa, section *Ethnology*.

ÑUBLE, nyo͞o'blȧ. One of the best populated provinces of Chile. It is bounded by Linares on the north, Concepción on the west and south, and Argentina on the east (Map: Chile, C 11). Its area is 3556 square miles. The eastern part belongs to the slope of the Andes, but the western section is generally level, flat, and very fertile. The climate is healthful and favorable for the cultivation of grain. Ñuble is one of the chief wheat-producing provinces of Chile. It affords good pasturage for cattle. The western part is traversed by a railway line. Population, in 1895, 152,935. Capital, Chillan (q.v.).

NUCELLUS (Neo-Lat., from Lat. *nucella*, diminutive of *nux*, nut). The body of the ovule of seed-plants, which is invested by one or two integuments. The nucellus is the essential part of the ovule (q.v.), as it contains the spore (megaspore, later the embryo sac) in which the embryo is developed.

NUCLE'OLUS (Lat., little nut). A small body, usually spherical in form, lying within the nucleus (q.v.). See Cell.

NU'CLEUS (Lat., little nut, kernel). A small body, usually spheroidal or ellipsoidal in form, which stains deeply and lies within the cytoplasm of the cell. It is generally regarded as a controlling centre of cell activity, and hence as a primary factor in growth, development, and the transmission of specific qualities from cell to cell, and so from one generation to another. In its improperly called 'resting place' the nucleus is globular and surrounded by a membrane. Within it there is an irregular network. The nucleus of certain tissue cells and of some unicellular organisms has been observed to undergo amœboid movements. In ciliate Infusoria, a large macronucleus and one or more micronuclei may be present in one and the same cell. Besides (1) a nuclear membrane, (2) a network or reticulum, (3) more or less rounded and irregular bodies, the nucleoli, exist in the nucleus, and (4) a clear nuclear sap, or 'karyolymph.' See Cell; Embryology; Mitosis.

NUDIBRANCHIATA, nū'dĭ-brăṉ'kĭ-ā'tȧ (Neo-Lat. nom. pl., from Lat. *nudus*, naked + *branchiæ*, from Gk. *βράγχια*, *branchia*, gills). A suborder of opisthobranch gastropods, hermaphroditic, destitute of shell, the primary gills completely aborted, and the secondary gills on the back of the body. Jaws and a well-developed radula are almost always present. The nudibranchs are often called 'sea-slugs' (q.v.). One (*Æolis pilate*) is common on the New England coast just below low-water mark. All the sea-slugs lay their eggs in jelly-like masses coiled up on stones and sea-weeds. Though the adults are shell-less, the embryos at first have a shell, indicating that the nudibranchs have descended from shelled gastropods. See Gastropoda; and accompanying Colored Plate of Sea-Slugs.

NUECES, nwā'sĕs. A river of southern Texas (Map: Texas, F 5). It rises in Edwards County in a range of low mountains, and flows southeastward for nearly 400 miles through an undulating prairie country, emptying into the Gulf of Mexico through the Bay of Corpus Christi. Under the Mexican régime it was the legal western boundary of the Province of Texas.

NUEVA CÁCERES, nwā'vȧ kä'thȧ-râs. The capital of the Province of Camarines, in southern Luzon, Philippines. It is situated at the foot of Mount Isarog, 10 miles south of the Bay of San Miguel, and at the head of navigation for steamers of 200 tons on the Bícol River (Map: Philippine Islands, H 6). It is an important road centre, a port of entry and telegraph station, and has a cathedral, a bishop's palace, a seminary, and a normal school. Population, in 1896, 11,550. Nueva Cáceres was founded in 1578, and was at first called Naga. It was at one time the chief bishop's see for the whole archipelago.

NUEVA ÉCIJA, ā′thê-hȧ. A province of central Luzon, Philippine Islands. It has an ocean frontage of 23 miles on the east coast of Luzon, and extends westward to the centre of the island, its southwestern corner being 30 miles north of Manila Bay (Map: Philippine Islands, E 4). Its area is 3840 square miles. The numerous river valleys are covered with a rich alluvial soil. The population of the province is essentially agricultural. The chief products are rice, corn, tobacco, and palay. There is a large boat traffic on the rivers, and a network of roads covers the greater part of the province. The population, in 1901, was estimated at 156,610, mostly Tagálogs. The capital is San Isidro (q.v.).

NUEVA ESPAR′TA. A State of Venezuela, which until 1901 formed a section of the State of Guzman Blanco. It consists of a group of islands, of which the principal is Margarita (q.v.).

NUEVA SAN SALVADOR, nwā′vȧ sän säl′vȧ-dōr′. A town of Salvador. See Santa Tecla.

NUEVA VIZCAYA, vēth-kä′yȧ. An inland province of northern Luzon, Philippine Islands (Map: Philippine Islands, F 3). It has an area of 1075 square miles. Almost the whole of the province is broken by the forest-covered foothills of the Sierra Madre on the east and the Cordillera Central on the west, between which runs the Magat River, a tributary of the Rio Grande de Cagayán. There are practically no manufactures or trade, even agriculture yielding scarcely enough for home consumption. The greater part of the province is inaccessible, and is inhabited by savage tribes, among whom the Igorrotes are prominent. The population in 1901 was estimated at 60,600. The capital is Bayombong (q.v.).

NUEVITAS, nwȧ-vē′tȧs. A town of the Province of Puerto Principe, Cuba, on the coast, 39 miles east of Puerto Principe, with which it is connected by rail (Map: Cuba, H 5). It is the most important port of the province, with a population, in 1899, of 4228.

NUEVO LAREDO, nwā′vō lȧ-rā′dō. A frontier town of Mexico, situated on the south bank of the Rio Grande, opposite Laredo, Texas. The town is the crossing point between Mexico and the United States of the Mexican National Railroad. Population, 2000.

NUEVO LEÓN, lȧ′ōn′, or New Leon. An inland State of Mexico, bounded by the State of Coahuila on the north and west, San Luis Potosí on the southwest, and Tamaulipas on the east and northeast (Map: Mexico, J 5). Area, 23,592 square miles. The State belongs partly to the Mexican plateau and is partly traversed by the Eastern Sierra Madre. In the north and northeast the country is low and slopes toward the Rio Grande. The rivers are numerous, but none of them suitable for navigation. The climate is not unhealthful, but the rainfall is irregular and droughts occur frequently. The soil is fertile. The chief products are sugar-cane and cereals. Stock-raising is also carried on to some extent. The State has good railway facilities and a considerable trade with the United States and the other Mexican States. Population, in 1900, 326,940. The capital is Monterey (q.v.).

NUISANCE (OF. *nuisance*, *noicence*, Fr. *nuisance*, from ML. *nocentia*, injury, from Lat. *nocere*, to harm). In common speech, anything which causes unusual and culpable annoyance, disturbance, or offense. As a legal term it is narrower, although scarcely more exact in signification. No definition has been offered which meets with general approval. Perhaps the best brief definition is that of Sir Frederick Pollock: "The wrong done to a man by unlawfully disturbing him in the enjoyment of his property, or, in some cases, in the exercise of a common right." It will be noticed that the gist of nuisance is the unlawful disturbance, annoyance, or discomfort which it produces. Accordingly, the same act may constitute a nuisance and another form of tort, such as trespass; in which case the injured party may seek redress for either of the two wrongs. This distinction has been recognized by English law from a very early period. Glanville, writing late in the twelfth century, and Bracton, writing in the next century, make it clear to us that the 'assize of nuisance,' or trial by jury in an action for nuisance, was distinct from the 'assize of novel disseisin,' as, later, it was distinct from the action of trespass.

Public Nuisance. Both of these ancient writers distinguish, as does modern law, between public and private nuisances. The former are offenses against the public at large, such as obstructing highways, polluting or diverting public waters, carrying on a business which is dangerous to the public health or offensive to the public, or maintaining disorderly houses, or indecent or disgusting exhibitions in a public place. Modern statutes have greatly extended the scope of public nuisances, but this legislation professes to observe the common-law test, viz. the tendency of the prohibited act, thing, or conduct to debase public morals, to endanger the health of persons generally, or to interfere unlawfully with their convenience. A public nuisance is a criminal offense and punishable as such by the State. If a legal proceeding is instituted for its abatement, this, too, must be brought and prosecuted by the public authorities. An individual will not be allowed to bring an action in his own name, either for damages or for abatement of a public nuisance, unless he can show three things: first, a particular injury to himself beyond that which is suffered by the rest of the public; second, that such injury is direct and not consequential; third, that it is substantial, not fleeting or evanescent. To illustrate: An unlawful obstruction in a highway constitutes a public nuisance, whether it does actual harm or not; but it will not support a private action by one owning property on the highway unless the latter can show that it has caused him special, direct, and substantial damage, such as diverting customers from his store, or preventing his passing to and from his premises.

Private Nuisance. An act or omission constituting a private nuisance is not generally a criminal offense. It may be, on the contrary, highly beneficial to the community. The tanning of leather, or the manufacture of illuminating gas, or the raising of pigs, is a lawful business and may be quite necessary, but if it is conducted in such proximity to any dwelling as to render the occupancy of it uncomfortable, it amounts to a private nuisance. It is no answer by the owner of such a business that its continuance will benefit thousands of people while harming but one. That one is entitled to the law's protection. Nor is it an answer that his business was established and conducted before I erected my dwelling. If it were, the owner of an offensive (though lawful) business could limit the growth of a city in his direction, or greatly depreciate the value of surrounding property. Still, a particular business will not be accounted a nuisance in one locality which will be considered such in another. A person who erects a dwelling in a locality given up to manufacturing or mining purposes must be deemed to assent to the sights, sounds, and odors of the locality.

Even when the discomfort or annoyance complained of is not a well-established incident of the plaintiff's surroundings, whether it is sufficient in kind or amount to constitute a nuisance is often a difficult question. It is clear that trifling and temporary discomforts must be put up with. The smoke that may, in certain conditions of the atmosphere, descend from a neighbor's chimney, the odors that may be wafted at times from his kitchen, though offensive and disagreeable, are not a nuisance. Between them and the dense smoke and fumes from a kiln or factory that render breathing difficult and produce nauseating sensations there is debatable ground, on which it is difficult to fix the exact point at which smoke and odors and noises become a nuisance in the eye of the law. On the one hand, it is not necessary to prove that they are such as to cause sickness. On the other, it is essential to show that they are of a character to damage property sensibly, or to render ordinary persons actually uncomfortable. Offense to an æsthetic taste or a peculiarly sensitive organism is not enough. The discomfort or annoyance must be that of the average person in the particular situation.

The right to maintain a nuisance cannot be acquired by prescription (q.v.) as against the public; but it may be gained as against individuals. Even in such cases the right is not easily acquired. The one asserting it must show that for twenty years he has continued the very nuisance under a claim of right adverse to that of the person now complaining of it (or of his predecessors in title) with the knowledge and acquiescence of the latter.

In some cases the maintenance of a nuisance may be legalized by statute. The power of the British Parliament in this direction is unlimited. In the United States Congress and the State legislatures are limited by constitutional provisions. A nuisance which amounts to the taking of private property cannot be constitutionally legalized unless due compensation is made to the victim of the nuisance. Even when the nuisance falls short of a taking of property, a statute purporting to legalize it is construed with much strictness. One who justifies under such a statute is bound to show a clear and unmistakable legislative sanction.

The remedies available to the victim of a private nuisance are three: abatement; a suit for damages; and an injunction. The first he may enforce with or without process of law. For example, he may cut off the boughs of overhanging trees, or pull down a ruinous structure that threatens to fall upon his property. One who thus takes the law into his hands needs to act with great care, for if he does more than is actually necessary to relieve himself of the nuisance, he becomes a wrongdoer himself. If he brings a suit for damages, he is entitled to nominal damages upon proving the nuisance; and in case he shows he has sustained actual damages, he is entitled to those. If the defendant has acted maliciously, he may be compelled to pay punitive damages. (See DAMAGES.) The most efficient remedy, however, is that of injunction (q.v.). Consult: Wood, *Law of Nuisances* (San Francisco, 1893); Garrett, *Law of Nuisances* (London, 1897); Pollock, *The Law of Torts* (ib., 1902).

NUKHA, nōō-kä′. A town in the Government of Yelizavetpol, Transcaucasia, situated about 150 miles northwest of Baku (Map: Russia, G 6). It is the centre of a silk-producing district. The town is Oriental in appearance. It was formerly the capital of a khanate, and retains the ruins of an ancient palace. Population, in 1897, 24,811, chiefly native Tatars and Armenians.

NÜLL, nụl, EDUARD VAN DER (1812-68). An Austrian architect, born in Vienna. He studied at the Academy, and with his fellow student, August von Siccardsburg, aimed at the promotion of the Renaissance style. Their sojourn in Italy was supplemented by a study trip to France, England, and Germany, and on their return to Vienna Nüll was appointed professor at the Academy. Henceforth associated in the construction of various noteworthy edifices, their joint activity reached its brilliant climax in the erection of the splendid Vienna opera house (1861-68). Before its completion Nüll took his life in a fit of melancholia.

NULLIFICATION (Lat. *nullificatio*, contempt, making as nothing, from *nullificare*, to despise, make as nothing, from *nullus*, none + *facere*, to do, make). In American history, the formal suspension by a State within its territorial jurisdiction of a law of the United States. The right was first asserted in the famous Virginia and Kentucky Resolutions (q.v.) of 1798 and 1799. Jefferson and Madison were the spokesmen of Kentucky and Virginia respectively. In the Kentucky Resolutions of 1798 which were adopted by the Legislature, it was declared that the Union was a 'compact,' and, as in other cases of compact, each party had a right to judge for itself of infractions and of the mode of redress. The resolutions of 1799 went even further, and declared that a nullification by the State sovereignties of all unauthorized acts done under cover of the Constitution was the rightful remedy in cases of infraction. The Virginia Resolutions did not go so far, but characterized the Union as a 'compact' and called upon the other States to join her in declaring the Alien and Sedition Laws null and void. No further action was taken for the time by these or other States to put into execution the methods of 'redress' here enunciated. After this there were occasional attempts to defeat the execution of legislative acts or judicial mandates of the United States courts, but with only partial success. Thus in 1809 the Government of Pennsylvania ordered out the militia to resist a mandate of the Federal court. Again, after the enactment of the Embargo Act the governments of several of the New England States, whose commerce and trade had been nearly destroyed, resorted to various means either of judicial construction or evasion to nullify the operation of the United States statute. The second war with Great Britain, which was vigorously opposed in New England, increased the nullification spirit in that section. In several States the operation of Federal enlistment statutes was defeated by the refusal of the State governments to comply with their requirements, and the opposition to the war policy increased to such an extent that a convention was called at Hartford with a view, it was believed, of taking steps toward separation from the Union. (See HARTFORD CONVENTION.) A somewhat successful nullification of the Federal will occurred in Georgia in 1825-29 through the assertion by the State Government of jurisdiction over the lands occupied by the Cherokee Indians. In none of these cases was the constitutional right to suspend a law of the United States made the basis of the violation. The first open assertion of nullification as a constitutional right of each individual State appeared in a paper prepared by John C. Calhoun in 1828 for the use of the South Carolina Legislature, and entitled *The South Carolina Exposition*. In this paper Calhoun argued that the States were sovereign, that the Federal Government was their agent, and that whenever a sovereign State became satisfied that the agent was misusing the powers delegated to it it was the right of such State to interpose and suspend the operation of the power thus being abused. According to this view the State had only to decide that a given statute of Congress was unconstitutional or oppressive, and then, acting through a convention (for Calhoun did not recognize the right of the Legislature in the premises), formally to suspend its further operation within the territory of the State until three-fourths of the States in national convention should declare the suspended act of Congress a valid and reasonable law. In 1830, after the publication of the *South Carolina Exposition*, Senator Robert Y. Hayne (q.v.), from South Carolina, in the celebrated debate with Daniel Webster (on the Foote resolution), made a brilliant defense of the nullification doctrine, and insisted, unlike Calhoun, that the formal act of suspension could be made by the Legislature. The immediate occasion for the assertion of the right of nullification by the two Carolinas was the rapid growth of the system of protective tariffs which, it was claimed, acted injuriously upon South Carolina and the Southern States generally, where manufacturing industries had not gained a foothold. The Tariff Act of 1824, itself containing high protective features, had been followed by the so-called 'tariff of abominations' of 1828, and a tariff act but little less favorable of 1832. The time had now arrived for the trial of the new theory, and accordingly the Governor of South Carolina called the Legislature together for such action as it might deem proper. The Legislature summoned a convention representing the 'sovereignty' of the State, and on November 24, 1832, this body passed an ordinance declaring the tariff acts of 1828 and 1832 null and void, prohibited the payment of duties after February 1, 1833, forbade appeals, on the questions involved, to the Supreme Court of the United States, and declared that if the Government of the United States attempted to interfere South Carolina would no longer consider herself a member of the Union. The new Legislature, which met in December, put the State on a war footing and passed a series of acts to enable the State officers to carry out the policy of nullification. Meantime President Jackson took measures to enforce the collection of the duties at Charleston, and on December 11th issued his celebrated proclamation warning the people of South Carolina that they were being misled by designing men, whose object was disunion and treason, and that he had no discretionary duty, but must enforce the laws of the Union. Congress came to his aid and passed the so-called 'Force Bill' in March, 1833, but in the meantime a compromise tariff measure had been agreed upon and made further resort to the Force Bill unnecessary. On March 6th the South Carolina convention met and repealed the ordinance of nullification. The conflict was thus postponed, and whether Union or nullification triumphed in this controversy is still a debatable question. Consult: Johnston, in Lalor, *Cyclopædia of Political Science* (New York, 1893); Houston, *A Critical Study of Nullification* (ib., 1896); and Powell, *Nullification and Secession* (ib., 1897).

NULLIPORE (from Lat. *nullus*, none + *porus*, passage, pore). A general name for the more massive coral-like calcareous algæ that grow on the outside of coral reefs and thus afford some protection to the more delicate corals growing inside. They belong to the Rhodophyceæ. The most important genus is Lithothamnium. See CORALLINÆ.

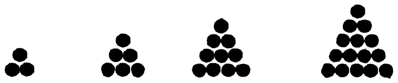
NUMANTIA, nû-măn′shĭ-ȧ. The chief town of the Celtiberian people called Arevaci in ancient Spain. It was situated on the Douro (Durius), in the neighborhood of the present Soria in Old Castile. The site is probably marked by the present Puente de Garray. Numantia is celebrated for the heroic resistance which it made to the Romans, from B.C. 153, when its citizens first met a Roman army in battle, to B.C. 133, when it was taken and destroyed by Scipio the Younger, after a siege of fifteen months, in the course of which famine and the sword had left alive very few of its 8000 brave defenders. See article SCIPIO.

NU′MA POMPIL′IUS. In the mythic history of Rome, the successor of Romulus. He was a native of Cures in the Sabine country, and was universally reverenced for his wisdom and piety. Unanimously elected King by the Roman people, he soon justified by his conduct the wisdom of their choice. After dividing the lands which Romulus had conquered, he proceeded, with the assistance of the sacred nymph Egeria, to draw up religious institutions for his subjects, and thus stands out in the primitive legend as the author of the Roman ceremonial law. His reign lasted for thirty-nine years, and was a golden age of peace and happiness. The only feature in the myth of Numa Pompilius which we can regard as probably historical is that which indicates the infusion of a Sabine religious element into Roman history at some remote period.

NUMA ROUMESTAN, nų′må rōō′mĕs′tăɴ′. A romance by Alphonse Daudet (1881), and the name of its chief figure, a typical Provençal who has been identified as Gambetta. The thread of the story is the opposition of the northern and southern temperaments, as shown in the light-hearted and irresponsible Numa and his Parisian wife, Rosalie, and is the antithesis in development of the author's happy relations with his northern wife.

NUMBER (OF., Fr. *nombre*, from Lat. *numerus*, number; connected with Gk. *νέμειν*, *nemein*, to distribute, and ultimately with Goth. *niman*, OHG. *neman*, Ger. *nehmen*, obsolete Eng. *nim*, to take). Number is the result of counting or of the comparison of a magnitude with a standard unit. This is more precisely expressed by Newton's definition—the abstract ratio of one quantity to another of the same kind. If a name is attached to the abstract number to indicate the nature of the quantity measured, the resulting number is said to be concrete. Thus, the ratio of the length of a room to one yard may be the abstract number 5; but 5 yards, the measure of the length of the room, is a concrete number. In the evolution of number through the application of the fundamental operations to positive integers, there have arisen the fraction, the irrational number, the negative number, and the complex number. All these kinds of number may be found described in special articles.

Various classifications of numbers, some of which have become obsolete, date from the time of Pythagoras. Among those extant are *odd* and *even*, *prime* and *composite*, *rational* and *irrational*, and *figurate* numbers. The last classification grew out of the Greek tendency to associate numbers with geometric ideas. This notion may be illustrated by arranging groups of dots corresponding to the numbers 3, 6, 10, 15, as shown in the figures.



These forms, being triangular, suggest the propriety of calling the numbers 3, 6, 10, 15, *triangular* numbers. In the same way the numbers 4, 9, 16, 25, came to be called *square* numbers. Since other series of numbers can be made to correspond to pentagons, and still others to various other polygons, the general term *polygonal* numbers was applied to all numbers of this class. An arithmetic definition of polygonal numbers as old as Hypsicles reads, "If as many numbers as you please are set out at equal intervals from 1, and the interval is 1, their sum is a triangular number; if the interval is 2, a square; if 3, a pentagonal; and generally the number of angles is greater by 2 than the interval." Spherical shot piled in the form of triangular pyramids, or square pyramids, or held in cubical boxes suggest numbers which were called *pyramidal* and *cubical*. For example, 4, 10, 20 are pyramidal numbers, and 8, 27, 64 are cubical numbers. The fact that some of these numbers correspond to figures of two dimensions and others to those of three dimensions also gave rise to the classifications *plane* and *solid*. The numbers in each of these groups belong to a series which has special properties and which is usually discussed in works on higher algebra under the title *Figurative or Polygonal Numbers*. Among the obsolete classifications are *amicable* (q.v.), *perfect*, *defective*, *redundant*, and *heteromecic* numbers. A perfect number is one equal to the sum of its aliquot parts; e.g. $6 = 1 + 2 + 3$. If the sum of the aliquot parts exceeds the number, it is called redundant; if it is less, defective. A heteromecic number is a number of the form $m\ (m + 1)$.

THEORY OF NUMBERS. This is one of the most intricate and extensive branches of mathematics. It treats principally of the forms and properties of numbers. Thus, many indeterminate problems of the Diophantine type (see DIOPHANTINE ANALYSIS) belong to this subject; e.g. to find two numbers the sum of whose squares shall be a square number is a condition satisfied by 5 and 12, 8 and 15, 9 and 40. . . . To find three square numbers in arithmetical progression is a condition satisfied by 1, 25, and 49, or by 4, 100, and 196. Various algebraic formulas serve to express all integers by assigning proper values to the letters involved. Thus by giving to m the successive values 0, 1, 2, 3,......$2m$ any of the following groups of formulas: $2m$, $2m + 1$; $3m$, $3m + 1$, $3m + 2$; $4m$, $4m + 1$, $4m + 2$, $4m + 3$, the natural series of numbers results. This is evident since there is one number between every two consecutive even numbers, there are two numbers between every two consecutive multiples of three, three between every two consecutive multiples of four, and so on. By means of such formulas, many properties of numbers may easily be exhibited. E.g. the product of two consecutive numbers is divisible by 2. Let $2m$ be one of the numbers; then the other is either $2m + 1$ or $2m - 1$; the product, $2m\ (2m + 1)$, contains 2 as a factor, and hence is divisible by 2. The product of three consecutive numbers is divisible by 6. For, let $3m$ be one of the numbers (as in every triad of consecutive numbers one must be a multiple of 3), then the others are $3m - 2$ and $3m - 1$, or $3m - 1$ and $3m + 1$, or $3m + 1$ and $3m + 2$. Each of the three possible products, $3m\ (3m - 2)(3m - 1)$, or $3m(3m - 1)(3m + 1)$, or $3m(3m + 1)(3m + 2)$, is obviously divisible by 3; and as, besides, at least one of each pair of factors by which $3m$ is multiplied is an even number, the product must also be divisible by 2; but being divisible by 3 and by 2, it is divisible by 6. It may similarly be shown that, in general, the product of n consecutive integers is divisible by $1 \cdot 2 \cdot 3 \ldots\ldots\ldots\ldots n$, called factorial n. These propositions form the basis of proof for many properties of numbers, such as: the difference of the squares of any two odd numbers is divisible by 8; the difference between a number and its cube is the product of three consecutive numbers, and is consequently always divisible by 6; any prime number which, when divided by 4, leaves a remainder unity, is the sum of two square numbers (thus, $41 = 25 + 16 = 5^2 + 4^2$, $233 = 169 + 64 = 13^2 + 8^2$, etc.). Besides these there are a great many interesting properties of numbers which do not come under any of the common classifications. Thus, the sum of the first n odd numbers equals n^2; e.g. $1 + 3 + 5 = 3^2$; $1 + 3 + 5 + 7 = 4^2$, etc.

HISTORY. No essential advance was made in the theory of numbers beyond the knowledge of the Greeks until the time of Vieta and Bachet (1612). The latter gave a satisfactory treatment of indeterminate equations of the first degree in his *Problèmes plaisants et délectables* (1612; 5th ed. 1884). Fermat (works published posthumously, 1670, 1679) enlarged the theory of primes and proved some of the most elegant properties of numbers. Legendre (1798), in his valuable *Essai sur la théorie des nombres*, epitomized all the results that had been published up to his time, and contributed original and brilliant investigations, especially on the law of quadratic reciprocity. Gauss (1801) called this law the *Theorema Fundamentale in Doctrina de Residuis Quadratis*. It relates to the following property of two odd and unequal prime numbers: Let $\left(\frac{m}{n}\right)$ be the remainder which is left after dividing $m^{\frac{n-1}{2}}$ by n, and let $\left(\frac{n}{m}\right)$ be the remainder left after dividing $n^{\frac{m-1}{2}}$ by m. These remainders are always +1 or —1. Whatever the prime numbers m and n may be, we always obtain $\left(\frac{n}{m}\right) = \left(\frac{m}{n}\right)$ in case the numbers are not both of the form $4x + 3$. But if both are of the form $4x + 3$, then we have $\left(\frac{n}{m}\right) = -\left(\frac{m}{n}\right)$. These two cases are comprised in the formula $\left(\frac{n}{m}\right) = (-1)^{\frac{m-1}{2}\cdot\frac{n-1}{2}}\left(\frac{m}{n}\right)$. Propositions embodying this law occupied the attention of Cauchy, Jacobi, Eisenstein, and Kummer. Up to 1890, twenty-five distinct demonstrations of the law of quadratic reciprocity had been published, making use of induction and reduction, of the partition of the perigon (see POLYGON), of the theory of functions, and of the theory of forms.

The *theory of primes* attracted many investigators during the nineteenth century, but the results were detailed rather than general. Tchebisheff (1850) was the first to reach any valuable conclusions in the way of ascertaining the number of primes between two given limits. Riemann (1859) also gave a well-known formula for the limit of the number of primes not exceeding a given number.

To Kummer is due the treatment of *ideal numbers*, a part of the general theory of complex numbers. They are defined as factors of prime numbers, and possess the property that there is always a power of these ideal numbers which gives a real number. E.g. there exist for the prime number p no rational factors such that $p^3 = A \cdot B$, where A is different from p and p^2; but, in the theory of numbers formed from the twenty-third roots of unity, there are prime numbers p which satisfy the condition named above. In this case, p is the product of two ideal numbers, of which the third powers are the real numbers A and B, so that $p^3 = A \cdot B$.

The *theory of congruences* may be said to start with Gauss's *Disquisitiones*. He introduced the symbolism $a \equiv b \pmod{c}$, and explored most of the field. Tchebisheff published in 1847 a work upon the subject in Russian, and Serret did much toward making the theory known in France.

The *theory of forms* (see FORMS) has been developed by Gauss, Cauchy, Poinsot (1845), Lebesgues (1859, 1868), and notably Hermite. In the theory of ternary form Eisenstein has been a leader, and to him and H. J. S. Smith (q.v.) is also due a noteworthy advance in the theory of forms in general. Smith gave a complete classification of ternary quadratic forms, and extended Gauss's researches concerning real quadratic forms to complex forms. The investigations concerning the representation of numbers by the sum of 4, 5, 6, 7, 8 squares were advanced by Eisenstein, and the theory was completed by Smith.

The theory of *irrational numbers* (see IRRATIONAL NUMBER), practically untouched since the time of Euclid, received new treatment at the hands of Weierstrass, Heine, G. Cantor, and Dedekind (1872). Méray had taken in 1869 the same point of departure as Heine, but the theory is generally referred to the year 1872. Weierstrass's method has been completely set forth by Pincherle (1880), and Dedekind's has received additional prominence through the author's later work (1888), the recent indorsement by Tannery (1894), and, in America, the recent (1901) translation of his work. Weierstrass, Cantor, and Heine base their theories on infinite series, while Dedekind founds his on the idea of a cut (*Schnitt*) in the system of real numbers, separating all rational numbers into two groups having certain characteristic properties. The subject has received later contributions at the hands of Weierstrass, Kronecker, and Méray.

The theory of *continued fractions* (due to Cataldi, 1613) was brought into prominence by Lagrange and further developed by Druckenmüller (1837), Kunze (1857), Lemke (1870), and Günther (1872). Ramus (1855) first connected the subject with determinants, to which phase Heine, Möbius, and Günther also contributed. Dirichlet also added to the general theory, as have numerous contributors to the applications of the subject.

Transcendental numbers were first distinguished from algebraic irrationals by Kronecker. Lambert proved (1761) that π (see CIRCLE) cannot be rational, and that e^n (e being the base of hyperbolic logarithms and n being rational) is irrational. Legendre (1794) showed that π is not the square root of a rational number. Liouville (1840) showed that neither e nor e^2 can be a root of an integral quadratic equation. But the existence of transcendental numbers was first established by Liouville (1844, 1851), the proof being subsequently displaced by G. Cantor's (1873). Hermite (1873) first proved e to be transcendental, and Lindemann (1882), starting from Hermite's conclusions, showed the same for π. Lindemann's proof was much simplified by Weierstrass (1885), still further by Hilbert (1893), and has finally been made elementary by Hurwitz and Gordon.

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TIONAL NUMBER; NEGATIVE QUANTITY; COMPLEX NUMBER; QUATERNIONS.

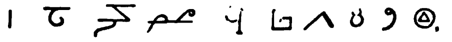
NUMBERS (Lat. *Numeri*, Gk. *'Αριθμοί*, *Arithmoi*, Heb. *Bĕmidbār*, in the wilderness, the fourth word of the book), BOOK OF. The fourth book of the Pentateuch. It consists of thirty-six chapters, and receives its common name 'Numbers' from the repeated references to the 'numbering' of the people which it contains. It is not a separate work, but constitutes a division of the group of six books—Pentateuch and Joshua—now designated by scholars as the *Hexateuch* (q.v.). The sources in the book are precisely the same that are found in the other divisions of the Pentateuch, viz. (a) the historical compilation designated as JE (see ELOHIST AND YAHWIST); (b) the Priestly narrative, including portions of the Priestly Code (see LEVITICUS; HEXATEUCH); together with (c) the usual additions and editorial insertions of the group of writers who welded these constituent elements into a consistent whole. The book in its present form falls naturally into three main sections: (a) i.-x. 10; (b) x. 11-xix.; (c) xx.-xxxvi. The first section embraces: (1) the census of the people (i.-ii.); (2) series of ordinances for the Priests and Levites (iii.-iv.), including general and specific duties, positions among the tribes, and census of Levites; (3) various laws—leper, marital jealousy, nazirite (v.-vi.); (4) dedication of altar (vii.); (5) miscellaneous ordinances with illustrative cases (viii.-x.10). The second section contains: (1) the wanderings (x. 11-28); (2) revolts against Moses by the people, Aaron, and Miriam (xi.-xii.); (3) spies sent to Canaan (xiii.-xiv.); (4) various ordinances (xv.); (5) rebellion of Korah with story of Aaron's selection (xvi.-xvii.); (6) ordinances for priests and people (xviii.-xix.). The third section embraces: (1) continuation of narrative of traditional history in the wilderness (xx.-xxi.); (2) story of Balaam (xxii.-xxiv.); (3) story of cult of Baal-peor (xxv.); (4) second census (xxvi.); (5) groups of ordinances with historical setting and illustrative cases (xxvii.-xxxvi.).

The Book of Numbers thus furnishes an admirable illustration of the method pursued by the Hebrew compilers in combining various historical sources and in using the Priestly Code (from which all the legal portions of the book are taken) as historical material to illustrate and confirm the religious point of view of the later editors and the theory upon which they base their historical narrative, which carries the complete religious organization of Israel back to the days of Moses. See HEXATEUCH.

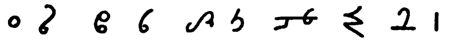
BIBLIOGRAPHY. Besides the commentaries of Dillmann, Strack, Bennett, and the forthcoming ones of Baentsch and Gray, and the introductions to the Old Testament by Driver, Cornill, Wildeboer, Kuenen, and Kautzsch, consult Addis, *Documents of the Hexateuch* (London, 1898); Carpenter and Battersley, *The Hexateuch* (London, 1900).

NUMB-FISH. A torpedo-ray. See TORPEDO.

NUMERALS (Lat. *numeralis*, relating to number, from *numerus*, number). A system of figures or symbols to represent numbers; more particularly the Hindu or Arabic system, which employs the characters 0, 1, 2, ... 9, of which all, or sometimes the last nine, are called 'digits.' Thus we speak of writing the *numeral* for 'five' meaning '5.' The word, however, is applied to other systems, as in speaking of the Roman numerals or the Greek numerals. Our common numerals come from old Sanskrit alphabetic forms. They appear in the tenth century in the form:



being attributed to Boëthius (q.v.), but are probably due to some later writer. In substantially this form, they are found in the time of Gerbert (see SYLVESTER II.), written upon counters for use upon one kind of the abacus (q.v.), and bearing the name 'apices.' This form is essentially that of the *Gobar* or *Gubar* (dust) numerals, possibly so called because they were written on the sanded board used in the Orient. These numerals appear among the Western Arabs of that period in the following form written from right to left:



These numerals changed slowly from the time of their introduction into Europe, notably by Gerbert and Leonardo of Pisa (see FIBONACCI), until they had assumed, at the close of the fifteenth century, a form approximately like those known to us. Printed arithmetics then began to appear, and they acted as an obstacle to further changes. These numerals, inherited from the Arabs, have commonly been designated as Arabic, although in their origin they might more properly be called Hindu. Since, however, they were not particularly usable until the introduction of the zero made possible a place value, and since the zero was introduced, so far as we know, by Arab writers, the credit may well be given to the latter. The common numerals are well adapted to the decimal system, having exactly ten symbols. The Roman numerals, on the contrary, while used with a decimal system of counting, were not well adapted to it, and allowed for no simple place value. See NOTATION; NUMERATION.

NUMERATION (Lat. *numeratio*, a counting, from *numerare*, to count, from *numerus*, number). The oral as opposed to the written expression of numbers. Numeration implies the naming of numerals (q.v.) and groups of numerals expressing numbers, the nomenclature thus employed having much to do with the efficiency of the system. Thus, if to every number there corresponded an independent name, a lifetime would not be sufficient in which to learn the numbers from one to a million. The common or decimal system proceeds by using independent names for a few of the smaller numbers and certain groups, and then repeats these names to express various numbers of groups. In this system the fundamental group is ten, independent names are given to the numbers represented by 1, 2,....9, 10, 100, 1000, 1,000,000, and all intervening numbers are expressed by combining these names. In the evolution of language the names of a few numbers have lost their suggestiveness, but they are probably not exceptions to the regular system of formation; e.g. the etymologies of eleven and twelve suggest their original meaning to have been *one plus ten* and *two plus ten*.

In reading numbers it is convenient to separate the digits, beginning at the decimal point, into groups of three each. The groups of integers are then expressed by units, thousands, millions, billions, trillions, etc. Each group of integers includes three orders, viz.: (1) the order of the group itself; (2) the tens of that order; and (3) the hundreds of that order. Similarly, in each group of decimals the three orders are: (1) the order of the group itself; (2) the hundredths of the order of the preceding group; and (3) the tenths of the order of the preceding group. Thus, for example, the number 9,321.34567 is expressed:

Thousands	Units			Thousandths			Millionths		
thousands	hundreds	tens	unit	tenths	hundredths	thousandths	ten-thous.	hundred-thous.	millionths
9	3	2	1	3	4	5	6	7	0

Usage has not fully determined the names to be employed beyond hundred millions. The French and Americans call 1000 millions a billion; the English and Germans use the word billion to designate a million million, and so on in groups of six figures.

NUMERICAL NOTATION. In modern music, a system used in theoretical works on music, of indicating single tones or entire chords by means of numerals. Every tone of a musical instrument can be denoted by a numerical sign indicating accurately its pitch. Middle C (the first note of the treble-clef requiring a leger-line *below*, or the first note of the bass-clef requiring a leger-line *above*) is denoted by the small letter c with the number 1 placed on the right side above, c^1. The tones of the octave below this middle C are indicated by the *small* letters of the alphabet *without* any numbers, c, d, e, f, g, a, b; the next lower octave by the *capital* letters, C, D, E, F, G, A, B; the octave below this by capitals with the number 1 (either on the right side above, or, better, on the left side below), ${}_1$C, ${}_1$D, ${}_1$E, or C^1, D^1, E^1, etc. The octave beginning with middle C adds the number 1 to the *small* letters, c^1, d^1, e^1, etc.; the next octave adds 2, c^2, d^2, e^2, etc.; the next 3, c^3, d^3, e^3, etc. This system of notation is especially used in indicating the range of various instruments. The range, therefore, of the piano can briefly be indicated as from ${}_1$A — c^5. The pitch of the different strings of the violin is accurately indicated by g, d^1, a^1, e^2; of the cello by C, G, d, a.

Arabic figures are also used to indicate the fingering in compositions. For finger-marking on the violin only four numbers are used, as the thumb is not used in playing that instrument. 1 refers to the index, 2 to the middle finger, etc. In marking the fingering of piano compositions the thumb is indicated by 1, the index by 2, middle finger by 3, etc. The older system of marking the thumb by x, and the other fingers as in violin-music, has fallen into complete disuse. For use of figures in figured bass notation, see FIGURED BASS.

In violin music the Roman numerals I, II, III, IV represent the strings e, a, d, g, respectively, but ordinarily Roman figures are employed to indicate chords. A large figure indicates a major, a small a minor, triad. The name of the key is placed before the figure, a capital letter to denote a major, a small letter to denote a minor key. Thus A IV means the subdominant of A major (a major chord on the fourth degree of A); C iii, the minor triad on the third degree of C major; a V, the dominant of A minor (a major triad on the fifth degree). A diminished triad is marked by a small figure with a 0 on the upper right side; an augmented triad, by a prime (′). Thus Dvii^{0} means the diminished triad on the seventh degree of D major (c♯, e, g); fIII′, the augmented triad on the third degree of F minor (a♭, c, e). Chords of the seventh are indicated as the triads with an Arabic 7 on the lower right side; GV$_7$ means the chord of the dominant seventh in G (d, f♯, a, c); bvii$^{0}_{7}$, the chord of the diminished seventh in B minor (a♯, c♯, e, g). This system was introduced by the eminent theorist G. Weber.

NUMIDIA (Lat., from *Numida*, Numidian, nomad, from Gk. *νομάς*, *nomas*, nomad, from *νέμειν*, *nemein*, to pasture, to distribute). Originally the Roman name for that part of Northern Africa lying between the provinces of Africa Propria and Mauretania, corresponding very nearly to the modern Algeria. It was bounded on the west by the river Mulucha (now Muluya), which separated it from Mauretania, and on the east by the river Tusca (now Wadi-el-Berber). On the south it reached to the chains of Mount Atlas and the Lacus Tritonis, which separated it from the land of the Gætulians and Libya. The inhabitants of Numidia, as of Mauretania, belonged to the race from which the modern Berbers are descended. They were a warlike race and excelled as horsemen, but were faithless and unscrupulous. Of their tribes, the ***Massyli*** in the east and the ***Massæsyli*** in the west were the most powerful. In the great struggle between the Carthaginians and the Romans they at first fought on the side of the former, but subsequently the King of the eastern Numidians, Masinissa (q.v.), joined the Romans, and rendered them effective service in the war with Hannibal. Favored by the conquerors, he united all Numidia under his sway. Of his successors in this kingdom, Jugurtha and Juba I. are the most famous. After the victory of Cæsar over Juba in the African war, Numidia became a Roman province (B.C. 46) under the name of Africa Nova, but Augustus afterwards gave the western part—from the river Ampsaga, now Wadi-el-Kebir—with Mauretania to Juba II., and the eastern part was united with Africa Vetus to form the new Province of Africa. The Emperor Septimius Severus erected Numidia once more into a province. It was conquered successively by the Vandals, the Byzantines, and the Arabs. Before the invasion of the Vandals, Numidia was a stronghold of African Christianity, and the jealousy between the Numidian bishops and the clergy of Carthage was one of the causes that brought about the Donatist Schism. See DONATISTS.

NUMIDIAN CRANE. See CRANE.

NUMISMATIC AND ARCHÆOLOGICAL SOCIETY, THE AMERICAN. An association organized in 1858 and incorporated in 1865. Its objects are the collection of coins and medals, the investigation of matters connected therewith, and the spreading of the science of numismatology. The society has a membership of three hundred, and its headquarters are in New

York City, where it possesses a valuable collection and a good library of books on numismatics, archæology, and kindred topics.

NUMISMATICS (from Lat. *numisma*, *nomisma*, from Gk. *νόμισμα*, coin, legal tender, from *νομίζειν*, *nomizein*, to use customarily, from *νόμος*, *nomos*, law, custom). The science which has for its object the study of coins and medals in their historical, artistic, iconographic, and economic aspects. In so far as it concerns ancient coins, numismatics is a branch of archæology; but as, in its broadest scope, it includes the coins of *all* times and peoples, it is a distinct science, wider in its field than any of those branches of investigation which it serves so well to elucidate and expand.

MATERIAL OF THE STUDY. NOMENCLATURE. The material of the study is the *coin* (a word derived through the French *coin*, 'a die,' from the Latin *cuneus*, 'wedge'), which is, strictly speaking, a piece of *metal* stamped with a *legal impress* for *public circulation*. Isidorus (*Origines*, xvi. 17) well expresses this definition: "There are three essentials of a coin: metal, legal type, and weight. In the absence of any of these essentials, it will not be a coin." In its strict application, then, numismatics should confine itself to the legal metallic currency of government, to the exclusion of all else. But there are many objects that bear so close a resemblance in form or in usage to actual coins, that they are naturally and inevitably included in the study. Such are *medals*, struck in commemoration of an event or a person, and not for circulation as money (see MEDAL); the ancient *contorniates*, the use of which is not yet fully understood, though they may well have served as checkers in the games; the obscene *spintriæ;* the so-called *tesseræ* of ivory, bone, or lead; and in modern times, siege-pieces; jetons; hard times, tradesmen's, bank tokens, and paper currency, not to speak of such primitive mediums of exchange as the cowry-shells of India and the wampum of the American Indians.

Numismatics has an exact terminology peculiar to its own needs. That side of the coin on which the face or main device is struck is called the *obverse* (Ger. *Hauptseite*, Fr. *droit* or *avers*, It. *diritto*), while the other side is known as the *reverse* (Ger. *Rückseite* or *Kehrseite*, Fr. *revers*, It. *rovescio*). The characteristic device on either side, whether portrait, figure, or scene, is called the *type*. In describing the type, the terms 'to right,' 'to left' refer to the right and left of the spectator. Besides the 'type' there is often a small figure, or adjunct (especially in ancient coins), as a mint-mark, or the like, which serves to identify the coin more closely. This is called a *symbol*. The principal inscription of either side, which may be circular, following the line of the rim, or in one or more lines across the surface, is called the *legend*. That part of either surface left unoccupied by *type* and *legend* is known as the *field*, and is often occupied by symbols, letters, or monograms. The lower portion of the field, separated from the rest by a horizontal line, is the *exergue*. The term *flan* is applied to the disk, or blank, of metal, ready to be coined, and hence to the coin itself regarded as a metallic disk. Thus a coin is said to be struck on a broad or narrow *flan*. The diameter of the *flan* determines the *module*, or measurement, of the coin. Three systems are in vogue for measuring coins: (a) the so-called 'Mionnet's scale,' a purely arbitrary method based on circles of varying diameter, used mostly in the older works, and now obsolete; (b) by fractions of the inch; this is the recognized usage in England; (c) by millimeters. The last is the most scientific method, and is in use on the Continent of Europe and largely in this country as well. The weight of coins is often a very important consideration, especially in determining the place of ancient coins. In England the weight is registered in troy grains. On the Continent, however, and largely in America, it is given in grams. One gram is equal to about fifteen grains. *Patina* is a technical term of ancient numismatics. Copper coins that have long lain in the ground, in connection with certain salts there existing, acquire a delicate surface-oxidation, generally green, which is called *patina*, and adds much to the beauty of the coin. Coins so oxidized are said to be *patinated*. There are two ways of making coins: (a) by *casting* in molds, the more primitive method, afterwards mostly confined to counterfeits; (b) by *striking* with dies. Even in the case of *struck* coins, the flan is often prepared by casting.

The various *metals* used for coinage deserve a word of elucidation. (A) *Gold* was the standard metal of Asia Minor in the earliest times. It was rarely coined in Greece proper, but was largely minted by Alexander the Great and his immediate successors, by the Egyptian Ptolemies, in the Græco-Bactrian Empire, and at certain West Hellenic cities, as Syracuse in Sicily and Tarentum in Italy. The Romans first coined gold for the payment of their troops engaged in war against Hannibal in Southern Italy (B.C. 216-202). During the Republican period gold was coined only at irregular intervals and in limited quantities. But with Augustus and his successors there were enormous issues of gold currency, until the third century, when it became rare, until again renewed by Constantine and the later Roman and Byzantine emperors. Again, during the Dark Ages, in Europe gold fell into disuse as money, to be revived in modern times. It is now the standard in most civilized countries. (B) *Electrum*, a natural alloy of gold and silver in the proportion, roughly speaking, of 73 parts gold to 27 silver, found in the river-beds of ancient Lydia in Asia Minor, was largely coined by the kings of that country and by the Grecian cities along the neighboring coast, especially Cyzicus and Phocæa. An artificially made electrum was used for coins at Carthage, at Syracuse, and by some of the Gallic chiefs. Electrum has the color of very pale gold, whence it was sometimes called 'white gold' (*λευκὸς χρυσός*) by the Greeks. (C) *Platinum* was coined extensively instead of gold in Russia from 1828 to 1846.

(D) *Silver* was the earliest, and always remained the standard, coinage of Greece. It was introduced into Rome B.C. 268, and was universal in ancient, as it is in modern, times. During the Middle Ages it was the standard currency, but is now replaced as such by gold in most countries, being used only for subsidiary coinage. (E) *Billon* is a name applied to certain base coins of ancient times, having silver for a basis with a very heavy alloy of copper, tin, or lead. Such were the *denarii* and *antoniniani* substituted for silver at Rome from Caracalla (A.D.

211) to Diocletian (c.300 A.D.), and the base tetradrachms struck during the Roman Empire at Alexandria in Egypt, Antioch, and Cæsarea in Cappadocia. The latter are sometimes described as of *potin*, but see below. (F) *Copper* was the original standard of value in Italy, and remained the only coinage in Rome until the introduction of silver in B.C. 268, when it tended more and more to become a purely subsidiary coinage. In Greece the standard was, and always remained, silver, though here, as in the East, copper was earlier used for the smaller values. The Greeks derived their copper largely from Cyprus, whence its name, χαλκὸς κύπριος, *æs cyprium*, or simply *cyprium* or *cuprum*, from which our word 'copper' is derived. The ancient coined copper had a strong alloy of tin; in other words, was really bronze. See also below, under *Brass*. Copper has since always been in common use for 'small change.' (G) *Potin*, or 'pot-metal,' bears the same relation in numismatics to copper as 'billon' to silver. It is technically a mixture of bronze (i.e. copper + tin) and brass (i.e. copper + zinc), with slight traces, sometimes, of lead or of silver, and was used for money by the Gallic Sequani in the first century B.C., and by the mint of Alexandria in Egypt under the Roman Empire until A.D. 296. Modern numismatic works often erroneously describe the base tetradrachms of Alexandria, Antioch, and Cæsarea as being of potin instead of billon.

(H) *Brass*, a mixture of copper and zinc, was found in nature and used for coinage under the early Roman Empire and in Asia Minor. It was regarded as more valuable than bronze, and was called *orichalcum* (i.e. ὀρείχαλκον, 'mountain copper'), often corrupted into *aurichalcum*, 'gold-copper;' or χαλκὸς λευκός, 'white copper.' In China, brass has always been the ordinary medium of exchange. (I) *Lead*, from its nature, was never well adapted to coinage, yet it was so used occasionally in ancient Gaul and Egypt. It has been a favorite material for counterfeiters at all times, and anciently even the official mints sometimes defrauded commerce by emissions of silver-plated lead coins instead of real silver. The majority, also, of ancient *tesseræ* are of lead. In modern times it is used only for trial pieces and for the cheaper class of medals. (J) *Tin* has only occasionally been used for money, as by the kings of Numidia in the second century B.C., and, according to Aristotle, by Dionysius, Tyrant of Syracuse. In modern times it is found as money among the Chinese, Malays, and Senegambians. (K) *Iron* as money was even rarer than tin in ancient times. We hear of iron coins among the early Lacedæmonians, in Byzantium, in Argos, and elsewhere. (L) *Nickel* was coined in Northern India already in the third century B.C. Otherwise it was never used for money until modern times. Switzerland began to strike nickel pieces about 1850, and since then it has been coined in many countries. (M) *Aluminum* has never served as money, but has frequently been used for medals.

HISTORY OF NUMISMATIC STUDIES. There is no direct evidence that the ancients were collectors of coins as objects of art and curiosity; yet there can be no doubt that many such collections were made. We know that works of art of all kinds found eager collectors in classical times. We cannot but believe, therefore, that coins also were preserved for their antiquity and their beauty, the more so when we consider the wonderful artistic charm that so many, especially of the Greek series, possess. (See Friedländer, "Ueber Münzsammlungen bei den Römern," in *Zeitschrift für Numismatik*, III. p. 167.) The fall of the Western Empire brought this, as all other manifestations of higher culture, to an abrupt termination.

The revival of classical studies led naturally to an interest in coins. Petrarch, who died in 1374, is said to have been the first modern collector, and sent his objects of art, including coins, as a present to the Emperor Charles IV. Many of the earliest commentators on the classical writers illustrated their notes with figures of coins. Here the knowledge of Roman coins naturally preceded that of the Greek. The first important works on coins did not appear until the sixteenth century. The Italian Andrea Fulvio published in 1517 his *Illustrium Imagines*, with portraits of famous men of ancient times taken from coins and gems. Such collections of coin-portraits became very frequent in the next hundred years. Far more pretentious was the *Fasti Magistratuum et Triumphatorum Romanorum* of Hubert Goltz (or Goltzius) of Antwerp—a large folio published at Bruges in 1566; and this he followed at intervals with other works, as histories of Julius Cæsar and Augustus, illustrated by coins. Goltz was a man of learning, but without a high critical faculty, and of so little scientific morality that he did not hesitate to invent at will coins that never existed; and in completing his *Fasti* he created consuls, generals, and private individuals who never lived.

Shortly after the appearance of Goltz's book, Fulvio Orsini (Fulvius Ursinus), a member of the noble Italian family of that name, a man of profound learning, and a great collector of antiquities and coins, published at Rome in 1577 a series of Roman silver coins from his collection of the class commonly known as 'consular' or 'family' coins. This work was highly prized by Scaliger, Ezechiel Spanheim, and Eckhel, who called it 'golden' and 'divine.' Orsini was more careful than Goltz, but many false or wrongly described coins crept into his work without his knowledge. The book was reëdited in 1663 by the French numismatist Patin. A surfeit of other numismatic books followed, of which, however, it is hardly worth while to cite the names, as almost all are unreliable and useless in the extreme. One alone deserves mention, for it was later worked over into a book of value: the *Numismata Imperatorum Romanorum* of Adolph Occo, published at Antwerp in 1579. Goltz and Orsini had given their greatest attention to the coins of Republican Rome. Occo, on the contrary, devoted his work to those of the Empire. The book was scholarly for the period, and collected a vast amount of material. It was reëdited twice at Vienna, in 1601 and 1625; then in 1683 it was entirely done over and published at Milan by Mezzabarba (Mediobarbus); and finally in 1730 a new revision was brought out by Argelati, forming an immense folio, in which the coins are described chronologically reign by reign and year by year. This was the first great attempt at a *corpus* of Roman Imperial coins.

During the seventeenth century we have no very notable additions to numismatic studies beyond the revisions of earlier works already mentioned. The real labor of this period lay in the gathering into collections of the material for future studies. The works of the French *savant* Jean Tristan, viz. two separate books known as *Commentaires historiques*, published in several editions from 1635 to 1659, deserve mention; as well as the *De Re Nummaria* of Scaliger (1616), the *De Præstantia et Usu Numismatum Antiquorum* of Spanheim (1664), and a series of books on Roman and Greek coins by the explorer and collector Jean Vaillant. One important work belongs to the early eighteenth century, the *Thesaurus Morellianus*, published in 1734 from the manuscript of Andreas Morell by Sigebert Haverkamp, which remained for a long time a chief source of information regarding the Roman 'consular' coins. This century saw the immense growth of the great national collections of Europe which have made possible the scientific study of coins. It was, in fact, the curator of the Vienna cabinet, J. H. Eckhel, who may with justice be called the 'Father of Numismatics,' since his marvelous *Doctrina Numorum Veterum* (8 vols., Vienna, 1792-98) placed the study of ancient coins on a thoroughly scientific basis. He was a man of such extraordinary erudition, accuracy, and judgment that even now, more than a century after his death, his *Doctrina* is in every numismatic library and may be consulted with great profit, if also with discretion. Eckhel's method served as a model for future studies, and his material as a starting-point in the classification of ancient coins. With him begins the modern period, the important works of which will be cited below. The real study of mediæval and modern coins is a development of the eighteenth century. For an account of the growth of numismatic studies, see Babelon, *Traité des monnaies grecques et romaines*, I. 66-325 (Paris, 1901).

ANCIENT COINS — ORIGIN — CLASSIFICATION. Among the most primitive peoples some kind of trade or barter was known; and the precious metals were incontestably used as its medium for centuries before the invention of coinage. Excavations in Chaldæa, Babylonia, and Assyria have brought to light very abundant texts in which gold and silver are named as measures of value. In Genesis (xiii. 2 and xxiv. 35) we are told that Abraham was "very rich in cattle, in silver, and in gold," and again (xxiii. 16) that he paid for the cave of Machpelah "four hundred shekels of silver current with the merchant." In all transactions of this early period the metal was weighed, not counted in bars; an operation that appears not infrequently in the pictures on Egyptian tombs.

It was from the Babylonians that the weight systems passed by various trade routes to all the shores of the Mediterranean, and, with the invention of coinage, were subdivided and adapted to the commercial needs of the Hellenic and Hellenized peoples. The Babylonians used a sexagesimal system; thus, in measuring time, 60 seconds = 1 minute, 60 minutes = 1 hour; so in measuring value, 60 *shekels* = 1 *manah*, 60 *manahs* = 1 *kikkar*. In the course of transmission from east to west this became slightly modified, so that in Greece we find sums reckoned: 50 *στατῆρες* (or, locally, *σίγλοι*, = shekels) = 1 *μνᾶ* (i.e. *manah*), 60 *μναῖ* = 1 *τάλαντον* (corresponding to the *kikkar*). For fractions of the *στατήρ* (or unit) the Greeks developed a *duodecimal* system, which became the basis of the Greek coinage and so passed to the early Romans, who, however, superposed upon it their own *decimal* notation. For a concise account of the transmission of ancient measures from Asia to Greece, consult Head, *Historia Numorum*, introduction (Oxford, 1887).

The first coins in the classical world were struck about B.C. 700. Ancient writers differ as to the place that should hold the honor of the invention, but it may be regarded as certain, however, that gold was first coined in Lydia, and silver in Ægina; and specimens of each of these primitive coinages are fairly common. From these early centres coinage spread with great rapidity to the Ionian coast-cities and the islands in the Ægean Sea, as well as to all Greece and the Greek colonies in Sicily, Italy, and elsewhere. For a thorough examination of the origin of money, consult Babelon, *Les origines de la monnaie* (Paris, 1897).

Ancient coins are classified in general according to the system laid out by Eckhel in his immortal *Doctrina*. The whole mass of material is divided into two general classes, Greek coins and Roman coins. (A) The Greek series (or more properly non-Roman, since it includes also Bactrian, Jewish, Carthaginian, Ibero-Spanish, and Gaulish coins, etc.) is classified in geographical order about the basin of the Mediterranean as follows: (1) Spain, (2) Gaul, (3) Italy, (4) Sicily, (5) Macedon, Thrace, etc., (6) Greece, (7) Asia Minor, (8) the East, (9) Egypt, (10) the coast of Africa. Under these various heads the subdivision is alphabetical for cities and chronological for kingdoms. The coins of each mint are then treated in detail, chronologically. By another division, Greek coins are classed as (a) autonomous, or struck by the city-republics, (b) regal, (c) Greek Imperial, that is, the Greek money of those towns which, under the Roman Empire, still retained the right of coinage for local circulation. Here, too, are generally added the Roman colonial coins, or coins with *Latin* inscriptions struck in a number of towns outside of Italy and Sicily, such as Corinth, Laodicea, and Antioch, in the East, and numerous colonies in Spain and Gaul. But the coins of the late Empire, from the Latin mints of Constantinople, Antioch, Alexandria, etc., are classified with the Roman series.

Roman coins are divided into two general classes: those of the Republic and those of the Empire. The former include the *æs grave*, or earliest heavy bronze coins, and the so-called 'consular' or 'family' coins, with initials or names of magistrates. Properly, these coins, too, should be classed chronologically; but as the dates of most are very uncertain, they are usually arranged alphabetically by families, as *Aburia*, *Accoleia*, *Acilia*, etc., and subdivided under the various names in order of supposed age. The Imperial series, from Augustus to Romulus Augustulus, is classed by reigns, under each of which the coins are arranged either chronologically or by the alphabetical order of the legend on the reverse. The same is true of the Byzantine series. On ancient coins in general, consult: Babelon, *Traité des monnaies grecques et romaines* (Paris, 1901); Hill, *Handbook of Greek and Roman Coins* (London, 1899); Lenor-

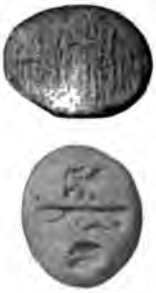
mant, *La monnaie dans l'antiquité* (Paris, 1878-79); Eckhel, *Doctrina Numorum Veterum* (8 vols., Vienna, 1792-98); Mionnet, *Description de medailles antiques grecques et romaines* (16 vols., with supplements, Paris, 1806-37); Grasse, *Handbuch der alten Numismatik* (Leipzig, 1853-54); De Barthélemy, *Nouveau manuel de numismatique ancienne*, vol. i. text, vol. ii. atlas (Paris, 1890).

GREEK COINS—GENERAL CHARACTERISTICS—HISTORY. The coins of the ancient Greeks deservedly occupy the first place in numismatic studies for their artistic excellence, which has never been surpassed, their enormous variety, and the light they throw on every phase of ancient Greek life. In the Hellenic world each town was a more or less independent State, and each proclaimed its autonomy by establishing a mint and issuing coins, generally for circulation within its own domains. The types chosen were extremely various, but generally bore some relation to the local cult. It will readily be seen, therefore, how much we are indebted to coins for our exact knowledge of the religion, mythology, art, and monuments of the ancient Greeks. This will be illustrated briefly in the following section, in which the history of Greek coins will be explained with reference to their *types*. A short preliminary account of the various *denominations*, considered purely as *money*, will not be without value. In the early gold and electrum coinage of Asia Minor the unit was the **στατήρ**, *statēr*, or 'standard;' with its divisions, the half-stater (ἡμιστατήρ, *hēmistatēr*), third (τρίτη, *tritē*), sixth (ἕκτη, *hektē*); and its multiple, the **δισταтηρον**, *distatēron*, or double stater. From their place of emission or from the name of the reigning king they received such names as **Κυζικηνοί, Λαμψακηνοί, Φωκαικοί** (staters of Cyzicus, Lampsacus, Phocæa), **Κροίσειος στατήρ** (stater of Crœsus), **Δαρεικὸς στατήρ** or **Δαρεικὸς** ('daric' of King Darius), etc. The Persian silver coin was called **σίγλος** (*siglos*, silver daric), which is the Greek form of the Hebrew *sheqel*, shekel, which was a unit of count in Palestine until actually coined by Simon Maccabæus. In Greece the unit of count was the silver **δραχμή**, *drachmē*, which in its origin was probably the value in silver of the grain that could be placed (a 'handful,' **δράξ**) upon one of the scales of the balance. Consequently the two equipoised handfuls, or **δραχμαί**, formed a new 'standard,' or unit of count, a **στατήρ** corresponding to the double drachme (**δίδραχμον**, or silver stater). The Greek subdivision was duodecimal, as follows: the **στατήρ** or silver didrachm was divided into twelve **ὀβολοί** or obols; and for small change the obol itself was divided into 'portions' known as **τριτητεταρτημόριον** ('three-fourths portion,' contracted to **τριτημόριον**, *tritēmorion*). **τριημιταρτημόριον** ('three-eighths portion'), **τεταρτημόριον** ('fourth portion,' contracted to **ταρτημόριον**, *tartēmorion*), and **ἡμιταρτημόριον** ('half-fourth portion,' or one-eighth obol). These names, with those of multiples of the drachme, were applied in different States to coins of interchangeable value in gold, silver, and copper, of which the following are the more important: (A) Multiples of the drachme. **Δωδεκάδραχμον**, *dōdekadrachmon*, a silver piece of twelve drachms, coined by the Ptolemies in Egypt and at Carthage. **Δεκάδραχμον**, *dekadrachmon*, of ten drachms, in gold and silver at Athens, at Carthage, and in Egypt. The so-called silver 'medallions' of Syracuse are *pentekontalitræ* (see below), equivalent to Attic dekadrachms. **'Οκτώδραχμον**, *oktōdrachmon*, of eight drachms, coined in gold and in silver by the Ptolemies, in gold by the Seleucidæ, and in silver in Thrace and Carthage. **'Εξάδραχμον**, *hexadrachmon*, of six drachms, coined perhaps in gold by the Seleucidæ, certainly in silver at Carthage. **Πεντάδραχμον**, *pentadrachmon*, of five drachms, of the Ptolemies in gold, and of the kings of Macedon in silver. **Τετράδραχμον**, *tetradrachmon*, in English *tetradrachm*, of four drachms, a silver coin of universal usage. **Τρίδραχμον**, *tridrachmon*, of three drachms, in silver, at Ephesus, Carthage, Cyme, Alabanda, and elsewhere. **Δίδραχμον**, *didrachmon*, in English 'didrachm,' the silver stater, in universal circulation, like the drachm itself. (B) Divisions of the drachme. **'Επτώβολον**, *heptōbolon*, of seven obols (1 1-6 drachms), the large *copper* coin of Egypt, struck under Ptolemy Philadelphus. **'Εξώβολον**, *hexōbolon*, copper of the second size of Ptolemy Philadelphus. **Πεντώβολον**, *pentōbolon*, of five obols (5-6 drachm), struck in silver in Athens in the time of Aristophanes the comedian, and in copper of the third size in Egypt. **Τετρώβολον**, *tetrōbolon*, of four obols, a silver coin at Athens in the fifth century B.C. **Τριώβολον**, *triōbolon*, of three obols, as a gold coin in Egypt and Carthage; as a silver coin = the **ἡμίδραχμον**, hemidrachm, found everywhere. **Διώβολον**, *diōbolon*, of two obols, in silver everywhere, in bronze in Egypt. **Τριημιώβολον**, *trihēmiōbolon* (i.e. 1½ obols or 1¼ drachm), in silver at Athens, Corinth, Leucas, Tegea, etc. **'Οβολός**, *obolos*, the small unit, very common as a silver coin; in bronze in Egypt, at Chios, Metapontum, etc. **'Ημιωβόλιον**, *hēmiōbolion* (1/12 drachm, ½ obol), also very common in silver. The smaller divisions are rarer. The *tritemorion* (¾ obol) is found in silver at Athens, Delphi, etc.; the *tartemorion* (¼ obol) at Athens and under Alexander the Great in silver, at Metapontum in copper; the *hemitartemorion* (⅛ obol) also at Athens in silver, at Metapontum in copper. In the Greek cities of Sicily and Italy the name **νόμος** or **νοῦμμος** was given to a silver coin of frequent mintage, similar to the Grecian didrachm or stater. But the Greeks of the West adopted also the native Sikel unit of the **λίτρα**, *litra*, equivalent to the ancient 'pound' of copper, divided into twelve **οὐγκίαι**, *oungkiai*, or ounces, whence the Romans derived their earliest system of the *æs grave*. (See below.) On the litral system, a number of fine silver coins were issued, as the splendid 'medallions' of Syracuse, the most artistic coins ever struck, which are **πεντηκοντάλιτρα**, or pieces of fifty **λίτραι**, and the famous **Δημαρήτεια** of Queen Demarete; also **δεκάλιτρα** in Sicily, **πεντάλιτρα** at Agrigentum, and **δίλιτρα** at Rhegium.

To give an adequate description, even in general terms, of Greek coins as works of art and as historic documents would require a volume; the reader is referred for fuller information to the bibliography appended to this section. For convenience of classification and study, the whole series is arranged in seven historic periods, as follows:

I. c.700-480 B.C. (*Period of Archaic Art*).
II. c.480-415 B.C. (*Period of Transitional Art*).
III. c.415-336 B.C. (*Period of Finest Art*).
IV. c.336-280 B.C. (*Period of Later Fine Art*).

NUMISMATICS I.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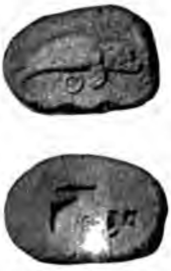
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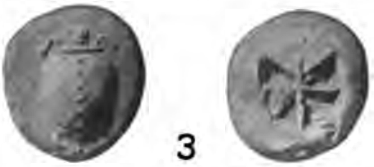
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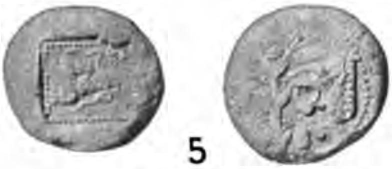
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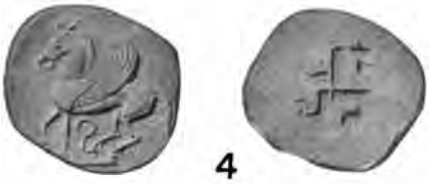
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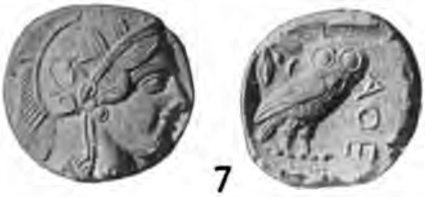
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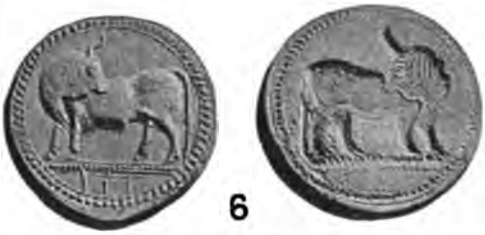
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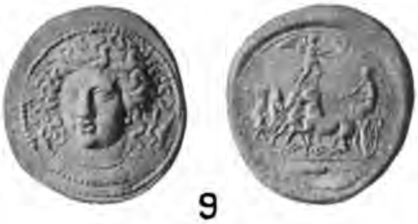
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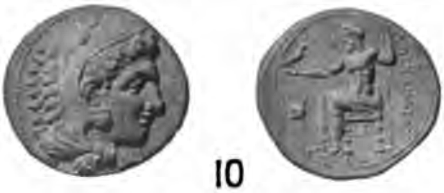
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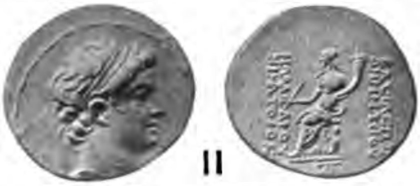
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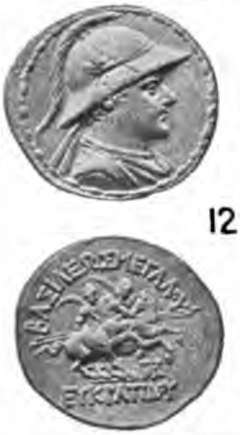
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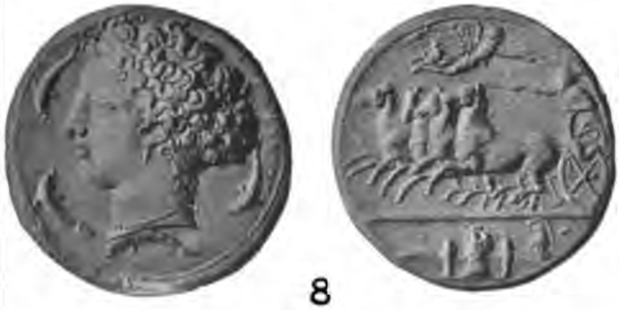
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1.	LYDIA,	-	PRIMITIVE GOLD STATER
2.	PHOCÆA,	-	GOLD STATER
3.	ÆGINA,	-	SILVER DIDRACHM
4.	CORINTH,	-	SILVER DIDRACHM
5.	CYRENE,	-	SILVER TETRADRACHM
6.	SYBARIS,	-	SILVER STATER (Incuse)
7.	ATHENS,	- - -	SILVER TETRADRACHM
8.	SYRACUSE,	- - -	SILVER DECADRACHM
9.	SYRACUSE,	- - -	SILVER TETRADRACHM
10.	ALEXANDER THE GREAT,		SILVER TETRADRACHM
11.	DEMETRIUS THE GREAT,		SILVER TETRADRACHM
12.	BACTRIA, EUCRATIDES,	-	SILVER TETRADRACHM

(Numbers 10, 11, and 12 are reduced in size)

V. c.280-146 B.C. (*Period of the Decline of Art*).

VI. c.146-27 B.C. (*Period of Later Decline*).

VII. c.27 B.C.-268 A.D (*Imperial Period*).

First Period—*Archaic Art.* This embraces all the coins struck from the beginning until the Persian War. Here belong the early gold and electrum coins of Asia Minor, of which the most primitive of all is the electrum stater of Lydia, attributed to the period of Gyges and Ardys (B.C. 700-637), which is without figures, the obverse having merely a series of sunken parallel lines, or striations, and the reverse a rough triple punch-mark. From this beginning we find a gradual development in style and technique. The punch-mark is long retained for the reverse, but it is gradually embellished, first by being divided geometrically, then by the addition of a small figure *in relief* within the sunken space. The types are generally animal figures or heads. Where the human head appears (for a divinity), the eye is shown in full, though the face be in profile, and the hair is represented by dots. The whole appearance of the figure is apt to be stiff and angular. In Magna Græcia (Southern Italy) the punch-mark is not found; instead, the same type appears on both sides of the coin, in relief on the obverse, concave (or, as it is technically called, *incuse*, i.e. 'struck in') on the reverse. Inscriptions are either wholly lacking or limited to the first letters of a name.

Second Period—*Transitional Art.* This extends roughly from the Persian War to the Athenian expedition against Syracuse (B.C. 415). The coins show a decided advance in style over those of the preceding period. The incuse square, or punch-mark, is still often retained, but is much more regular, and more frequently has a device in relief within. The figures are more accurate and varied, with greater attention to anatomical detail. Inscriptions are the rule instead of the exception, but are generally abbreviated, though sometimes names and even titles are written in full. The types are of infinite variety and often quite complex, but almost invariably drawn from the local mythology.

Third Period—*Finest Art,* to the accession of Alexander the Great (B.C. 336). The coins of this period, the finest that the world has yet produced, reflect the art of the greatest Greek sculptors. In fact, the die-engravers often signed their names to their works of art, notably at Syracuse. The type, whether head, figure, or group, is in perfect proportion and exquisitely adapted to the limited space. The subjects are still drawn almost universally from mythology, though the splendid *biga* and *quadrigæ* of certain cities bear allusion often to victories in the national games.

Fourth Period—*Later Fine Art,* extending to the death of Lysimachus, King of Thrace (c.280 B.C.). This period, corresponding to the art of Lysippus, illustrates the rise and perfection of portraiture. Alexander the Great himself hesitated to offend the religious susceptibilities of his subjects by substituting his own likeness for that of a divinity on his coins, which bear regularly the head of Zeus Ammon or Herakles or some other god. But his successors little by little introduced their own portraits; and we thus have in the succeeding periods a splendid series of wonderful likenesses of the rulers of the Greek world in the last three centuries before Christ, notably the Syrian Seleucidæ, the Ptolemies of Egypt, and the Macedonian and Bactrian monarchs.

Fifth Period—*Decline of Art,* to B.C. 146, the fall of Corinth and conquest of Greece by the Romans. An age of magnificent portraiture; but as regards fabric the coins are broad and flat, with long inscriptions that mar the symmetry of the reverse type, which, too, displays always greater carelessness of details. Coins can now be more accurately dated; in fact, many bear the date and place of mintage in letters or monograms.

Sixth Period—*Later Decline of Art,* to the foundation of the Roman Empire (B.C. 27.) This period signalizes the end of the distinctly Greek coinages. It is characterized by base silver coins, often with fine portraits still, but crude in workmanship. The names of local magistrates are extremely common and of great historical value. The inartistic *cistophori* are in general circulation in Asia Minor. In the farther East the Bactrian money loses its Greek character and becomes Oriental.

Seventh Period—*The Greek World Under Roman Sway.* The Romans partitioned the Greek world into provinces, which were governed by agents sent out from Rome. But while the general management of the provinces was controlled from Rome, the greatest possible degree of home rule was left to the thousands of Greek towns scattered over the old Hellenic world from Parthia to Egypt. Each one of these towns was allowed to retain its local mint and issue bronze coins; while the special privilege of issuing base silver ('billon') tetradrachms was limited to Antioch in Syria, Cæsarea in Cappadocia, and Alexandria in Egypt. These coins generally bear the head of the Roman Emperor, and a reverse type of local significance, in a very degraded style of art. The local mints were all closed under Gallienus (c.268 A.D.), with the exception of Alexandria alone, which retained its privilege until A.D. 296.

The standard work of reference on Greek coins is Head, *Historia Numorum* (Oxford, 1887). See also: Head, *Guide to the Principal Gold and Silver Coins of the Ancients* (London, 1881); Gardner, *Types of Greek Coins* (Cambridge, 1883); British Museum, *Catalogue of Greek Coins,* in many volumes by different editors; Bibliothèque Nationale, *Catalogue des monnaies grecques,* by various editors; Macdonald, *Greek Coins in the Hunterian Collection, University of Glasgow* (Glasgow, 1899-1901); Imhoof-Blumer, *Monnaies grecques* (Paris, 1883); Ward, *Greek Coins and Their Parent Cities* (London, 1902).

Roman Coins—*History and Characteristics.* The Italic peoples of Central Italy were a pastoral race, and their earliest medium of exchange was cattle (*pecus*); the Latin words *pecunia,* 'money,' *peculium,* 'property,' and *peculatus,* 'stealing,' are evidence of this. Bronze was the only metal that they possessed in quantity and used for implements, weapons, and ornaments; it thus furnished a convenient substitute for cattle in barter, and in fact for some centuries after the founding of Rome, *æs rude,* or shapeless pieces of bronze, to be weighed with each transaction, were the only 'money.' Thousands of these have been found, notably in sacred springs and in tombs, where they were thrown as votive offerings or deposited out of respect for the dead.

The real coined money of the Romans began with the Æs Grave, or heavy bronze, which seems to have begun about B.C. 350, though some have wished to place its origin as far back as the decemviral legislation (B.C. 450). The duodecimal system of the *æs grave* was adopted from the Greeks of Southern Italy and Sicily, whose 'pound of copper,' or *λίτρα*, of twelve 'ounces' (*οὐγκίαι*) became the Roman *libra* of twelve *unciæ*. The *libra* thus became the unit of count (*as*), and as such was coined, a large and bulky copper (bronze) piece, which, however, seldom exceeds ten ounces, and is generally less. The earliest *as* and its divisions bear no letters whatever, but the value is marked by dots. The reverse type is always the prow of a ship. The obverse types of the various denominations differ as follows: *As*, double head of Janus with 1 (unit); *semis* (½ *as* = 6 *unciæ*), head of Jupiter with S; *triens* (⅓ *as* = 4 *unciæ*), head of Roma with four dots; *quadrans* (¼ *as* = 3 *unciæ*), head of Hercules with three dots; *sextans* (1-6 *as* = 2 *unciæ*), head of Mercury with two dots; *uncia* (1-12 *as*), head of Roma with one dot. These remained the fixed types of Roman bronze money during the whole Republic. All these coins are cast (not struck), and are of rude fabric. There is also an enormous series of *æs grave*, coined on the Roman system, but of even greater size, with the most diverse types, by the many Italic tribes of Central and Northern Italy.

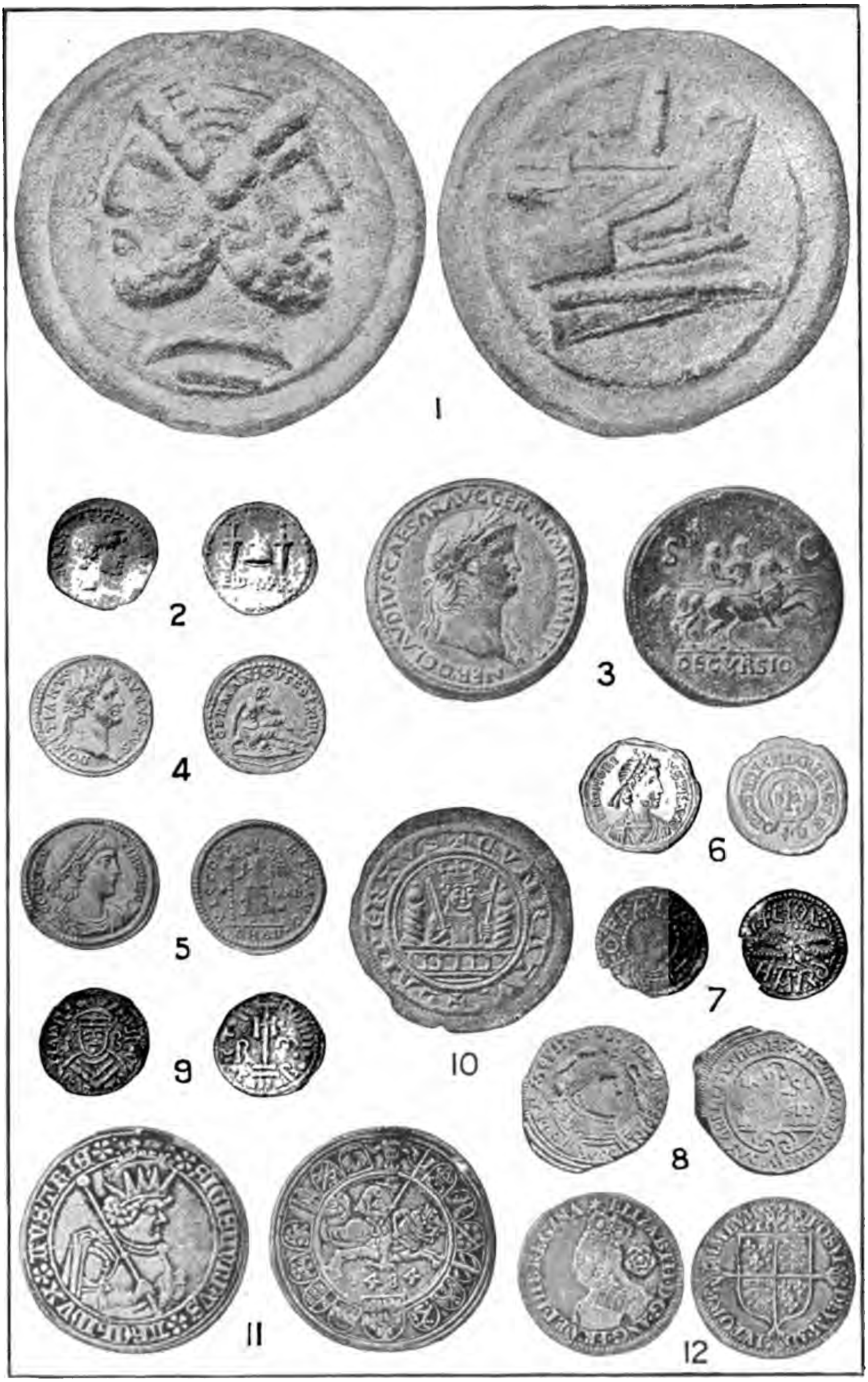
But while the Romans at home were content to use their cumbersome bronze coins, their generals operating in Campania and Apulia struck coins on Greek systems, in silver as well as copper, and far finer in technique. These bear at first the name Romano, afterwards Roma, and are known as *Romano-Campanian* coins. They were not intended for circulation in Rome. A great reorganization of Roman coinage took place in B.C. 269-268, after the successes over the Samnites, Pyrrhus, and the Tarentines. The bronze *as* and all of its divisions were reduced to one-third of their former weight and size (so that the *as* now contained only as much metal as the earlier *triens*), and at the same time multiples of the *as* were coined in silver; the silver coins along with the smaller divisions in bronze (*sextans* and *uncia*) being struck, the others still *cast*. The silver coins were the *denarius* (1-72 of a pound of silver; equivalent to ten *reduced asses*), *quinarius* (of five *asses*), and *sestertius* (of 2½ *asses*). The silver coins have all the same types: obverse, head of Roma, with winged helmet, and sign X (= ten), V (= five), IIS (= 2½), respectively; reverse, the Dioscuri galloping to the right, with the name Roma. Shortly afterwards other reverse types were introduced, as Victory or Diana in a chariot. There was also a very slight emission of bronze multiples of the *as*, namely, the *decussis* (ten *asses*), *tripondius* (three *asses*), *dupondius* (two *asses*). But even now the bronze coinage, which was still the backbone of the Roman monetary system, tended gradually to diminish in weight. The *as* was reduced to the weight of the original *quadrans*, then to the *sextans*; and finally, in B.C. 217, under the pressure of the crisis produced by the invasion of Hannibal, the *Lex Flaminia* ordained a new reorganization of Roman finances. The *as* was reduced to the size of the original *uncia*, and the *denarius* was coined at 84 to the *libra* of silver, instead of 72. This changed the relation of silver and copper coins, and the *denarius* equaled 16 *asses* instead of 10. From henceforth all coins are *struck*.

The right of coinage, which at first was vested in the consuls and other magistrates, was now confined to a special board of *triumviri monetales* (though at first the board of moneyers was not limited to three), and these early began to place their initials, monograms, or names upon their coins. We thus have a long series of coins (the so-called 'family' or 'consular' series) bearing the most noble names in Roman history from the third century B.C. to Julius Cæsar, Pompey, Brutus, Cassius, and M. Antonius. About B.C. 150 the types begin to be very various on the silver coins, each moneyer following his own whim in recording family traditions, religious cults, or historical events. In B.C. 91 the great uprising broke out which is known as the Social War. Many tribes of Central Italy declared themselves independent of Rome, and formed an offensive and defensive alliance against Rome, striking coins with the name of their leader, Q. Pompædius Silo, with the type of the bull of Italy crushing the serpent of Rome, and with the name of their new republic, Italia, in Oscan or Latin letters. It required years for Rome to subdue this powerful union, and in B.C. 89 a financial crisis was again averted by the expedient of reducing the coinage. The silver was not changed, but the *as* was made equal to the *semuncia* (½ uncia). This is called the semuncial system. This was the last change under the Republic. Gold had not heretofore been coined in Rome (though gold pieces of 20, 40, and 60 sesterces, with Roma, had been struck after B.C. 217 in the Romano-Campanian series); in the last century of the Republic, however, there were numerous emissions of *denarii aurei* (or simply *aurei*), which, like the silver coins, bear the names of magistrates and generals, as Sulla, Pompey, and Cæsar. It was Julius Cæsar who first placed his portrait on a Roman coin.

The standard work on coins of Republican Rome is Babelon, *Description historique et chronologique des monnaies de la république romaine* (2 vols., Paris, 1885). With this compare Bahrfeldt, *Nachträge und Berichtigungen zur Münzkunde der römischen Republik* (Vienna, 1897, with supplementary volume, 1900). Consult, also, Garucci, *Le monete dell' Italia antica* (Rome, 1885).

With Augustus Cæsar begins the coinage of the Empire, a long and important series with an infinite number of varieties in gold, silver, and bronze. Augustus took under his personal charge the coinage of gold and silver, leaving the bronze to the Senate; wherefore bronze coins from now till the third century bear the letters S. C. (*senatus consulto*, 'by order of the senate'). The obverse of Imperial coins generally bears the ruler's head, with his name and titles; the reverse has a varying type (deity, personification, group, monument, or the like), with explanatory inscription or continuation of Imperial titles. The denominations are: in gold, *denarius aureus* (or simply *aureus*), equal to 25 silver *denarii*, and its half, the *quinarius aureus*; in silver, the *denarius*, equal to four *sestertii*, and the *quinarius*, of two *sestertii*; in bronze, the *sestertius* (so-called 'large-bronze'), of four *asses*, *dupondius*, of two *asses* ('middle bronze'), *as* ('middle

NUMISMATICS II.



1. ROME, - EARLIEST LIBRAL AS
2. ROME, BRUTUS, - SILVER DENARIUS ('Ides of March')
3. ROME, NERO, - BRONZE SESTERTIUS
4. ROME, DOMITIAN, - SILVER DENARIUS
5. ROME, CONSTANTINE THE GREAT, - GOLD SOLIDUS
6. BYZANTINE, HONORIUS
7. ANGLO-SAXON, OFFA, KING OF MERCIA
8. FRANCE, DAGOBERT
9. POPE HADRIAN I.
10. CONRAD III., - BRACTEATE
11. AUSTRIA, SIGISMUND, - THALER
12. ENGLAND, ELIZABETH, - SIXPENCE

bronze'), *semis* (half-*as*, so-called 'small bronze'), and *quadrans* (quarter-*as*, also so-called 'small bronze'). The *sestertius* and *dupondius* are of yellow bronze (orichalcum), the *as* of red bronze. Further, the *dupondius* and *as*, which are almost of a size, are generally distinguished by the fact that the former has the Imperial head with radiate or spiked crown—the latter with laurel wreath. Down through the Antonine period we have a splendid series both artistically and technically, but from the reign of Commodus (180-192) coins begin to be debased both in quality and fabric. The *denarius* especially began to be small and of base metal, so that Caracalla introduced a new silver coin, the *antoninianus*, or double *denarius*, distinguished by the radiate crown for emperors, and a crescent at the neck for empresses. From this time all coins (except gold, which is rare) were more and more debased. Billon superseded silver, or the *denarius* became a copper coin washed with silver. The larger bronze coins, *sestertius, dupondius, as*, disappeared forever. Under the later Empire mints were opened in all parts of the Roman world, and the sign of the mint appears on the coin, as *PLON* (*pecunia Londinensis*, mint of London), SMANT (*sacra moneta Antiochensis*, mint of Antioch) etc. Constantine (A.D. 312) fixed the gold unit at 1-72 of a pound, and named it *solidus*, with divisions, the *semissis* or half, and *triens* or third. He reëstablished silver coins, notably the *miliarense* and the *siliqua;* and coined in bronze the *maiorina* and *centenionalis*. These coins endured till the fall of the Western Empire. The *art* of the Roman coins is best expressed by their portraiture. During the first two centuries the portraits are masterpieces; in the third century they are either gross or brutal; and in the fourth and fifth they are unnatural and absurd.

The reference work on Imperial coins is Cohen, *Description historique des monnaies frappées sous l'empire romain* (2d ed., Paris, 1880-90). Consult also: Stevenson, *Dictionary of Roman Coins* (London, 1889); Gnecchi, *Monete romane* (Milan, 1896); Blanchet, *Les monnaies romaines* (Paris, 1896).

Mediæval and Modern Coins. There is no sharp line of demarcation between ancient and modern coins, but the Byzantine series, which continues the mintages of the Eastern Roman Empire, is a natural link. Byzantine coins are: in gold, the *solidus*, with its half and third; in silver, the *siliqua*, with its half and quarter; in copper, the small unit, without sign of value, the *nomisma* (marked ε = 5), *centenionalis* (marked I = 10), *denarius* (marked K = 20), and the *follis* (marked M = 40). The workmanship is generally crude. After the tenth century the portrait of the Emperor is supported by some patron saint. The reverse has such types as Victory with a cross, afterwards a representation of the Saviour or the Virgin. Latin is gradually superseded by Greek in the inscriptions, and wholly disappears by the time of Alexius I. (1081-1118). The series continues until the overthrow of Constantinus XIV. Palæologus by the Turks in 1453.

Consult Sabatier, *Monnaies byzantines* (2 vols., Paris, 1862).

In the West the coins of the barbarian States founded on the ruins of the Roman Empire retained the form and style of the late Roman coins, though becoming always more degraded in art and fabric. Latin is the universal language. The principal coins in circulation in the early middle ages were the silver *denarius* and its half, the *obol*. It will be possible here to treat the development of coinage in modern times only in a very summary way. With the rise of barbarian kingdoms in Italy, Spain, and Africa, we have coins in silver and copper (rarely gold) of the Ostrogoths, Visigoths, and Vandals. The Visigothic coinage in Spain extends from Leovigildus (573-586) to the overthrow of Roderic by the Arabs in 711. A Moorish coinage now begins in Spain, with the peculiarity of Arabic on one side and Latin on the other, and bearing dates both according to the Hegira and according to the old Roman indictional system. These coins are numerous in the eighth century. Consult Codera y Zaidin, *Tratado de numismatica arabigo-española*.

In England the Anglo-Saxon coinage begins in the seventh century, and though also a development of the late Roman coins, it shows little resemblance to them. The two chief coins are the silver *skeatta* and the copper *styca*. The little gold coin of Pada, or Peada, King of Mercia (655-656), is notable as having runic letters along with the Latin. The coins of Offa, King of Mercia (757-796), and of Alfred the Great (871-901) are especially characteristic. The Merovingian kings in Gaul begin to strike coins under Theodebert I. (534-538). There are gold *solidi* and *trientes*. A fine gold piece of Dagobert (622-638) is perhaps the best of the series. The Carolingian coins begin with Pepin (752-768), and are most common in the gold *triens* and silver *denarius*. Of Charlemagne (768-814) the coins are numerous, and often have a good likeness. On Merovingian coins consult: De Belfort, *Description générale des monnaies mérovingiennes* (Paris, 1892). On Carolingian coins: Gariel, *Les monnaies royales de France sous la race carolingienne* (Strassburg, 1883-85). In Italy the coinage of the Lombards begins during the Merovingian period in France, with numerous issues in Milan, Benevento, and Salerno, always with the flat flans and crude fabric of the period. For the coins of the early Middle Ages in Europe, consult: Engel et Serrure, *Traité de numismatique*, vol. i., Paris, 1892. Papal coins, a long and interesting series, begin with Hadrian I. (772-785) and extend to Pius IX. Consult: Cinagli, *Le monete dei Papi* (Ferino, 1848). The coins of the German rulers of this period often have on the reverse the name and emblems of a bishop. To the tenth century belongs the earliest coin with a German inscription, a *denarius* struck at Gittelde, near Brunswick, reading "*hir steid te biscop*" (*hier steht der Bischof*), with bishop's portrait, and "*lelithis pening*" (*Pfennig of Gittelde*). The word *pening* was now the general name in Germanic countries for *denarius*, whence English d. = *penny*. On mediæval German coins, consult: Cappe, *Die Münzen der deutschen Kaiser und Könige des Mittelalters* (Dresden, 1848-57). In Norway and Sweden in the eleventh century we have *denarii* or *pennies*, with inscriptions in runic or Latin letters, and in Swedish or Latin, or both together. The coins of the Danish kings in England, Cnut for instance, have purely English legends, as do also those of contemporary Irish princes, as Sitric III., King of Dublin (989-

1029). On the Continent, in the twelfth and thirteenth centuries, the *denarii* were struck on a broad flan, so thin that even with low relief it was impossible to stamp them on both sides. Such coins are known as *bracteates*, from Latin *bractea*, a thin, flat piece of metal, and were commonly struck by the German princes, of whom the first was Conrad III. (1138-52). Those of Frederick Barbarossa are very numerous and often beautiful of their kind. Polish coinage begins with the introduction of Christianity under Mieciclas I. (c.965-992). The style and fabric is like the German coins of the same epoch, but the inscription is often in Russian letters. Russian coins begin under Vladimir, who died in 1015. Consult: Tolstoy, *La numismatique russe avant Pierre le Grand* (Saint Petersburg, 1884). The coinages of the thirteenth century are notable for the large number of gold pieces. Here begins the splendid series of gold *florins* of Florence and *sequins* (or *ducats*) of Venice, which show an advance in style that rapidly spread to other parts of Europe. The doges' coins extend with little change from Giovanni Dandolo (1279-89) to Ludovico Manin (1797). For Italian coins, consult: Promis, *Tavole sinottiche delle monete battute in Italia* (Turin, 1869). In the fourteenth century the coinage in gold and silver is vastly improved, the broad, flat pieces being very rich in ornamentation, especially the French silver *tournois* and gold *mouton*, the German silver *groschen*, and the English gold *noble*, or *rose-noble*. The fifteenth century continues the *gulden*, *florins*, and *ducats* of the previous epoch. The *bracteates* are still found, but small and poor. A new type of money is now introduced at Joachimsthal in Bohemia, a broad, flat silver coin, which quickly spread over all Germany and received from its first place of mintage the name *Joachimsthaler*, soon abbreviated to *thaler* (the origin of our American name *dollar*). The earliest dated *thaler* is that of Duke Sigismund of Tyrol, 1484. The broad *thalers* of the fifteenth and sixteenth centuries are real medallions of art, and this is true also of many of the contemporary coins of Italy, which are the work of artists of the first rank, as Francesco Francia of Bologna and Benvenuto Cellini. With the dating of coins the really modern period now begins; portraits are especially fine, and values are placed on the various pieces. The types are limited in variety and the historic value of coins is largely transferred to medals. Oriental coins have an origin quite independent of the European series. In China, some kind of coinage is said to have existed in the third millennium B.C. The earliest coins known are of brass, and have the form of 'trousers,' 'razors,' or squares. A peculiarity of later Chinese brass coins ('cash') is the square hole in the centre, for ease in carrying on strings. Consult: Terrien de Lacouperie and Poole, *Catalogue of Chinese Coins* (British Museum) (London, 1892). In Japan, in the seventeenth century, there were the oval gold *kobang* with mint-stamps, the oblong gold and silver *itzebu*, and the oval brass *tempo*, the latter having the square hole for stringing, like the Chinese 'cash.'

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NU'MITOR. See ROMULUS.

NUMMULITES, nŭm'mû-lī'tēz (Neo-Lat. *nummulus*, diminutive of *nummus*, coin). A genus of vitreo-calcareous foraminifera that secrete a lenticular shell composed of many whorls coiled in a flat spiral. At the present time Nummulites is represented by only a few species that live in the shallow water of warm seas, but during ancient geological times, especially during the Tertiary, it was of great importance, for its shells formed limestone formations often hundreds of feet in thickness. These massive nummulite limestones are prominent features in some parts of the Alps, and they occur also in the north of Africa, in Asia Minor, Persia, India, China, and Central America. An allied genus, Orbitoides, is common in the Eocene beds of the Southern United States. See article FORAMINIFERA.

NUN. See MONASTICISM; SISTERHOODS.

NUN-BIRD. (1) A puff-bird. (2) Any of several species of titmouse. (3) A variety of domestic pigeon. In each case the colors of the plumage suggest the name.

NUNC DIMIT'TIS (Lat., now lettest thou depart). The name given, from its opening words in the Latin version, to the canticle of Simeon (Luke ii., 29-32), which forms part of the compline office of the Roman breviary, and in the evening service of the Anglican Church follows the second lesson.

NUNCIO, nŭn'shĭ-ō. See LEGATE.

NUNEATON (nŭn'ē-ton) **AND CHILVERS COTON.** A manufacturing and market town in Warwickshire, England, on a tributary of the Anker, 8½ miles northeast of Coventry (Map: England, E 4). The town has the interesting Gothic Church of Saint Nicholas, the new Church of Saint Mary embodying the remains of a twelfth-century priory of nuns, two endowed schools, a free library, and a literary institute. It owns water-works and electric lighting plants. It has noted ribbon manufactures, worsted, cotton, and elastic weaving industries, iron works, and tanneries. Coal is mined in the vicinity. During the nineties Nuneaton and Chilvers Coton amalgamated under one municipal council. Population, in 1891, 15,300; in 1901, 25,000.

NUÑEZ, nōō′nyās, Rafael (1825-94). A South American statesman, President of Colombia. He was born in Cartagena; entered politics as a member of Congress in 1851; was twice (1855-57 and 1861-62) Secretary of the Treasury; and was a prominent journalist and editor, being director for two years of *El Continental*, a Spanish newspaper published in New York City. Nuñez was consul at Havre and Liverpool for some time. He was President from 1880 to 1882; was reëlected in 1883; and, after the Revolution in 1885 and the reform of the Constitution, was inaugurated for a term of six years in 1886, and again in 1892. He died in office.

NUÑEZ CABEÇA DE VACA, nōō′nyāth kä-bä′thȧ dȧ vä′kȧ, Alvar (c.1490-c.1560). A Spanish adventurer in North and South America. He was born in Jevez de la Frontera and was living in Seville when Narvaez was raising his forces for the colonization of Florida. He received an appointment as royal treasurer and high sheriff to the expedition. He shared in all the misfortunes of the undertaking, and was chiefly instrumental in extricating the party from the interior and getting it back to the Gulf coast. In the final wreck of the boats of the Narvaez expedition Nuñez was cast ashore with a few others on one of the islands outside Matagorda Bay, November 6, 1528. The Indians took charge of the survivors, and for some time the Spaniards lived on the islands and adjoining mainland in a state of semi-servitude. Alvar Nuñez secured freedom, and for several years wandered about the country in what is now Texas and Arkansas, trading among the different tribes and acting as physician or medicine man. Eventually, with three others, the only survivors of the Narvaez expedition, Estévan Dorantes, Alonso del Castillo, and a Moorish negro named Estevanico, he started to find the route back to civilization. Making their way from tribe to tribe, across Texas to the Rio Grande, then through Sonora and so on westward, they finally came upon a party of Spanish soldiers in Sinaloa, not far from the Gulf of California. They were sent on to the City of Mexico, where the Viceroy welcomed them on July 24, 1536. Cabeza de Vaca went back to Spain, where he arrived in August, 1537. He claimed some compensation for his years of suffering, asking for the Governorship of Florida. Instead he was granted authority to conquer the territory of the Paraguay Indians along the Rio de la Plata. He expended all his means in equipping an expedition, which sailed in 1540. He soon became involved in difficulties with his subordinates, who eventually put him under arrest and sent him back to Spain. The Council for the Indies after six years sentenced him to banishment in Africa. This sentence was probably not enforced, however, for he is said to have settled in Seville, where he was living some twenty years later. Cabeza de Vaca's own account of his various adventures, first published in 1542 and 1555, has been translated by Buckingham Smith (New York, 1871) and by Dominguez in the Hakluyt Society volume for 1891.

NUÑEZ DE ARCE, dȧ är′thȧ, Gaspar (1834-1903). A Spanish playwright and lyric poet, born at Valladolid. Before he was twenty he was associated with the editorial staff of the Madrid journal *El Observador*. He soon gained considerable repute by his contributions to the periodical *La Iberia*, as correspondent for which he went through the African campaign (1859-60). He entered the Cortes in 1865, and after the troubles of 1868 he became Civil Governor of Barcelona. In 1882 he became Minister of Colonial Affairs under Sagasta. Nuñez de Arce is of decided merit, both as a dramatist and as a lyric poet, and his verse enjoys widespread popularity in Spanish America as well as in Spain. In 1875 he published a collection of lyrics under the title of *Gritos del combate*, a title indicative of the passion and patriotic energy of most of them. Since it appeared, he has produced other poems of some length, that have likewise won popular favor: the *Idilio;* the *Elegía*, written, like the *Idilio*, in 1878; the *Última lamentación de Lord Byron* (1878); the *Vértigo* (1879, one of the most famed of his works and one which has provoked much imitation, creating a school of his followers in the legend), a graphic description of the crime and remorse of a modern Cain; the *Visión de Fray Martin* (1880), a psychological study of Luther; *La pesca* (1884), a charming idyll; and *Maruja*. As a dramatist, he has written both alone and in collaboration with Antonio Hurtado. His individual works are the comedies, *Deudas de la honra*, *Quien debe paga*, and *Justicia providencial*, in all of which he cultivates the drama of manners, already made successful by Tamayo y Baus and Ayala, and the *Haz de leña*, a tragedy both historical and psychological in its tendencies. This last piece deals with the story of Philip II. and his son, Don Carlos. The editions of his lyrics are legion. That of *Gritos del combate* (Madrid, 1891) contains also his prose *Discurso sobre la poesía*. His chief plays are to be found in the *Obras dramáticas escogidas* (Madrid, 1879). Consult also the study of him by Menendez y Pelayo, in volume ii. of Novo y Colson's *Autores dramáticos contemporáneos*, reprinted in the critic's *Estudios de crítica literaria* (1884).

NUÑEZ DE VILLAVICENCIO, vil′lȧ-vē-thăn′-thē-ō, Pedro (1635-1700). A Spanish historical, portrait, and genre painter, born in Seville. He first studied under Murillo in Seville, and then, as he was a knight of the Order of Saint John, went to Malta, where he was the pupil of Matteo Preti, called Il Calabrese. Upon his return to Seville, he again studied with Murillo and continued to live with him. He assisted his master in founding the Academy of Seville, and was his testamentary executor. His subjects were similar to those Murillo chose, and the works of the two men sometimes are confused. His "Children Playing with Dice" (in the Prado Museum, Madrid) shows considerable native talent.

NUNIVAK, nōō′nĭ-väk. An island in Bering Sea, situated in latitude 60° N., 50 miles from the mainland of Alaska, and 140 miles southwest of the mouth of the Yukon (Map: Alaska, B 3). It is 55 miles long, 45 miles wide, and has an area of about 1200 square miles. It is but little known, and inhabited only by Eskimos, who trade in skins and ivory.

NUN OF KENT. See Barton, Elizabeth.

NUN'S PRIEST'S TALE, The. One of Chaucer's *Canterbury Tales.* The source of the tale is a short fable by Marie de France, enlarged later into the old French "Roman de Renart," and a similar story is found in *Æsop's Fables.* Chanticleer, being carried off by a fox, escapes by inducing the latter to open his mouth to berate his pursuers. This slender narrative is amplified by many instances of significant dreams.

NURAGHE, nōō-rä′gȧ, or **NURHAG,** nōōr-häg′. The name of ancient towers, in the shape of truncated cones, three thousand of which in greater or less state of preservation are scattered about the island of Sardinia. They are built of granite, limestone, basalt, porphyry, sandstone, and schist. Some of the stones in the lower courses are of great size; they have been roughly hewn and were laid up without cement. The entrances are small and low and the interiors are divided into two or three stories each with a dome-shaped ceiling. The upper chambers are reached by means of spiral staircases and are lighted through loopholes, and there is supposed to have been a terrace on the summit. They are to be compared with the talyots of Majorca and Minorca, the 'burgs' or 'duns' in the north of Scotland, and in the Shetland Islands; and with the round towers of Ireland, both as to structure and function. Skeletons and deposits made with the dead have been found in them, but their original authors and purpose are not known. Consult: Petit Radel, *Nuraghes* (Paris, 1826-28); Spano, *Nuraghi di Sardegna* (1867); Ferguson, *History of Rude Stone Monuments* (London, 1872); Lambert, *Handbook to the Mediterranean* (ib., 1882).

NUR-ED-DIN EL-BETRUJI, nōōr-ĕd-dēn′ ĕl-be-trōō′jē. An Arabian astronomer of the twelfth century, born in Morocco, and also known by the name Alpetragius. He is mostly known for his opposition to the epicycle theory of Ptolemy, although he did not substitute anything better. Consult *Alpetragii Arabis Planetarum Theorica Physicis Rationibus Probata* (Venice, 1531).

NUREDDIN-MAHMUD, nōō-rĕd-dēn′ mȧ-mōōd′, Malek-al-Adel (1116-74). A Mohammedan ruler of Syria, born at Damascus. His father, Omad-ed-din Zengi, originally Governor of Mosul and Diarbekr on behalf of the Seljuk sultans, had established his independence, and extended his authority over Northern Syria, including Homs, Edessa, and Aleppo. Nureddin succeeded him about 1145 and changed the seat of government from Mosul to Aleppo. The feudal Latin States had been established in Syria as a result of the First Crusade, and Count Jocelyn, Prince of Edessa, tried to regain the territories which he had previously lost, but was signally defeated under the walls of Edessa. This was one of the chief occasions of the Second Crusade. Nureddin defeated the Crusaders before Damascus, and finally compelled them to abandon the enterprise. He next conquered Tripolis and Antioch, the prince of the latter territory being defeated and slain in a bloody conflict near Rugia (June 29, 1149), and before 1151 all the Christian strongholds in Syria were in his possession. An illness, which prostrated him in 1159, enabled the Christians to recover some of their lost territories, and Nureddin, in attempting their resubjection, was totally defeated near the Lake of Gennesaret by Baldwin III., King of Jerusalem; but he resumed the offensive, defeated the Christian princes of Tripolis and Antioch, making prisoners of both, and again invaded Palestine. Meanwhile, he had obtained the sanction of the Caliph of Bagdad to his project to seize Egypt from the effeminate Fatimites and a large army under his lieutenant, Shirkoh, speedily overran Egypt. Shirkoh was succeeded by his nephew, the celebrated Saladin (q.v.), who completed the conquest of the country. Nureddin, becoming jealous of Saladin, was preparing to march into Egypt in person, when he died at Damascus, May 15, 1174.

NUREMBERG, nū′rem-bĕrg (Ger. *Nürnberg,* nụrn′bĕrk). The second city of Bavaria, Germany, situated on the Pegnitz, about 95 miles north-northwest of Munich (Map: Germany, D 4). It consists of the inner town (still partly walled, and divided by the river into the two parts Sebalderseite and Lorenzerseite, named after its two principal churches) and a number of suburbs where the chief industrial establishments of the city are found. The inner town, with its red-roofed houses and gables facing the street, its numerous churches, and its architectural monuments, is of unusual interest. Nuremberg being the only large city in Germany which has preserved its mediæval appearance to such a remarkable degree. Its fine samples of domestic architecture date mostly from the fifteenth and sixteenth centuries, the period of its fullest political and artistic development, when Dürer, Kraft, Vischer, Stoss, and others made it the centre of German art.

The Church of Saint Lawrence, the finest in the city, was originally built in the thirteenth century, and was restored in the nineteenth century. It is Gothic in style, with beautiful stained glass windows, and has a remarkable stone Ciborium with figures supposed to be those of Adam Kraft and his two pupils. Saint Sebaldus is considered one of the finest Gothic churches of Germany. It was built in the fourteenth and fifteenth centuries and was recently restored. It contains some of the best samples of the work of Nuremberg artists, notably the tomb of Saint Sebaldus by Peter Vischer, the Schreyer Monument by Adam Kraft, and the Last Judgment over the southern entrance, by the same artist. Worthy of mention are also the Marienkirche, with its fine portal, paintings by Wolgemuth, and its curious clock, and the Gothic Church of Saint John.

Among the examples of secular architecture, the Kaiserburg deserves to be considered first. as the nucleus of the city. It was probably founded by Henry II. It was enlarged by Frederick Barbarossa, and is now used in its restored form as a royal residence. It is situated on a rock at the northern end of the old town and contains many objects of art. At the foot of the castle hill stands the town hall, built in Italian Renaissance in 1616-22 and restored in 1884-89. Its chambers are decorated with frescoes and paintings by

Nuremberg artists, and in the court stands a fine fountain dating from the sixteenth century.

Among the numerous old private houses of Nuremberg may be mentioned the Nassauer Haus, a Gothic building of the fourteenth century, the houses of Dürer and Hans Sachs, and the Rupprecht House. The chief modern buildings are the theatre, the law courts, and the chamber of commerce. Many of the squares of Nuremberg are adorned with beautiful fountains and statues, of which the most noteworthy are the Schöne Brunnen, a Gothic pyramid (fourteenth century) covered with numerous statues, the statue of Dürer by Rauch, the fountain in the goose market, the Tugendbrunnen (1589), near the Church of Saint Lawrence, the statue of the poet Konrad Grübel, and the Kraft stations near Saint John's Cemetery, consisting of a number of pillars adorned with reliefs by Kraft.

The National Germanic Museum, for the purpose of preserving the monuments and promoting the knowledge of German art and culture in prehistoric and historic times, was founded at a congress of German antiquaries in 1852. The plan was approved by the Bavarian and other German governments, and found enthusiastic support among the general public.

In 1857 the museum was definitely located in its present site at Nuremberg, a former Carthusian monastery being purchased to house its collections. The neighboring priory of the Augustines has been recently restored and made a part of the museum, which now forms a picturesque feature in the mediæval quarter of the city. Valuable private art collections, like those of the city of Nuremberg, have been placed in custody of the museum.

The collections are concerned with Germanic antiquities, and are divided into over thirty groups, most of which are accessible to the general public. Among the most important are the collection of Christian and early mediæval antiquities; the gallery of paintings, especially rich in the early German school; the collection of sculptures, including the famous "Nuremberg Madonna," by Peter Vischer the Younger; the cabinet of engravings, containing over 200,000 specimens; collections of stained glass, seals, medals, etc. The museum is especially rich in plaster casts, showing the development of architectural ornament, sculpture, and sepulchral monuments. The library contains over 200,000 volumes; the archives possess a large collection of documents and autographs. The museum has issued many important illustrated publications treating Germanic antiquities, and has a quarterly journal, *Anzeiger des germanischen Nationalmuseums*.

The educational institutions comprise the old gymnasium, whose foundation is ascribed to Melanchthon, the new gymnasium, a number of special schools, the valuable library of about 80,000 volumes, the Bavarian Industrial Museum, with valuable collections, and the interesting municipal archives.

The industrial fame of Nuremberg is of long standing. Its wares, comprising chiefly toys, lead pencils, small articles of gold, silver, and ivory, gold leaf, watches, hardware, haberdashery, etc., are still the main products of the city, but there are also extensive machine works, chemical works, manufactures of ultramarine and other paints, railway cars, electrical supplies, lithographs, chromos, etc. The bronze foundry of Professor Lenz is noted for its artistic castings.

The trade of Nuremberg, although of less relative importance than formerly, is still extensive. Besides trading in local manufactures, the city exports large quantities of hops and the small products of the house industry embraced in 'Nuremberg wares,' and it imports groceries, grain, flour, etc. The trade is facilitated by strong financial institutions and good communication facilities.

The municipal affairs are administered by a first and a second burgomaster, a board of magistrates of 27, and a municipal council of 51 members. The municipality owns and operates a gas and an electric plant, the water-works, and an abattoir. The city is equipped with electric railways. Like most large cities in Europe and the United States, Nuremberg has annexed latterly a large number of adjacent communities, with the result that its population has increased from 99,519 in 1880 to 142,590 in 1890, and 261,081 in 1900. The inhabitants are mostly Protestants.

HISTORY. Nuremberg is mentioned for the first time in 1050. Henry III. conferred upon it the privileges of a mint, a market, and a customhouse, and Emperor Lothair granted it to Henry the Proud of Bavaria. Conrad III. annexed it to the Empire and Frederick II. raised it in 1219 to the rank of a free city of the Empire. Its importance increased with its political freedom, and it was the seat of the Diet at which the Golden Bull of Charles IV. was promulgated in 1356. The burgraves of Nuremberg (the counts of Zolre or Zollern since 1191; see HOHENZOLLERN) interfered but little with the affairs of the city.

Nuremberg became a very important factor in the trade between Italy and Northern Europe, and its material prosperity found expression in that splendor which characterizes its private dwellings so well preserved to our day. In 1427 the city acquired the castle from the burgraves of Nuremberg, who had become margraves of Brandenburg. The foremost centre of German art and one of the wealthiest cities of the Empire, Nuremberg also played a prominent part in the religious struggles in the period after the Reformation, which the city accepted in 1524. It was at Nuremberg that peace was for the first time concluded between Charles V. and the Protestants in 1532, and it was also here that Charles V. entered into a union with the Catholics against the Protestants in 1538. The commercial importance of the city, however, had already been dealt a serious blow by the discovery of the sea route to India in 1497.

The Thirty Years' War, during which Nuremberg was occupied by Gustavus Adolphus, who made vain efforts to dislodge Wallenstein from his intrenched position before the city (1632), and finally the wars of the French Revolution, completely exhausted the resources of the city republic, so that it offered itself to the King of Prussia in 1796 in order to be relieved of its enormous debt—an offer which was declined. The city was annexed to Bavaria in 1806. Nuremberg is noted for the many important inventions credited to its inhabitants, such as the watch, which was originally called the 'Nuremberg egg,' the air gun, the gun-lock, the terrestrial and celestial globes, etc.

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NURSE-FROG. A term applied to various frogs which take care of their young or eggs, or both, especially the midwife frog (q.v.). Some curious examples are to be found in the genera Phyllobates, Arthroleptis, Rhacophorus, and among the tree-frogs.

NURSERY (from *nurse*, OF. *norice*, *nourice*, Fr. *nourrice*, nurse, from Lat. *nutrix*, nurse, from *nutrire*, 'to nourish'; connected with Goth. *naups*, OHG. *nôt*, Ger. *Not*, AS. *nēad*, *nyd*, Eng. *need*, OPruss. *nauti*, necessity). In horticultural parlance, a place where plants are propagated. In the New World the term is usually restricted to those establishments devoting themselves exclusively to the rearing of woody plants, while the rearing of herbaceous plants is classed as a department of floriculture. This division has been the natural result of the enormous demand for plants of both classes, and as one class requires a very different equipment from the other, the tendency toward specialization soon separated the two departments. A further differentiation is being made, a division along the line of fruit-bearing trees and plants and the ornamental or decorative trees and plants.

During the last decade the nursery business has changed in its method most markedly. The nurseryman who grows his own stock, other than peach stock, is the exception rather than the rule. Nearly all the pear and cherry stocks used in America are grown in France; while a great bulk of the apple stocks used in the United States are raised on the deep soils of the prairie by specialists in this line. Since the work of the modern fruit-tree nursery is to produce as large and straight a stock in as short a space of time as possible, and since the prevailing belief is that more than one crop of nursery stock cannot be successfully grown on any given piece of land, new soils are chosen for each crop of nursery stock. A nursery is, therefore, a transient affair, and the plants are usually grown on lands leased for short periods. Since the propagation of forest and ornamental trees seems to be less subject to the objection, viz. impoverishment of soil, urged against fruit trees, most of the nurseries engaged in this work are more permanent in their location. Comparatively few plants of this character are budded and grafted; most of the skill of the propagator is demanded in perpetuating species from seeds and cuttings.

The history of the nursery business began with the colonization of America. As early as 1768 Thomas Young of New York was awarded a prize of £10 for the largest number of apple trees, the number being 27,123. The great nursery interests of the country have from the first been located in western New York. The growth of the enterprise has kept pace with the demands made by the rapidly increasing commercial orchard and vineyard development. Statistics of the census of 1900 show that there were in the United States 4500 nurseries, covering an acreage of over 172,800 acres, representing an investment of $52,500,000. In these nurseries 45,600 men, 2279 women, and 14,200 animals were employed, and 3,400,000,000 plants were grown. Of these, 518,000,000 were fruit trees, and 685,600,000 grape vines and small fruits. The greatest number of plants of a single species was represented by the apple, of which there were 240,500,000, or more than twice as many trees as were then standing in the orchards of the country.

The influence of the leading nurseries on the horticulture of the country has been very marked. Previous to the development of the experiment stations their office was quite as much to test the merits as to propagate and disseminate a variety. The aim of all leading nurserymen has been to stimulate trade and maintain a high reputation through honest dealing and the dissemination of stock true to name. The sale of spurious stock has worked great injury by retarding development in localities naturally well suited to orcharding. These evils do not exist in developed orchard areas. New fruits introduced from abroad brought with them their natural enemies, the spread of which to other plants has led to the enactment of inspection laws in all States in which either the orchard or nursery business has attained an important place. These laws require the inspection of the orchards and nurseries for certain insect pests and fungous diseases, and prohibit the sale of infested stock, which must be destroyed. If the stock is free from the specified pests the nurseryman is granted a certificate to that effect, and it is taken as a passport in shipping from State to State.

NURSERY LORE. The folklore of children. The material may be separated into two classes, according as it consists of traditional sayings and usages which have been handed down by mothers and nurses, or of customs maintained and transmitted by the children themselves. To the former class belong those nursery rhymes and jingles which are ascribed to Mother Goose, a name adapted from the French. In 1697 Charles Perrault issued a few tales, popular in origin but of literary ornamentation, which he called *Contes de ma mère l'oye.* This designation was not invented by Perrault, for the goose had long had a popular repute as a story-teller. About 1760 J. Newbery, the first publisher of books for children, produced a little collection of rhymes to which he gave the name of *Mother Goose's Melody.* In 1810 J. Ritson brought out *Gammer Gurton's Garland, or the Nursery Parnassus,* in which he included some rhymes not given by Newbery. Between 1824 and 1827 Munroe and Francis, Boston, Mass., issued an expanded edition under the title of *Mother Goose's Quarto, or Melodies Complete,* reprinted in 1833 as *Mother Goose's Melodies,* and the popularity of this publication may have something to do with the widespread acceptance of the name. Up to this time nursery rhymes were not learned from books, but repeated by word of mouth; it seems likely that the traditional stock was similar to that which has found a place in print.

More curious, from the point of view of folklore, are the games played by children, often to the accompaniment of rhymed formulas. These are for the most part of ancient origin, and although at the present time extinct or moribund, have been traditionally current for centuries. Allowing for minor variations, American game-rhymes are very similar to those of Great Britain, France, and Germany. Such correspondence, formerly interpreted to signify a remote common descent, is now known to be the result of intercommunication. The games, and the formulas used in playing them, were not originally the property of children, but indifferently employed by both old and young. These customs did not owe their origin to peasants; on the contrary, they were introduced and supported by the higher strata of society. Of the games, some have a religious character, or at least were formerly interpreted as possessing religious significance; for example, a sport called 'Weighing,' in which a player is carried by two others, each of whom grasps with right hand the left hand of his fellow, constitutes an imitation of the Last Judgment, in which the soul is to be weighed to determine its destination for heaven or hell. The game of 'London Bridge,' in which the line of participants is made to pass under an arch formed by the lifted hands of two keepers, has been supposed to have had its source in imitation of foundation sacrifices, in which a human being was interred under the bridge in order to insure its stability. A drama enacted by girls, called 'Old Witch,' sets forth the robbery of children by a limping cannibal demon, the devouring of the victims, and their resuscitation by the mother; the witch who figures in this amusement is of the same class as the destroyer of children known to the ancient Greeks as Lamia or Empusa. The well-known childish dance in which is imitated the sowing of oats, etc., may go back to a rite intended to insure the ripening of the crops. Guessing games, in which the object is to win the counters of the adversary, seem analogous to those played in the time of Xenophon, while that in which the opponent is required to guess the number of fingers which may be held up is similar to one depicted on Egyptian pyramids.

BIBLIOGRAPHY. Consult: Bolton, *The Counting-out Rhymes of Children* (London, 1888); Whitmore, *The Original Mother Goose's Melody*, reproduction in facsimile (Boston, 1892); Halliwell-Phillipps, *The Nursery Rhymes of England* (London, 1842); Green, *A History of Nursery Rhymes* (ib., 1899); Gomme, *Traditional British Games* (London, 1894); Haddon, *The Study of Man* (New York, 1898); Newell, *Games and Songs of American Children* (2d ed., Boston, 1903).

NURSERY RHYMES. Children's rhymes, used in the nursery and in childish games. These songs and sayings, witty or absurd, are peculiar to the English language, and for the most part of no great antiquity, the majority scarcely antedating the seventeenth century. It has been thought that some may have had at first a political significance; but many doubtless owed their origin to the infantile love of nonsense for its own sake. Certain rhymes of nurses, such as those used to amuse children in the process of dressing, may have a more respectable antiquity. A word may be added about the formulas known as 'counting-out rhymes' in games. One word is told off for each player, and he on whom falls the final syllable is dropped from the row; this process of exclusion is continued until only one remains, who is 'it.' All modern nations possess similar rhymes, which have the common property of being unintelligible. It has been supposed that the rhymes were invented for purposes of sorcery or sacrifice, and have become degraded in their survival; yet it is uncertain whether we are to look for any deeper motive than a childish fondness for mystery and nonsense.

NURSES, TRAINING OF. At the end of the fourth century, when the temples of Æsculapius, Hygeia, and Serapis were closed, the sick poor formerly housed in these temples were turned adrift. Christian monasteries and temples were opened to them, and conventual orders arose whose office was to provide for the sick. In very early times there was a corporation of matrons and elderly women in England who were employed in obstetrics, at that time forbidden to men. The eleventh century saw the beginning of the founding of hospitals, many of which were rendered necessary by the Crusades. The hospitalers were assisted by various bodies of women, in the dearth of physicians. In the latter part of the twelfth century Hildegarde, Abbess of Rupertsberg, organized a school of nurses for service in the hospitals. From these beginnings grew the modern system of training nurses for charitable hospital work, for charitable work among the sick poor in their homes, and later for assistance to the sick rich for proper remuneration. In 1840 'Mrs. Fry's nursing sisters' composed an organization which cared for the outcasts of London society. Florence Nightingale (q.v.) gave the greatest impetus to the movement toward securing efficient training for nurses, after her return to London in 1853, upon the completion of an inspection of hospitals all over Europe. In 1872 the Bellevue Training School, New York City, sent out the first class of trained nurses graduated in this country.

The course of study for nurses under training has become lengthened during the past ten years. In some small towns in the United States the course at a local hospital may be completed in a year, in others in eighteen months. In New York and Philadelphia the course extends in a few schools over two years' time; in most over three years' time. An applicant is received into the school for a period of two months on probation. During this period applicants receive their board and lodging at the training school without charge, and serve without remuneration, and their education, physical strength, endurance, adaptability, powers of observation, and judgment are tested. Should they prove acceptable, they are required to sign an agreement for the remainder of the term of three (or two) years, to obey regulations, and to remain in the school till the term has ended. Pupils reside in the hospital or in the training-school building, and assist in various departments. They wear a uniform when on duty. No charge is made for instruction. The pupils receive board, lodging, and laundering of clothing, and a certain amount of money for the purchase of text books and uniforms, and for incidental expenses. The instruction is given by the physicians and surgeons of the visiting and resident staffs of the hospital, the superintendent, and the head nurses, and covers anatomy and physiology, and all departments of nursing, including cooking of proper food and delicacies, and frequently massage, obstetrics, and the care of insane as well as alcoholic patients. In some institutions there is a regulation under which nurses are sent out to nurse in families before completing their course of study as a test of fitness.

Perhaps the most prominent training schools in the United States are the following: Bellevue, Presbyterian Hospital, New York Hospital, and Mount Sinai Hospital, in New York City; Massachusetts General Hospital, in Boston, Mass.; Philadelphia Hospital and Pennsylvania Hospital, in Philadelphia, Pa.; Johns Hopkins Hospital, in Baltimore, Md.; and Illinois Training School, Chicago, Ill. Consult: Nightingale, *Notes on Nursing* (London, 1860); Mitchell, *Nurse and Patient* (Philadelphia, 1877); Hampton, *Nursing* (Philadelphia, 1893).

NURSE-SHARK. (1) A shark (*Ginglymostoma cirratum*), the type of a family, which abounds in the waters of the West Indies and on the West coast of Mexico, where it is called 'gata.' It is from six to ten feet in length, and is brownish in color, with an obtuse depressed head and rounded fins. See Plate of Great Sharks. (2) In New England, the sleeper (*Somniosus microcephalus*). See Sleeper-Shark. (3) The Port Jackson shark. See Cestraciont.

NUS, nu̮s, Eugène (1816-94). A French dramatist, born at Chalon-sur-Saône. His first dramatic success was *Jacques le corsaire* (1844), and his other plays include: *L'enseignement mutuel* (with Desnoyer, 1846); *Le vicaire de Wakefield* (with Tisserand, 1849); and *La tour de Londres* (with Brot and Lemaître, 1855). He was also prominent as a Socialist, and was at the head of the *Bulletin du Mouvement Social* in 1873. His writings include: *Les dogmes nouveaux* (1861), poems; *La république naturaliste. Lettre à Emile Zola* (1879); *Choses de l'autre monde* (1880); *A la recherche des destinées* (1891); and *Vivisection du catholicisme* (1894).

NUSKU, no͞os′ko͞o. A Babylonian and Assyrian deity. Originally a solar deity (according to some, a lunar god), he became a fire-god. His name is not found in historical inscriptions until the Assyrian period, which may be accounted for by his general identification with another and perhaps older fire-god, Gibil. He was regarded as the messenger of the gods, fire being the medium of intercourse with deity (cf. Agni in the Indian theology), but in this aspect he was inferior to the far better known Nabu. Nusku, along with Gibil, appears especially in the incantation texts, where, according to universal arts of witchcraft, fire is used to destroy symbolic representations of an enemy, and so is supposed to affect the latter's person. In this connection Nusku had a wide vogue in the vulgar religion. As the god of fire he was also honored as a patron deity of civilization. Consult Jastrow, *Religion of Babylonia and Assyria* (Boston, 1898).

NUSLE, no͞os′lyĕ. A town in the Crownland of Bohemia, Austria, situated a few miles southeast of Prague, in a wine-growing region. The town has a castle and a park. Population, including the adjacent village of Pankratz, in 1890, 11,740; in 1900, 20,440.

NUSSBAUM, nu̮s′boum, Johann Nepomuk (1829-90). A German surgeon, born in Munich. He became lecturer in surgery and ophthalmology at the University of Munich in 1857, and in 1860 received a professorship. He retired in 1890. As both surgeon and writer on surgical topics he became well known in Germany. His publications include: *Die Pathologie und Therapie der Ankylosen* (1862); *Vier chirurgische Briefe an seine in den Krieg ziehenden ehemaligen Schüler* (1866); *Die Verletzungen des Unterleibs* (1880); and *Ueber Chloroformwirkung* (1885).

NUT (AS. *knuhtu*, Icel. *hnot*, OHG. *nuz*, Ger. *Nuss*, nut). A hard, one-seeded, indehiscent (non-opening) fruit, which has usually come from an ovary of several carpels, as the acorn, hazelnut, etc. (See Fruit.) The best-known and most valuable nuts are almonds, Persian or English walnuts, cocoanuts, pecans, Brazil nuts, hazelnuts, chestnuts, and the various hickory nuts, butternuts, etc., all of which are edible and of commercial importance. Strictly speaking, the peanut is not a nut, although commonly spoken of as such. The various nuts are considered under their separate headings.

In 1899 the United States imported 9,957,427 pounds of almonds, having a value of $1,222,587. The value of the cocoanuts imported amounted to $625,789, and of all other nuts, $879,166. The exports of domestic nuts the same year amounted to $140,250. The most important nuts now grown commercially in the United States are the Persian or English walnuts, almonds, pecans, and chestnuts. The culture of the first two is confined almost entirely to California. The Persian walnut crop amounts to about a million pounds a year, and the almond crop to between 600,000 and 800,000 pounds. Pecan orchards are largely confined to the Southern and Southwestern States and California, but the bulk of the crop is obtained from native trees in Louisiana and Texas. Commercial chestnut orchards are few in number in the United States, but they are increasing from year to year, European and Japanese varieties being largely used to top graft the small native sweet varieties. As with pecans, the bulk of the crop is produced on wild trees. Other native nuts of the United States, which have a greater local than commercial value, are black walnuts, butternuts, the various shellbark hickory nuts, hazelnuts, and chinquapin.

Food Value. From 50 to 65 per cent. of the nuts most commonly eaten (almonds, Brazil nuts, filberts, hickory nuts, pecans, and walnuts) consist of shell. All of these nuts contain little water. The percentage of protein is fairly high, but fat constitutes the largest part of the edible portion, and carbohydrates, which are usually important constituents in vegetable foods, are generally present in small amounts. The chestnut, however, contains nearly 40 per cent. carbohydrates. The percentage in cocoanuts, acorns, and litchi nuts is also fairly high. The meat of nuts, excepting those last mentioned, contains nearly fifty times as much fat and less than one-fifth as much carbohydrates as wheat flour, and has about double the fuel value, i.e. energy-producing power. A pound of unshelled nuts will furnish about half as much protein and the same amount of energy as a pound of flour. Owing to their high fuel value and low protein content, nuts would not make a well-balanced food when eaten by themselves. This is no reason, however, why nuts should not fill an increasingly large place in dietaries. Very few foods supply the needed nutrients in the proper proportion to form a well-balanced ration. Foods rich in fuel constituents need to be combined with other foods of relatively high protein content.

The composition of a number of different kinds of nuts used as food is shown in the following table:

Composition of Nuts

	Refuse	Edible portion	Composition and fuel value of the edible portion					
			Water	Protein	Fat	Carbohydrates	Ash	Fuel value, per pound
	Per ct.	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Calories*
Almonds	64.8	35.2	4.8	21.0	54.9	17.3	2.0	3,030
Brazil nuts	49.6	50.4	5.3	17.0	66.8	7.0	3.9	3,329
Filberts	52.1	47.9	3.7	15.6	65.3	13.0	2.4	3,432
Hickory nuts	62.2	37.8	3.7	15.4	67.4	11.4	2.1	3,495
Pecans	53.2	46.8	3.0	11.0	71.2	13.3	1.5	3,633
English walnuts	58.0	42.0	2.8	16.7	64.4	14.8	1.3	3,305
Chestnuts, fresh	16.0	84.0	45.0	6.2	5.4	42.1	1.3	1,125
Chestnuts, dried	24.0	76.0	5.9	10.7	7.0	74.2	2.2	1,875
Acorns	35.6	64.4	4.1	8.1	37.4	48.0	2.4	2,718
Beechnuts	40.8	59.2	4.0	21.9	57.4	13.2	3.5	3,263
Butternuts	86.4	13.6	4.5	27.9	61.2	3.4	3.0	3,371
Walnuts	74.1	25.9	2.5	27.6	56.3	11.7	1.9	3,105
Cocoanut	48.8	51.2	14.1	5.7	50.6	27.9	1.7	2,986
Cocoanut, shredded	......	100.0	3.5	6.3	57.3	31.6	1.3	3,125
Pistachio, kernels	......	100.0	4.2	22.6	54.5	15.6	3.1	3,010
Pine nut or piñon	40.6	59.4	3.4	14.6	61.9	17.3	2.8	3,364
Peanuts, raw	24.5	75.5	9.2	25.8	38.6	24.4	2.0	2,560
Peanuts, roasted	32.6	67.4	1.6	30.5	49.2	16.2	2.5	3,177
Litchi nuts	41.6	58.4	17.9	2.9	.2	77.5	1.5	1,453

There is little reliable information regarding the digestibility of nuts. The belief that they are indigestible, i.e. digest with difficulty, causing more or less pain or distress, seems to be widespread, and perhaps has some basis in fact. It is quite probable that if the nuts were properly prepared and eaten at proper times much of this prejudice would disappear. There is also a general belief that salt eaten with them aids in their digestion. The present practice of munching them at odd hours, or as a dessert, when sufficient food has been taken to meet the requirements of the body, overtaxes the digestive organs and places the nut under a reproach that is, at least in part, undeserved. While most nut meats are generally eaten without any previous preparation, they may be used in a variety of ways. Chopped nut meats are much relished for sandwiches, and nut salads are not uncommon, while nuts, most commonly chestnuts, are often used as stuffing for roast fowl. The use of nuts in cakes, confectionery, creams, etc., is common. Large quantities of pecans are used by confectioners for making salted pecans, and bonbons of various sorts; and in some European countries, where the chestnut is abundant, bread is made from the ground kernels. Many attempts have been made to prepare nut foods, and to extend their use in various ways. An oil used for salad and other culinary purposes is expressed from beechnuts, walnuts, and very likely from others. Cocoanut oil is much used for culinary purposes, especially in the tropics. This and other nut oils also have various commercial uses.

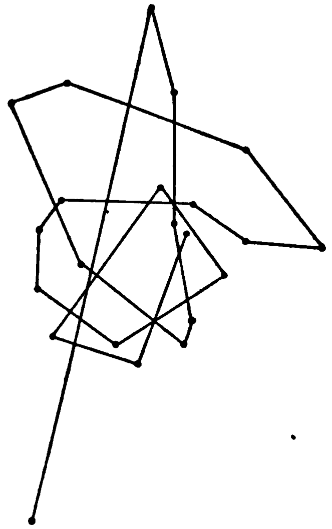
Consult: United States Department of Agriculture, *Nut Culture in the United States* (Washington, 1896); Fuller, *Nut Culturist* (New York, 1896); Parry, *Nuts for Profit* (Parryville, N. J., 1897); Maine Agricultural Experiment Station, Bulletin 54, *Nuts as Food* (Orono, Maine, 1899).

NÛT, no͞ot. An Egyptian goddess, the wife of Seb (q.v.), or, according to other accounts, of the sun-god Rê. She personified the sky, and is usually represented as a naked woman bending, with feet and hands touching the ground, over Seb (the earth), who lies prostrate beneath her. Nût is also depicted as a cow uplifted by the god Shû and supported by other divinities, while over her body, which is adorned with stars, travels the bark of the sun. In the legend, the sun-god Rê, weary of ruling over the earth, retires to rest upon the back of the celestial cow, which typifies the goddess Nût. Consult: Wiedemann, *Religion of the Ancient Egyptians* (New York, 1897); Lepsius, *Ueber die Götter der vier Elemente* (Berlin, 1856); Brugsch, *Religion und Mythologie* (Leipzig, 1888-90).

NUTATION (Lat. *nutatio*, a nodding, from *nutare*, to nod). A vibratory motion of the pole of the equator due to the unequal attraction of the moon on the equatorial ring of the earth. Astronomers define the positions of the stars on the celestial sphere by means of their right ascensions and declinations (q.v.), which are analogous, respectively, to longitudes and latitudes on the earth. But one of the effects of gravitational attraction is to change the position on the sky of the celestial equator, thus altering continually the right ascensions and declinations of all stars. This alteration is called *precession* (q.v.). The general effect of precession is to cause the celestial pole to describe a circle around the pole of the ecliptic (q.v.) once in about 25,800 years. This rotation, however, is not quite uniform. It is subject to a small disturbance of about nine seconds of arc, called *nutation*. This nutation acts forward and backward about 1400 times in the course of one 25,800-year rotation of the celestial pole. The stars' right ascensions and declinations are therefore alternately increased and decreased by nutation, whereas precession generally acts in one direction over a great number of years.

NUTATION (in Plants). The bending movements executed by organs of plants, such as stems, leaves, roots, etc., by which the part is inclined successively in various directions. Nutations are due to the unequal rate of growth of different sides of the organ, an inequality which, as far as is known at present, is dependent upon internal (unknown) causes, and is not called forth by the action of external stimuli. See IRRITABILITY.

Simple nutation occurs in dorsiventral organs, such as flat leaves, both foliage and floral. The movements are only in one plane, being dependent upon the unequal growth of the opposite sides. When young the growth of the foliage leaves is most rapid upon their outer (dorsal) face, in consequence of which the leaf applies itself to the axis, arches over the apex, and with its neighbers forms a compact bud. Later, growth becomes more rapid on the inner (ventral) face, the bud opens, and the leaves straighten out. Similar inequality of growth, but more sharply localized, leads to the folding and rolling of the leaf in the bud. (See *Vernation*, under BUD.) Like movements of radial organs, such as stems, cylindrical leaves, and roots, have been termed circumnutation or revolving nutation, to distinguish them from the simple nutation of dorsiventral organs. When any plant is in vigorous growth the axis rarely grows in length uniformly on all sides. The side on which growth is most rapid will push the apex over toward the side on which growth is less rapid. If the region of more rapid growth changes, shifting around the axis, the tip will be inclined successively to all points of the compass, and with its simultaneous upward growth will describe a spiral; but since the rate of growth is not uniform at successive intervals, the path described will be a very irregular spiral. A path of this kind, reduced to a plane, is shown in the accompanying figure.



NUTATION OF THE TIP OF THE PEA-STEM.

The dots represent the observations; the line is drawn merely to show their serial relation. The true path is doubtless less angular.

Movements quite similar to those above described are called forth in plant organs as responses to external stimuli. Thus twining plants exhibit both true nutation and nutation due to a geotropic sensitiveness. (See GEOTROPISM IN PLANTS.) Changes in temperature cause flowers to open or close by movements which resemble the simple nutation of dorsiventral organs. Thus the tulip, crocus, and other vernal flowers are very sensitive to changes in temperature. The latter can perceive a change of 0.5° C., and will respond to a change of 20° C. in two minutes.

NUT-BROWN MAID, THE. An English ballad of the fifteenth century, telling the exceptional story of the maid, a high-born lady, who maintains her love and constancy to her outlaw lover through the tests he uses to try her. Finally she conquers, and finds the outlaw is also of high degree, and his banishment is feigned. The lover has been supposed to be the Earl of Cumberland, and the nut-brown maid, Margaret Percy. The earliest version is found in Arnold's "Chronicle," a collection of London antiquities (1502). It was reprinted in 1707 in the "Muses' Mercury," and paraphrased by Prior in his "Henry and Emma," in 1718.

NUT-CRACKER. A bird of the crow family, of the genera Nucifraga and Picicorvus. The form and characters are similar to those of crows, but the habits are rather those of jays, and in some respects indicate an approach to woodpeckers. One species (*Nucifraga caryocatactes*) is not uncommon in Europe and Asia, particularly in mountainous regions covered with pines. It is about the size of a jay, but has a longer tail. The plumage is light brown, speckled with white, except on the wings, rump, and tail, which are nearly black. The nut-cracker frequents the tops of high pines, is shy, and breeds earlier than most birds, and in a very secretive manner. Its food, apart from some insects in summer, consists of the seeds extracted from pine cones. These it holds with its feet while it works at them; but its ability to crack a nut, in spite of its name, is doubtful. The only American nut-cracker (*Picicorvus Columbianus*), usually called 'Clarke's crow,' inhabits the pine regions of the West from Mexico to Alaska, and is gray with black and white wings and tail. It is noisy and gregarious, but during the breeding season it is shy. It builds its nest in the tops of tall pines and conceals it with care. The eggs are light grayish green, marked with grayish brown and lilac. Consult: Newton, *Dictionary of Birds* (London, 1893-96); Coues, *Birds of the Northwest* (Washington, 1874); Keyser, *Birds of the Rockies* (New York, 1902). See Plate of JAYS, MAGPIES, ETC.; and Colored Plate of EGGS OF SONG BIRDS.

NUTGALL, or GALL. See GALL-INSECTS.

NUT GRASS. See CHUFA, and Plate of CYPRESS, ETC.

NUTHATCH (formerly also ***nuthack***, ME. ***nuthake***, ***nuttehake***, from ***nut*** + ***hack***). A genus of birds of the family Paridæ, having a straight bill and short legs, the hind toe very strong. The genus is represented in North America by four species, of which the white-bellied nuthatch (*Sitta Carolinensis*) is the commonest and best known. It is found throughout the whole United States and Canada, and is about six inches long, clear ashy blue above, white beneath, and with the crown rich, glossy, green-black. It is abundant in most localities in the fall and spring and often during the winter, when its thrice-repeated querulous call, *nee-nee-nee*, is constantly heard; but in summer it is rather retiring. The nest is made in holes in trees, and the eggs, six to eight in number, are white, speckled with reddish and lilac. The other American species are the smaller red-breasted nuthatch (*Sitta Canadensis*), the brown-headed nuthatch (*Sitta pusilla*) found in the South Atlantic and Gulf States, and the pygmy nuthatch (*Sitta pygmæa*), found from the Rocky Mountains to the Pacific. The last two species are only four inches long. The red-breasted nuthatch is found throughout temperate North America, but is not nearly so common as its white-breasted brother. The European nuthatch (*Sitta Europæa*) is common in most parts of Europe. If taken young, it is easily tamed, and becomes very familiar and amusing. Several other species are known in Asia and Africa.

NUTMEG (ME. *nutmegge*, *nutmege*, from *nut* + *muge*, OF. *muge*, musk, from Lat. *mucus*, musk). The kernel of the fruit of several species of Myristica, of the natural order Myristicaceæ, which contains about eighty species, all tropical trees or shrubs, natives of Asia, Madagascar, and America. The fruit is succulent. It opens like a capsule by two valves. The seed is nut-like, covered with a laciniated fleshy aril which appears in commerce as mace. The species which furnish the greater part of the nutmegs of commerce is Myristica fragrans, or moschata, a tree about 25 feet in height, with oblong leaves, and axillary, few-flowered racemes; the fruit, which is golden yellow when ripe, resembles a pear in size and appearance. The fleshy part of the fruit, which is rather hard, is of a peculiar consistence, resembling candied fruit, and it is often preserved and eaten as a sweetmeat. Nutmegs are now successfully cultivated in the East Indies, Spice Islands, West Indies, and Brazil. Nutmegs are chiefly used as a spice. They yield, by expression, a peculiar yellow fat, called oil of mace (because of its color and flavor, it was generally supposed to be derived from mace), and by distillation is obtained an almost colorless essential oil which has very fully the flavor of the nutmeg. In 1890 the United States imported nutmegs to the value of $534,340.

Other species of Myristica yield nutmegs which, though sometimes used, are of inferior quality. The fruits of several species of Lauraceæ also resemble nutmegs in their aromatic and other properties, as the cotyledons of Nectandra Puchury-major and Puchury-minor, the Pichurim beans of commerce, and the fruit of Acrodiclidium Camara, a tree of Guiana, the camara or ackawai nutmeg. The clove nutmegs of Madagascar are the fruit or Ravensara aromaticum, and the Brazilian nutmegs of Cryptocarya moschata. The calabash nutmeg is the fruit of Mondora Myristica, of the natural order Anonaceæ. See Colored Plate of FLAVORING PLANTS.

NUTMEG-BIRD. A bird-dealer's name for one of the mynas (*Munia punctulata*), also known as the 'cowry-bird.' An East Indian fruit-(nutmeg-)eating pigeon of the genus Myristicivora is known as the 'nutmeg pigeon.'

NUTMEG FLOWER. See NIGELLA.

NUTMEG STATE. Connecticut. See STATES, POPULAR NAMES OF.

NUTRIA. The local Spanish name in South America for the coypu (q.v.), also called 'racoonda,' and the trade name for its fur.

NUTRITION (from Lat. *nutrire*, to nourish). The process by which living organisms appropriate, modify and utilize the materials needful for their existence, growth, and development. The ultimate appropriation of food takes place in the individual cell, which seems to have a gland-like power not only of attracting materials from the blood, but of causing them to assume its structure and participate in its properties. A necessary complement to the process of assimilation is that of excretion, which consists in the discarding of effete matter—the products of its own vital activity—by the cell. In modern terminology the assimilative or building up process is called anabolism; the disassimilative or breaking down process is called katabolism, and the sum of the two, metabolism. The blood is the medium through which nutritive materials are brought to the cells and excreted products are carried off. It is borne by the capillaries to the several tissues of the body and is the source from which they derive the materials for their growth and development; and there is a direct relation between the vascularity of any part and the activity of the nutritive operations which take place in it. Thus in muscle, skin, and mucous membrane, and in nerve tissue, rapid decay and renovation are constantly going on, and in these tissues the capillaries are most abundant; while in cartilage and bone, tendon and ligament, disintegration is comparatively slow, and the capillaries fewer.

All the processes of development and growth are the results of the plastic or assimilative force by which living bodies are able to form themselves from dissimilar materials (as when an animal subsists on vegetables, or when a plant grows by appropriating the elements of water, carbonic acid, and ammonia); but they are the results of this force acting under different conditions.

Development is the process by which each tissue or organ of a living body is first formed, or by which one, being already incompletely formed, is so changed in shape and composition as to be fitted for a function of a higher kind, or finally is advanced to the state in which it exists in the most perfect condition of the species.

Growth, which commonly concurs with development, and continues after it, is properly mere increase of a part by the insertion or superaddition of materials similar to those of which it already consists.

Nutrition, on the other hand, is the process by which the various parts are maintained in the same general conditions of form, size, and composition.

In the elementary forms of animal and vegetable life, represented on the one hand by the amœba and on the other by bacteria, the process of nutrition is a comparatively simple one. They are surrounded by a material which they can use as food, and each individual cell, being fitted to digest and absorb, appropriates what it needs and rejects what it does not require. In the higher animals, however, careful selection and a high degree of preparation and modification of the food is necessary; and these processes are carried on in the digestive canal and by the secretions of the glands (q.v.) which open into it. The phenomena attending the elaboration of food and its preparation for assimilation by the tissues are described under Digestion, Organs of.

In order that nutrition may be carried on in a healthy manner, certain conditions must be present. The blood must be normal in composition and amount, and circulate with suitable rapidity; there must exist a certain nervous stimulation and control; and the part to be nourished must be able to appropriate the materials brought to it by the blood. The dependence of nutrition upon the first of these conditions is shown in anæmia, in which disease the contents and carrying capacity of the blood are lowered, and nutrition correspondingly depressed. The influence of the nervous system is demonstrated by the atrophy or even death of a part which follows the destruction or cutting off of its nerve supply. This often happens in certain diseases of the spinal cord.

It is not only necessary that the body should be supplied with food in order that its natural functions may be performed, but it is equally necessary that the food supplied should consist of the proper materials. Each animal by instinct seeks those substances which best meet the needs of its own metabolism, and it is a matter of every-day experience that man endeavors to supply himself with food suitable to the conditions under which he lives, and alters his diet with respect to season, latitude, age, activity, and occupation. Food is intended to supply the place of that which is given out by the body. But in the choice of diet this is not enough; the food should be sufficient to meet such needs without waste, and without increasing unduly the output of excreta, while the organism should be maintained in health. Careful analysis of the excreta shows that they are made up, besides water, chiefly of the chemical elements, carbon, hydrogen, oxygen, and nitrogen, but that they also contain, although in smaller amounts, sulphur, chlorine, potassium, and certain other elements. To balance this waste it is evident that food must be supplied containing all these elements in something like the proportion in which they are excreted; that is, a 'mixed diet' is necessary. Experiments upon the lower animals have shown that a diet composed exclusively of one class of food, such as fat, or sugar, results in the death of the animal after a longer or shorter period of time. See Diet.

The subject of nutrition is exhaustless. It comprehends all vital phenomena, for none of the functions of life are performed without involving replacement by living matter, and therefore nutrition. The subject of hygiene in all its aspects is connected with it, whether in eating, drinking, exercise, sleeping, or breathing. A change in each of these processes involves a corresponding change in the elaboration and appropriation of new material, and the disassimilation or elimination of old, or its reconversion.

Consult the chapters on "Nutrition and Diet," in Kirke, *Handbook of Physiology* (Philadelphia, 1902); and Foster, *Textbook of Physiology* (New York, 1900). See Respiration; Secretion.

NUTRITION (in Plants). In its widest sense the nutrition of plants includes all processes by which food is obtained and used. The food of plants consists of organic material. Even the green plants require organic food, which they manufacture out of the simpler substances, carbon dioxid and water, that they absorb. The mode in which plants obtain both foods and the materials out of which foods can be made, is described under the head of Absorption. (For the nature of the materials which plants require, see Food of Plants.) Reserve foods are stored in the special tissues or organs. Such materials must be moved first from regions of absorption or manufacture to the points of storage, and after digestion at some later time thence to the regions of growth. Having been brought to the regions of growth, some of the food is used for the supply of energy to the protoplasm, either directly or after incorporation into the substance of the protoplasm itself. The energy is released through the process of oxidation and the by-products are carried away. All processes of nutrition connected with the release of energy for growth and movement constitute the function called respiration (q.v.). Other portions of the food are utilized for the making of new parts. See Growth; Photosynthesis; Assimilation; Storage; Digestion.

NUTT, nŭt, Alfred Trubner (1856—). An English folk-lorist, born in London, and educated at the University College School and the Collège de Vitry, France. He studied the publishing business in Leipzig, Berlin, and Paris from 1874 until 1877, and then succeeded to that of his father in London. He was one of the original members of the Folk-Lore Society, became its president in 1897, and was a founder of the Irish Texts Society in 1898. His publications are: *The Legend of the Holy Grail, with Especial Reference to the Hypothesis of the Celtic Origin* (1888) and *The Voyage of Bran* (2 vols., 1895-97).

NUT'TALL, Thomas (1786-1859). An American ornithologist and botanist, born at Long Preston, Settle, England. He came to the United States in 1808, and went West. Though an ardent ornithologist, and constantly in the wilderness, he rarely carried a gun. In 1822 he was made professor of natural history at Harvard University, but gave only irregular instruction, devoting himself mainly to the culture of the botanic garden, founded in 1805 by his predecessor, Dr. W. D. Peck. He remained in Cambridge ten years, and wrote and published *The Genera of North American Plants* (1818) and *A Manual of the Ornithology of the United States and Canada* (1832-34), in two volumes, which is a classic in American science. A second enlarged edition was published by Nuttall in 1840; and a third edition, with notations by M. Chamberlain, was published in Boston in 1896. In 1834 Nuttall suddenly resigned his professorship and started on an expedition to the Pacific Coast, led by Captain Wyeth, and accompanied by another naturalist, J. K. Townsend, who published a *Narrative* of the journey (1839). From California he went on to the Sandwich Islands, whence he returned around Cape Horn, in the vessel which had among its crew Richard H. Dana, author of *Two Years Before the Mast.* Nuttall then settled in Philadelphia and prosecuted scientific study and writings for a few years. After publishing a second edition of his *Ornithology* (1840), and a *Supplement* to Michaux's *North American Sylva* (1842-49), he returned to inherited estates in Lancashire, where he died.

NUT-WEEVIL. Any one of several species of weevils, of the family Curculionidæ, which infest chestnuts, hickory nuts, and other nuts. They belong to the genus Balaninus, and are of rather large size, usually clay-yellow in color, and possess an exceedingly long, slender beak or snout. By means of this beak they puncture the burs of young chestnuts, the husks of hickory nuts and walnuts, and the coverings of young acorns, reaching nearly to the centre of the nut, and placing an egg in the hole thus made. The larva, which is a stout white grub, eats out the interior of the nut and burrows its way through the shell, and then enters the ground to pupate.

NUX VOMICA (Neo-Lat., vomit nut, from Lat. *nux*, nut, and Neo-Lat. *vomicus*, relating to vomit, from Lat. *vomere*, to vomit). The pharmacopœial name of the seed of *Strychnos nux vomica*, or *poison nut*. The seeds, which are imported from the East Indies, are nearly circular and flat, about an inch in diameter, umbilicated and slightly convex on one side, externally of an ash-gray color, thickly covered with short satiny hairs, internally translucent, tough, and horny, intensely bitter, and inodorous.

The nux vomica tree is a native of Coromandel, Ceylon, and other parts of the East Indies. It is a tree of moderate size, with roundish-oblong, stalked, smooth leaves, and terminal corymbs. The fruit is a globular berry, about as large as a small orange, one-celled, with a brittle shell, and several seeds lodged in a white gelatinous pulp. The bark is sometimes known as *false Angostura bark*, having been confounded with Angostura bark in consequence of a commercial fraud; but its properties are very different, as it is very poisonous.

The seeds contain (in addition to inert matters, such as gum, starch, woody fibre, etc.) two alkaloids closely related to each other, which act as powerful poisons on the animal frame, and speedily occasion violent tetanic convulsions and death. These alkaloids or bases are named *strychnine* and *brucine* (qq.v.).

Nux vomica is poisonous in a greater or lesser degree to most animals. In very small doses, its effects upon man are those of a general tonic, acting as a stimulant to digestion, circulation, respiration, and the nervous system. It seems to exert a selective action upon the cells of the anterior bone of the spinal cord. In larger doses there is a disordered state of the muscular system; the limbs tremble; a slight rigidity or stiffness is felt when an attempt is made to put the muscles in action; respiration is jerky and there is a sense of uneasiness. If the use of the medicine is continued these effects increase in intensity, and the voluntary muscles are thrown into a convulsed state by very slight causes—as, for example, by inspiring more deeply than usual, or even by turning in bed. In paralysis the effects are most marked in the paralyzed parts. In poisonous doses the symptoms are like those of tetanus, but with the muscles of the jaw the last to be affected, followed by death. It is difficult to say what is the smallest dose that would prove fatal to an adult. Thirty grains of the powdered nuts, given by mistake to a patient, destroyed life. Three grains of the extract have proved fatal, half a grain of sulphate of strychnine caused death in fourteen minutes. Its chemical antidote is tannin, which forms a partially insoluble compound.

NYACK, nī'ăk. A village in Rockland County, N. Y., picturesquely situated on the west bank of the Hudson River, at the broad expansion called Tappan Bay, opposite Tarrytown, with which it is connected by ferry, and 27 miles north of New York City; the terminus of the Northern Railroad of New Jersey, a branch of the Erie Railroad (Map: New York, G 4). It is popular as a place of residence and as a summer resort. It has a public library, and is the seat of the Hudson River Military Academy, Rockland Military Academy, and Nyack Military Academy. There are cloth-finishing and yacht and boat building establishments, also manufactories of shoes, carriages, sleighs, etc. Nyack was settled about 1700, was incorporated as a village in 1873, relinquished its charter in 1876, and was reincorporated in 1883. The government, under a general village law, revised in 1897, is vested in a president and board of trustees. The water-works are owned and operated by the village. Population, in 1890, 4111; in 1900. 4275.

NYAM-NYAM. An African people. See Niam Niam.

NYAN. The name in Ladak for an argali (q.v.).

NYANGWE, nyăng'wĕ. A trading station on the Upper Congo, in Congo Free State, Central Africa, in longitude 26° 20′ E., and latitude 4° 15′ S. (Map: Congo Free State, E 3). It is connected by a caravan route with Lusambo, on the Sankuru, from where there is steam communication with Leopoldville. It is also connected with Albertville, on Lake Tanganyika. Nyangwe was visited by Livingstone in 1871, and was the starting point for Stanley's expedition to the mouth of the Congo in 1876.

NYANZA, nyän'zȧ. A word in the eastern Bantu languages meaning 'great water,' and applied to several of the large lakes in Central Africa. See Albert Edward Nyanza; Albert Nyanza; Nyassa; Victoria Nyanza.

NYASSA, nyäs'sȧ (a form of the Bantu word *nyanza*, meaning 'great water'). One of the large lakes of Southeastern Africa. It is situated southeast of Lake Tanganyika, and about 380 miles from the Indian Ocean, between latitudes 9° 30′ and 14° 25′ S. (Map: Congo Free State, F 5). It is 340 miles long from north to south, with an average breadth of 40 miles, and an area of 14,200 square miles. Near its southern and eastern shores it reaches a depth of 700 feet, and in many places its bottom lies below the surface of the Indian Ocean, but it becomes shallow toward the north and west. It closely resembles Lake Tanganyika (q.v.) in shape and formation, both being formed by deep fissures in the great plateau. Lake Nyassa is surrounded on all sides by mountains, which on the east coast are from 5000 to 10,000 feet high. Between these and the shores there is an intervening strip of low, sandy or marshy alluvial land from 2 to 10 miles wide, except in the northeast, where the mountains approach close to the water's edge. On the west the mountains are broken in several places by gaps through which rivers find their way to the lake, which is drained southward into the Zambezi through the Shire River. Anchorage can be found in some of the creeks and river mouths, and several British and German steamers ply regularly on the lake, which is bounded on the west by British Central Africa, and on the northeast by German East Africa. Lake Nyassa was discovered by Livingstone in 1859.

NYASSALAND, nyăs′sȧ-lănd. Formerly the name of the British Central Africa Protectorate (q.v.).

NYĀYA, nyä′yȧ (Skt., analysis). The name of the sixth and latest of the orthodox systems of ancient Hindu philosophy.

Of the six systems the Mimamsa and Vedanta are grouped together as more closely connected in dealing with divine and spiritual matters. The Nyaya and Vaiseshika systems form a group, having in common especially the atomic theory of the universe, and a clear and logical classification of ideas. The latter feature is particularly characteristic of the Nyaya system, so that it is commonly spoken of as 'Logic,' although it is really a philosophical system. The Nyaya agrees with all the other systems in promising to its followers final beatitude. The way to the attainment of supreme bliss is through a knowledge of the principles taught by this particular system. These principles are embodied in the sixteen 'topics,' *pramāṇa*, or means of knowledge, *pramēya*, or objects of inquiry, *saṁśaya*, or doubt, *prayōjana*, or purpose, *dṛṣṭānta*, or precedent, *siddhānta*, or tenet, *avayava*, or syllogistic member, *tarka*, or confutation, *nirṇaya*, or ascertainment, *vāda*, or discussion, *jalpa*, or wrangling, *vitaṇḍa*, or caviling, *hētvābhāsā*, or fallacy, *chala*, or prevarication, *jāti*, or futile objections, and *nigrahasthāna*, or failure in argument.

The great prominence given by the Nyaya to the method by means of which truth might be ascertained has sometimes misled European writers into the belief that it is merely a system of formal logic, not engaged in metaphysical investigations. It was, however, really intended to be a complete system of philosophical investigation; and some questions, such as the nature of intellect and articulated sound, or those of genus, variety, and individual, it has treated in a masterly manner.

The founder of the Nyaya system is said to have been Gotama, or Gautama. The events of his life and his date are quite unknown, though it is probable that the work attributed to him is, in its present shape, later than the work of the grammarian Panini (q.v.). It consists of five books, or *Adhyāyas*, each divided into two 'days' or diurnal lessons, which are again subdivided into sections or topics, each of which contains several aphorisms, or *Sūtras*. Like the text-books of other sciences among the Hindus, it has been explained by commentaries, which, in their turn, have been made the bases of more popular or elementary treatises.

The Nyaya system, like the kindred Vaiseshika, was originally atheistic. It became theistic later, but without acknowledging the existence of a personal God as a creator of matter. This feature, which it shares with the later form of the Vaiseshika, was elaborated in Udayanacharya's *Kusumañjali* (about A.D. 1200), and in some other works.

The Sanskrit text of the Sutras of Gotama, with a commentary by Visvanatha, was edited at Calcutta (1828), and the first four books, and part of the fifth, of the text, with an English version, an English commentary, and extracts from the commentary by Ballantyne (Allahabad, 1850-54). More recent is the edition of the *Nyāya Sūtras* at Benares (1896); also Udayanacharya's *Kusumañjali* (Calcutta, 1895). Consult: Garbe, *The Philosophy of Ancient India* (Chicago, 1897); Max Müller, *The Six Systems of Indian Philosophy* (New York, 1899). See Mimaṁsa; Sankhya; Sūtra; Vaiśēshika; Vēdānta; Yoga.

NYBLOM, nụ′blôm, Karl Rupert (1832—). A Swedish poet and critic, born at Upsala. He studied at the university in his native town, and was professor of æsthetics and of the history of art and literature there from 1867 to 1897. His publications include some valuable studies of art under the title, *Estetiska studier* (1873-84). His works in poetry include: *Dikter* (1860); *Bilder från Italien* (1864, revised as *Et tår i Södern*, 1883); *Nya Dikter* (1865); *Vers och Prosa* (1870); and *Valda Dikter* (1876). Besides these original works he translated Moore's *Melodies* and the *Sonnets* of Shakespeare.

NYBORG, nụ′bôr-y′. A seaport of Denmark, situated on the east coast of the island of Fünen, 17 miles southeast of Odense (Map: Denmark, D 3). There are an old Gothic church, and the remains of an ancient palace, formerly a royal residence, but now used as an arsenal. The harbor is accessible for large vessels, and a line of ferry-boats runs across the Great Belt to Korsör in Zealand. Nyborg is of considerable industrial importance, having large iron foundries, steam textile mills, and tobacco factories, besides a large trade in grain. Population, in 1890, 6049; in 1901, 7785. Nyborg was founded in the twelfth century, and soon became one of the foremost cities of Denmark, being the regular meeting place of the early Government assemblies.

NYC′TALO′PIA (Lat., from Gk. *νυκτάλωψ*, *nyktalōps*, night-blind, from *νύξ*, *nyx*, night + *ὤψ*, ōps, face, eye). Night-blindness. An affection of vision due rather to defective power of retinal adaptation than to defective light-sense, but resulting in a limited ability to see in a faint light. See Sight, Defects of.

NYC′TERI′BIA (Neo-Lat., from Gk. *νυκτερίς*, *nykteris*, bat + *βίος*, *bios*, life). An extremely curious genus of degraded, parasitic flies having neither wings nor balancers. It is the sole genus of the family Nycteribiidæ. It resembles the Hippoboscidæ in parasitic habits, and in the retention of the eggs within the abdomen of the female, until they have not only been hatched, but have passed from the larva into the pupa state. The few species are all parasitic on bats.

NYC′TOTRO′PIC (from Gk. *νύξ*, *nyx*, night + *τροπή*, *tropē*, a turning, from *τρέπειν*, *trepein*, to turn). A term applied to those movements of plants which are called forth by variations in the intensity of the light. A later and more exact term is photeolic.

NYD′IA. In Bulwer's *Last Days of Pompeii*, a blind flower-girl, of gentle birth, rescued by the hero from the slavery into which she had been sold. The story of her love for Glaucus is modeled on Mignon's passion, but is individualized by her blindness, which the author handles with much art.

NYE, Edgar Wilson (1850-96), better known as Bill Nye. An American humorist, born in Shirley, Maine, August 25, 1850. Nye's childhood was passed in Wisconsin. He went as a young man to Wyoming, studied law, was admitted to the bar there in 1876, was elected to the Legislature, and afterwards served as Postmaster and newspaper correspondent. His health failing, he returned to Wisconsin in 1883 and settled in New York in 1886, having already achieved wide popularity as a humorist, lecturer and writer. His humor consists very largely in punning and in making free with the English tongue. The more noteworthy of his books are: *Bill Nye and the Boomerang* (1881); *Forty Liars* (1883); *Baled Hay* (1884); *Bill Nye's Blossom Rock* (1885); *Remarks* (1886); *Chestnuts* (1887); *Railroad Guide*, with James Whitcomb Riley (1888); and, with the same, *Fun, Wit, and Humor* (1889); a play, *The Cadi* (1891); *Comic History of the United States* (1894); and *Comic History of England* (1896). Nye died in Asheville, N. C., February 27, 1896.

NYIREGYHÁZA, nyē̍'rĕd-y'hä'zŏ. A town and railway junction in the District of Szabolcs, Hungary, on the Nyir, 167 miles by rail northeast of Budapest (Map: Austria-Hungary, G 3). Situated near the Tokay wine region, the inhabitants are largely engaged in viticulture; other branches of agriculture are also profitably developed, and there are manufactures of soda, saltpetre, and matches; important annual fairs are held. Population, in 1900, 33,088.

NYKÖPING, nụ'chē-pĭng. A seaport of Sweden, situated on an inlet of the Baltic Sea, 50 miles southwest of Stockholm (Map: Sweden, G 7). It possesses regular steamship connections with the capital city and Norrköping, and has cotton and wool spinning establishments, and an active trade in grain. Population, in 1901, 7375. In the Middle Ages Nyköping was one of the most important towns of Sweden.

NYLANDER, nụ'lån-dẽr, William (1822-99). A Finnish botanist, born at Uleåborg. From 1857 to 1863 he was professor of botany at Helsingfors, and then settled in Paris. He left his valuable collections and his library to the University of Helsingfors. Nylander wrote on the lichens of Europe and of the tropics, *Essai d'une nouvelle classification des lichens* (1854); *Prodromus Lichenographiæ Galliæ et Algeriæ* (1856); and *Lichenographiæ Novo-Granatensis Prodromus* (1863).

NYLGHAU. See Nilgai.

NYM CRIN'KLE. A pseudonym of the American newspaper writer Andrew C. Wheeler (q.v.).

NYMPH (Gk. Νύμφα, *Nympha*). In Greek mythology, a lesser divinity or spirit of the woods and streams. The nymphs are mortal, though gifted with long life and free from old age. Their homes are the groves and fountains, forests, meadows, and the sea. There were many classes of nymphs, such as the Nereids (q.v.) in the sea, the Naiads (q.v.) at the springs, and the Dryads (q.v.) and Hamadryads in the trees. The Naiads especially, as goddesses of the waters, were regarded as divinities of fruitfulness and increase. The cult of the nymphs was very widespread, but never attained special splendor. They were worshiped with Pan in caves, or at the springs where they dwelt. In art they are found as spectators or participants in many mythological scenes, and are also represented on many reliefs dedicated by votaries at their shrines. In Greek art they are usually represented as fully draped maidens, often holding hands and dancing; the number is usually three, and sometimes Hermes appears as their leader. In later times they are commonly in the form of maidens, nude above the waist and holding before them a large mussel-shell or basin as a symbol of their control over fountains.

NYMPH (from Lat. *nympha*, from Gk. *νύμφη*, *nymphē*, nymph, bride). The third stage of any insect which undergoes an incomplete metamorphosis. It is an active stage, and in it the insect as a rule closely resembles the adult, except in not possessing wings. See Metamorphosis.

NYM'PHÆA'CEÆ (Neo-Lat. nom. pl., from Lat. *nymphæa*, Gk. *νύμφαια*, *nymphaia*, water-lily, from *νύμφη*, *nymphē*, nymph, bride). The Water-Lily Family. A natural order of more than 60 species of dicotyledonous plants growing in the mud of lakes, ponds, ditches, and slow rivers, in warm and temperate regions. Their large, long-stalked, heart-shaped or peltate leaves float on the surface of the water, and the large, often beautiful and fragrant flowers either float or are raised slightly above the water. There are usually four sepals, and numerous petals and stamens, often grading into one another. The many-celled ovary with radiating stigmas and numerous ovules in some of the genera is more or less surrounded by a large fleshy disk. The seeds have a farinaceous albumen and those of many species are used as food, as are also the rootstocks of some. See Water-Lily; Lotus; Nelumbo; Euryale.

NYORO, nyō'rô, or **BA NYORO.** One of a group of powerful Bantu tribes, living on the east side of Lake Albert Edward, Africa. They are the northernmost of the Bantu. They are as a rule good-looking, tall and well proportioned, but their countenances are disfigured by their custom of extracting the four lower incisors. The huts are conical frames, covered with thatch. Their weapons are spears, assegais or throwing spears, wooden shields, and bows and arrows. They make dugout canoes and rafts of bundles of papyrus for navigating the streams and lakes. Game and fish are caught with ingenious traps and nets. Their staple food is the sweet potato and grain, from which beer is brewed. The clan system prevails, and it is forbidden for a Nyoro to kill or eat the totem of his clan. The best defined religious practice is the worship of ancestors, which grows out of the clan system. As iron-workers, weavers, and potters they show decided skill. They number about 110,000. Consult Johnston, *The Uganda Protectorate* (New York and London, 1902).

NYRÉN, nụ-rān', Magnus (1837—). A Swedish-Russian astronomer, born in the Province of Wermland, Sweden. He studied at Upsala, and in 1868 was first engaged in the Observatory at Pulkova, of which he became vice-director in 1890. Nyrén made valuable researches for the determination of the constants of precession, nutation, and aberration, and wrote: *Détermina-*

tion du coefficient constant de la précession au moyen d'étoiles de faible éclat (1870); *Bestimmung der Nutation der Erdachse* (1873); *Die Polhöhe von Pulkowa* (1873); *L'aberration des étoiles fixes* (1883); and *Variations de la latitude de Poulkova* (1893).

NYS'SA. A genus of North American trees. See TUPELO.

NYSSENS, nē'säɴ', ALBERT (1855—). A Belgian politician, born at Ypres. He studied law at Ghent, and became professor in the Catholic University at Louvain. Afterwards he entered politics, was representative from Louvain in 1892, and played a prominent part in the struggle over the suffrage in 1893. Nyssens was made Minister of Industry and Labor in 1893. The labor laws he succeeded in having passed in this capacity did not suit the extremists of either party. He wrote *E. Pirmez* (1893), a biographical sketch of the celebrated leader of the Left.

NYSTAD, nụ'ståd. A town in the Län of Åbo-Björneborg, Finland, situated on the Gulf of Bothnia, about 40 miles southeast of Åbo (Map: Russia, B 2). It is noted for the treaty concluded here in 1721 between Sweden and Russia, by which the territory conquered by Peter I. along the Gulf of Finland and the Baltic was conceded to Russia. Population, in 1897, 3928.

NYX (Lat., from Gk. νύξ, night). In Greek mythology, the goddess of night, called Nox by the Romans. She was the daughter of Chaos and mother, by her brother Erebus, of Day and Light. Among her children were the Mœræ, Hypnos, Nemesis, Discord, and Thanatos, and some of the poets call her the mother of all things.

O

O The fifteenth letter and fourth vowel in English, and a symbol for a sound in general common to all languages. Its form is derived through the medium of Latin from the Greek, and still more remotely from the Phœnician character. In Semitic the name of the letter was *ayin*, 'eye,' having reference to the form of the letter, which must originally have been a pictograph. This Semitic letter represented a guttural breathing, the *'ain*, which did not exist in Greek. The sign was adopted by the Greeks to represent different *o*-sounds, for the long sound of which they afterwards developed the character omega (Ω). In post-classical times the names *omicron*, 'little *o*,' and *omega*, 'big *o*,' were given to these symbols. See Alphabet.

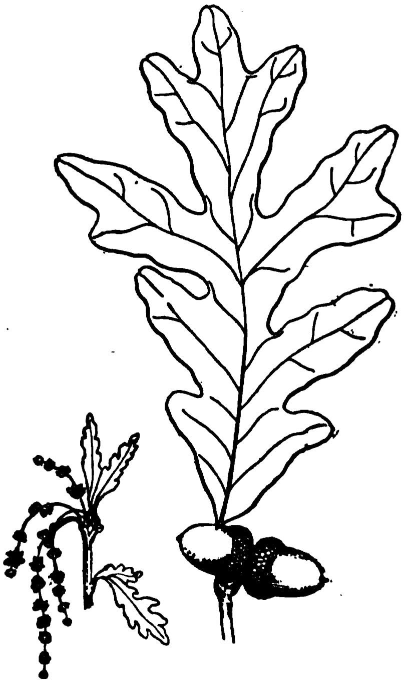
Sound. In English the letter *o* is used to indicate two chief divisions of *o*-sound, first the close or 'long *o*' in *old*, *no*, etc., which is sometimes represented also by digraphs, as in *sew*, *dough*, *tow;* second, the open or 'short *o*,' which may be wide, as in *hot*, *rot*, or narrow, as in *shorn*, *lord*. The main source of the English long *o* is an Old English *ā*, Germ. *ei*, Goth. *ai*, as in Eng. *stone*, A.S. *stān*, Germ. *Stein*, Goth. *stains;* the short *o* is usually a retention of a West Germanic *o* as in *gold* (A.S. *gold*, Germ. *Gold*). As a graphic device, moreover, *o* is sometimes used to express a *u*-sound, as in *who*, *wolf*, *love*, *monk* (A.S. *munuc*), etc. This spelling is really not orthographic, but was due to the Anglo-Norman scribes adopting a looped *o* instead of *u* when adjoining an angular pointed letter like *m*, *w*, *n*, *v*, where the vowel could not readily be distinguished by the eye. In some words this has even affected the pronunciation, as in 'sovereign,' and often 'wont.'

As a Symbol. In mediæval notation as a numeral *o* = 11; in chemistry O = oxygen; in logic it is the sign of the particular negative proposition; and it is common in abbreviations, O.T. = Old Testament; O.H.G. = Old High German, etc.

OAHU, wä'hōō. One of the Hawaiian Islands (q.v.).

OAJACA, wȧ-hä'kȧ. A State and a city of Mexico. See Oaxaca.

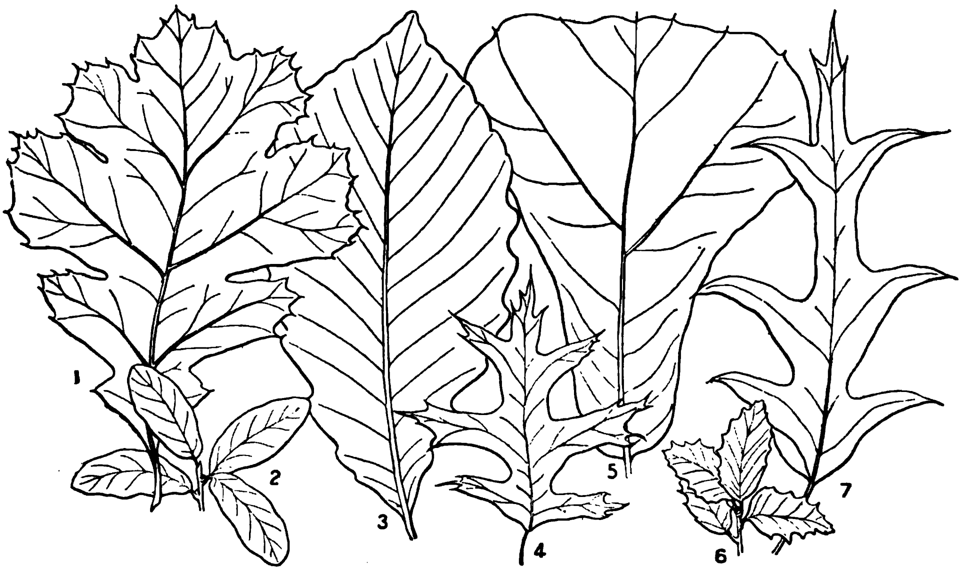
OAK (AS. *āc*, OHG. *eih*, Ger. *Eiche*, oak; connected with Lat. *æsculus*, Gk. *αἰγίλωψ*, *aigilōps*, oak), *Quercus*. A genus of trees and shrubs of the natural order Cupuliferæ, having a three-celled ovary, and a round (not angular) nut (acorn) placed in the lower part of and invested by a scaly truncated cup. The species number about 300 and are natives of temperate and tropical countries. Several are found in Europe. North America produces many, and many are natives of Asia, especially of mountainous regions. None are found in tropical Africa, in Australia, or in South America except in the most northern parts. The oaks have alternate simple leaves, which are entire in some, but in the greater number variously lobed and sinuated or cut; evergreen in some, but more generally deciduous, when they have well-developed winter buds.



Oak (*Quercus alba*).

The oaks are famous for the strength and durability of their timber, the majesty of their appearance, and their great longevity. They reach maturity in from 120 to 200 years, depending upon the species, and well-attested specimens are known to be nearly 1000 years old. Some species rise tall and stately to a height of from 50 to

100 or even 150 feet, and have thick trunks and wide-spreading branches. The trunk is often four, six, or even eight feet in diameter. The oak succeeds best in loamy soils, and especially in those that are somewhat calcareous. The timber is very solid, durable, peculiarly insusceptible of the influence of moisture, and therefore eminently adapted to ship-building. It is also employed in carpentry, mill work, etc. The bark abounds in tannin, and contains a peculiar bitter principle called quercine, and is used in medicine, chiefly in gargles, on account of its astringency, sometimes also as a tonic; it is used along with gall-nuts in the manufacture of ink; but most of all for tanning (see **Bark**), on which account the oak is often planted as copse-wood (see **Copse**) in situations where it cannot be expected to attain great size as a tree. The acorns of some trees are also much less bitter than others, and species occur which produce acorns as sweet as chestnuts.



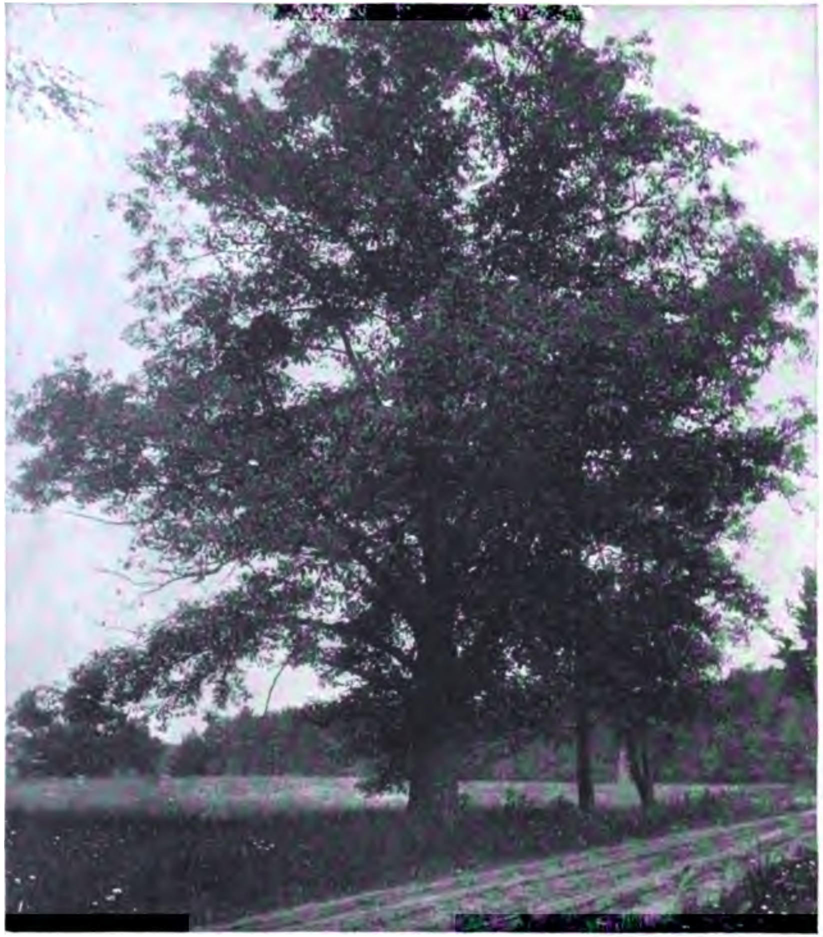
OAK LEAVES.

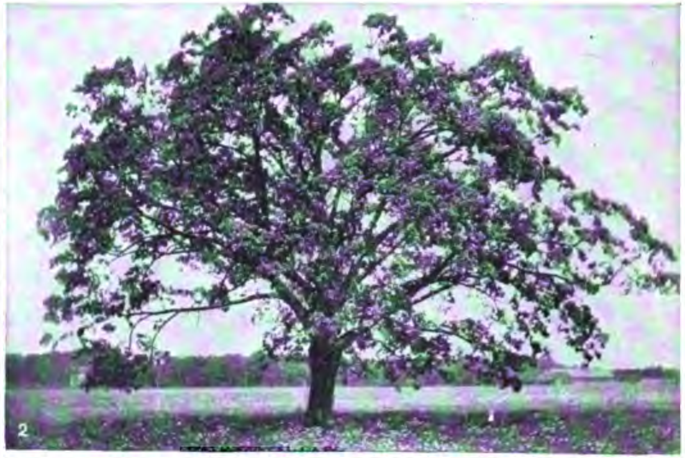
1, Black oak (*Quercus velutina*); 2, Live oak (*Quercus Virginiana*); 3, Rock Chestnut oak (*Quercus primus*); 4, Pin oak (*Quercus palustris*); 5, Black Jack oak (*Quercus Marylandica*); 6, Corn oak (*Quercus suber*); 7, Spanish oak (*Quercus digitata*).

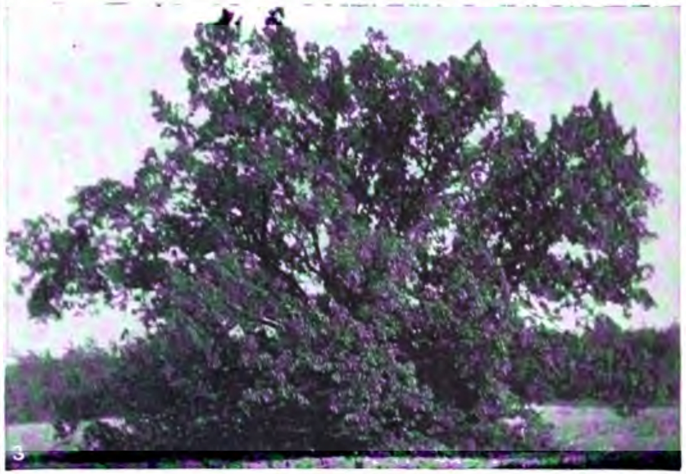
Economically considered the principal oak of Europe, also distributed over Western Asia, is *Quercus robur*, the British oak, of which there are two well-known varieties, *pedunculata* and *sessiliflora*, so named because in the former the acorns have stalks, in the latter not. These and other differences in habit have no apparent influence upon the value of the timber. Of these varieties, which some botanists call distinct species, *pedunculata* is more abundant in the north and *sessiliflora*, often called durmast oak, in the south. The Turkey, or Adriatic oak, sometimes called Austrian oak (*Quercus Cerris*), native to Southeastern Europe, is large and valuable and extensively planted. Its leaves are acutely lobed and the cups of the acorns have long acute bracts, from which it is called mossy-cupped. The holm or evergreen oak (*Quercus Ilex*) is an evergreen species occurring commonly in the south of Europe. It is more fully described under **Ilex**. The cork oak (*Quercus Pseudo-suber*), from the bark of which the cork of commerce is obtained, is a native of Spain and the north of Africa. (See **Cork**.) The Valonia oak (*Quercus Ægilops*), of Eastern Europe and Asia and extensively planted in Algeria and elsewhere, is celebrated for the amount of tannin contained in its acorns and cups, large quantities of which are used in tanning leather. The gall oak (*Quercus lusitanica*), a common, low shrub native of Asia Minor, is noted for the galls produced upon its leaves by insects.

In the United States more than 50 species of oaks are found with a score or more additional described varieties and hybrids. Some species are very restricted in their distribution, being known from only a single locality, where others range from Maine to Minnesota and southward to the Gulf of Mexico. The American species, and possibly the others, readily fall into two great groups, the white oaks and black oaks, respectively, the former with round-lobed, never bristle-tipped leaves, and acorns which ripen the first year; the latter with acute bristle-tipped leaf lobes, and fruits which mature the second year. The American white oak (*Quercus alba*), a large tree of rather rapid growth and tough, hard, strong, close-grained wood, is one of the most valuable of timber trees. It is found from Canada to the Gulf and west to Texas. The bur oak, or mossy-cup oak (*Quercus macrocarpa*), is a large tree of much the appearance and distribution of the white oak and is one of the most valuable oaks for Western planting. Its timber is coarser grained and not so strong, but otherwise equals that of the former species. The red oak (*Quercus rubra*) and the scarlet oak (*Quercus coccinea*) are large, valuable trees that occupy about the same territory. They belong to the second class of oaks mentioned above. Their timber is coarse-grained, heavy, hard, and strong, and is used in various kinds of building and for furniture. No difference between the

OAKS







1. SCARLET OAK (Quercus rubra).

2. WHITE OAK (Quercus alba).
3. SPANISH OAK (Quercus digitata).

two is noticed in the lumber trade. The chestnut oak (*Quercus Prinus*) is a large tree with a deeply furrowed bark and leaves resembling those of the chestnut. The bark, which is rich in tannin, is used extensively in tanning leather. The chinquapin oak (*Quercus acuminata*), and the dwarf chinquapin oak (*Quercus prinoides*), by some botanists referred to *Quercus Prinus*, bear edible acorns. The yellow oak, or quercitron (*Quercus tinctoria*), or *Quercus discolor* of some botanists, yields a valuable bark for use in tanning, and a dyestuff, quercitron. The live oak (*Quercus virens* or *Quercus Virginiana*) is found growing in the rich soil of moist climates from Virginia to Texas, also in California, Mexico, Central America, and Cuba. It is one of the hardiest of the evergreen oaks, attaining a height of 60 feet or more, and six to eight feet in diameter. It was formerly extensively used in ship-building. The Spanish oak of the southeastern United States is variously called *Quercus digitata* and *Quercus dilatata*, the latter name being also applied to an East Indian species.

The name oak is given to many other trees and plants not related to Quercus. The African oak is a kind of teak (q.v.). In Australia a number of species of Casuarina (q.v.) are called oak, as are also species of Grevillea, Lagunaria, etc. *Rhus toxicodendron* is often called poison oak in the United States, etc. Fossil oak leaves are known in the Cretaceous rocks, where are also found some forms intermediate between the oaks and chestnuts. These latter indicate for the two genera Quercus and Castanea a common ancestry in early Cretaceous times. In the Tertiary oaks were prominent members of the vegetation and ranged to far northern latitudes, for their leaves are found in the Lower Eocene beds of Disco Island, on the west coast of Greenland.

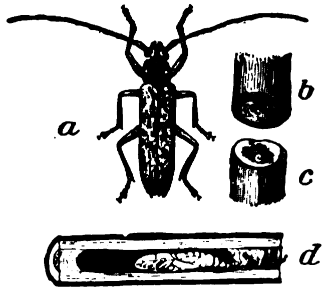
OAK APPLE, or GALL. See GALL-INSECTS.

OAK CROWN, ORDER OF THE. A civil and military order of Luxemburg, founded in 1841 by King William II. of the Netherlands. It has five classes and is conferred on distinguished artists. The decoration is an eight-pointed silver star, with a golden W beneath the royal crown on a green field, surrounded by an oak crown. The cross is suspended from an orange ribbon with three green stripes. The motto is *Je maintiendrai.*

OAKELEY, ōk'lĭ, Sir HERBERT STANLEY (1830-1903). An English organist and composer, born at Ealing, Middlesex. He was educated under native teachers, and at Oxford University. Later he studied at the Leipzig Conservatory and privately (organ) with Schneider of Dresden and Breidenstein of Bonn. He held several university appointments as lecturer on musical topics, and held high degrees from most of the leading universities of Great Britain. He was composer (in Scotland) to Queen Victoria, and was knighted by her in 1876. His organ recitals were famous throughout the United Kingdom. His compositions include the Cantata *Jubilee Lyrics*, a sonata op. 20, considerable church music, songs, and an orchestral "suite in the olden style" (1893).

OAKES, ōks, URIAN (1631-81). An American colonial clergyman and poet, born in England. He was brought to Massachusetts in 1634. He graduated at Harvard in 1649, and showed his precocity by the early publication at Cambridge of a set of astronomical calculations, and shortly afterwards accepted a pastorate at Titchfield, England. His Non-Conformist views compelled him to relinquish his pastorate in 1662, although later he preached to another congregation. On account of his learning and piety he was chosen pastor of the church in Cambridge, Mass., where he began his labors in 1671. He accepted the presidency of Harvard College in 1675 (being formally installed five years later), and held this position until his death, which occurred in Cambridge, Mass., July 25, 1681. He was an eloquent preacher, but is remembered chiefly for *Elegy Upon the Death of Thomas Shepard* (1677), one of the best and most elaborate of early colonial poems. This poem has been more than once reprinted. For specimens and criticism, consult Tyler, *History of American Literature*, ii., 15-18, 163-167.

OAK INSECTS. The insect fauna of oak is very extensive. Between 500 and 600 species of insects have been recorded that live upon the different species of Quercus, and there are in addition many other species which live in decaying oak wood and oak stumps. In Germany 537 species of insects of all orders have been recorded by Kaltenbach as preying upon the oaks of that country. It has been estimated that it is not improbable that 1000 species of oak insects exist in the United States. The roots of the live oak, and probably of the water oak, are infested by a great longicorn borer (*Mallodon melanopus*) by which the trees are permanently dwarfed and their growth arrested. There are several species which burrow into the trunk, the most prominent being the caterpillar of the carpenter moth (*Prionoxystus robiniæ*), which occurs from New England to Texas and honeycombs the wood with large black burrows. Several flat-headed borers (Buprestidæ) and many bark-boring beetles (Curculionidæ) affect oak.



OAK-PRUNER.

a, Adult beetle (*Elaphidion villosum*); *b*, end of twig severed by larva from tree; *c*, reverse end containing maggot; *d*, same from side, split to show pupa within it.

The oak-pruner (*Elaphidion villosum*) and the periodical cicada (see CICADA) cut off the twigs and small limbs. The leaves of various oaks are eaten by many species of lepidopterous larvæ, the most prominent being the forest tent-caterpillar (*Clisiocampa disstria*) and the large black and red striped spiny caterpillar of *Anisota senatoria.* These two caterpillars in the Atlantic and Central States, as a rule, do more harm to oak forests than all other species combined.

Several species of leaf-rollers (q.v.) are found upon oak, and leaf-miners (q.v.) frequently dis-figure the leaves. There are also plant-lice and scale-insects which are confined to the trees of this kind, and the so-called gloomy scale (*Aspidiotus tenebricosus*) frequently endangers the life of half-grown trees, while the imported oak-scale (*Asterodiaspis quercicola*) enfeebles the trees in many localities, disfiguring the smaller branches by pitting the tender bark with its peculiar depressions.

A striking characteristic of the insect fauna of oak is the occurrence of many kinds of galls produced mainly by gall-flies of the hymenopterous family Cynipidæ. One hundred and eight distinct species of gall-flies live upon oaks in the United States, each species making its characteristic gall either upon the roots, the twigs, the buds, or the leaves. Some of the most striking of the oak galls are: The oak potato-gall, the large, hard, uneven swelling resembling a potato in shape, growing upon white oak twigs and attaining a length of two inches or more; the wool-sower gall, which consists of a round mass resembling wool, from the size of a walnut to that of a goose-egg, growing on the side of or surrounding white oak twigs in June, pure white in color tinged or speckled with rose-red; and the oak cup-gall, which consists of a very curious swelling on the acorn cups, terminating in a bunch of curly, woolly fibres. Several galls are made by dipterous insects of the gall-midge family, Cecidomyiidæ. Consult Packard, *Fifth Report, United States Entomological Commission* (Washington, 1890).

OAK′LAND. A beautiful residential city and the county-seat of Alameda County, Cal., six miles across the bay from San Francisco; on the Southern Pacific Railroad (Map: California, B 3). Oakland, named from the number of evergreen oaks within its limits, has a healthful climate, is surrounded by beautiful scenery, and possesses fine drives and wide and level streets, 146 miles paved, a great proportion with macadam, and five miles with bitumen. Steam ferries connecting with San Francisco and eighty miles of street railway demonstrate the city's accessibility as a residence district. Many of its private dwellings are finely situated and are notable structures. Particular mention may be made also of Macdonough Theatre, the public library, which contains nearly 30,000 volumes, the high school, and other public school buildings, as prominent architectural features. Oakland is the seat of California College (Baptist), established in 1870. Lake Merritt, south of the city and connected with San Francisco Bay by a narrow inlet entering an indentation of the bay, is a popular resort.

The city, adjacent to a fertile agricultural and fruit-growing region, controls a large commerce as a railroad terminus and as a shipping centre, both vessels and cars meeting here to exchange commodities. With its manufacturing advantages it also has important industrial interests—shipbuilding yards; marble, smelting, and metallurgical works; flour, cotton, quartz, and planing mills; fruit-canning works; cordage, carriage, jute, and windmill factories, etc. The government is vested in a mayor, elected every two years, a unicameral council, and in subordinate administrative officials, the board of health being appointed by the executive, and all other officers chosen by popular vote. Oakland spends annually, in maintenance and operation, about $785,000, the principal items of expense being $295,000 for schools, $100,000 for the police department, $90,000 for the fire department, $70,000 for municipal lighting, and $55,000 for street cleaning and sprinkling. The bonded debt of the city is about $400,000, and the assessed valuation of property, real and personal, amounts to $45,000,000. Oakland was settled about 1850, was incorporated as a town in 1852, and was chartered as a city in 1854, though in 1860 there were only 1543 inhabitants. Population, in 1870, 10,500; in 1880, 34,555; in 1890, 48,682; in 1900, 66,960, including 17,300 persons of foreign birth and 2200 colored persons.

OAK-LUNGS. A species of lichen. See LUNGWORT.

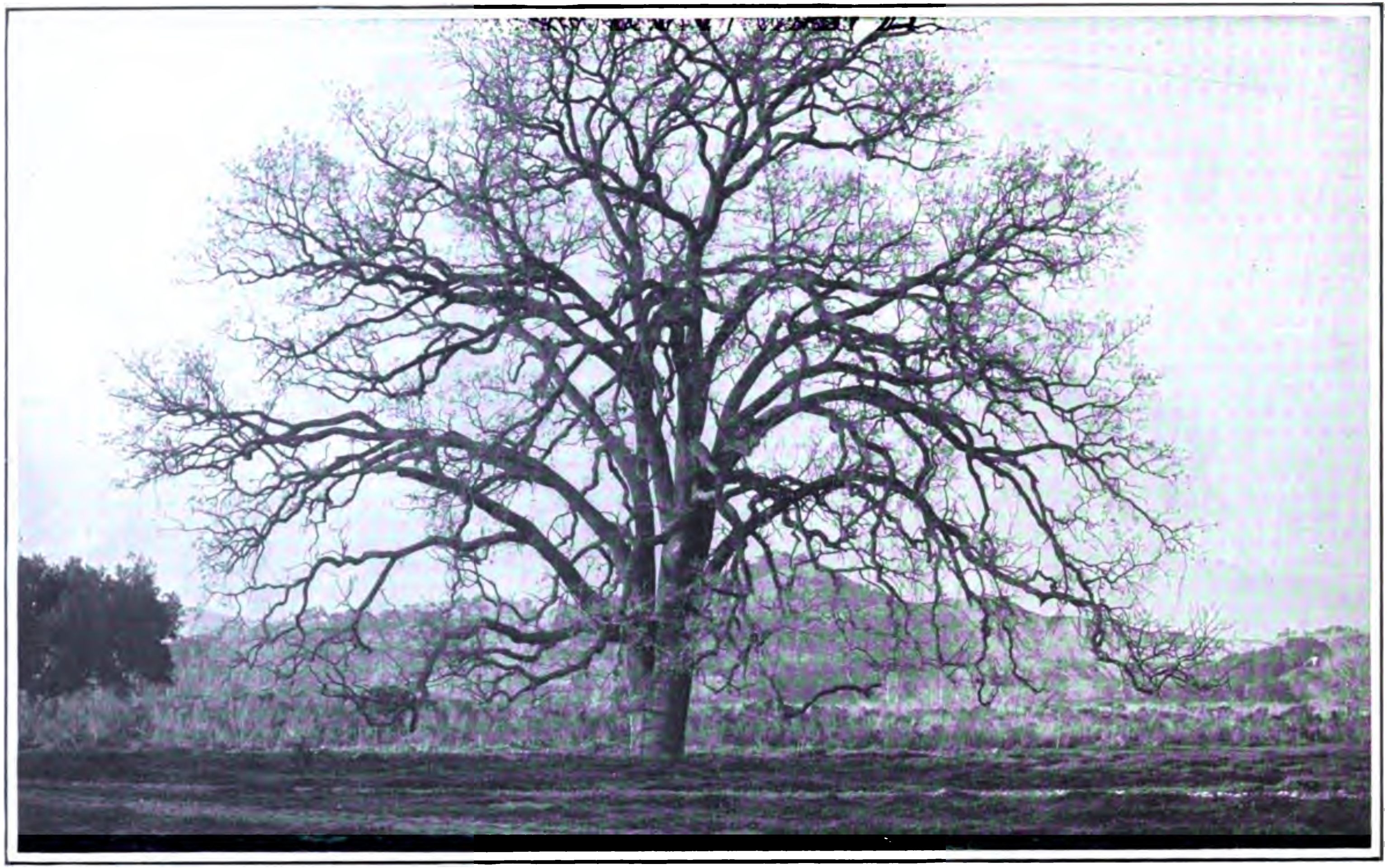
OAKS, THE. One of the most important English horse races, run at the Epsom Summer Meeting on the Friday following the Derby. The race is confined to three-year-old mares.

OAKUM (AS. *ācumba*, *ācemba*, OHG. *āchambi*, tow, oakum, from AS. *ā*, out + *cemban*, to comb). A tangled mass of tarred hempen fibres, made from old rope by untwisting the strands and rubbing the fibres free from each other until it is in about the same condition as the loose tow of which it was made originally. Its principal use is in calking the seams between planks, the space round rivets and bolts, and the joints of water and other pipes, to prevent leakage. It is sometimes used in dressing wounds. *White oakum* is made from untarred hemp.

OANNES, ō-ăn′ēz. The name of a Babylonian god found in the fragments of Berosus (q.v.). It is said that in the first year of the foundation of Babylon he came out of the Persian Gulf. He is described as having the head and body of a fish, to which were added a human head and feet under the fish's head and at the tail. He lived among men during the daytime, without, however, taking any food, and retired at sunset to the sea, from which he had emerged. Oannes instructed men in the use of letters, and in all the principal arts and sciences of civilization, which he communicated to them. The story has not yet been found among the remains of Babylonian literature, and we are dependent, therefore, largely upon conjecture in attempts to identify Oannes with any of the Babylonian deities known. He is evidently the deity supposed to reside in the Persian Gulf, and this fact points to his identification with Ea, the chief deity of Eridu, a city that once lay at the Persian Gulf. Ea is a prominent figure in the religious literature and is distinctly a water-deity. He is also portrayed as the source of wisdom to whom Marduk (see MERODACH), the head of the Babylonian pantheon, goes for advice, and the fact that Marduk is represented as the son of Ea points to the great antiquity of the Ea cult and the reverence in which it was held. On Assyrian sculptures and on seal cylinders we find frequently the body of a man, but covered with fish scales, and it is likely that this is a representation of Ea. A difficulty, however, remains in accounting for the curious name, which yet must in some way be connected with Ea. Consult Jastrow, *Religion of Babylonia and Assyria* (Boston, 1898).

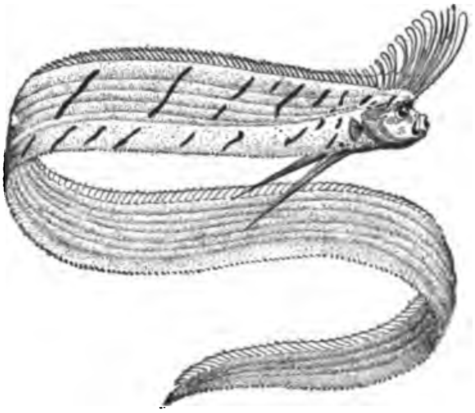
OAR-FISH. One of the band-fishes or ribbon-fishes of the genus Regalecus, family Regalecidæ.

WHITE OAK



WHITE OAK (Quercus alba), Santa Ynez Valley, California.

The body is much elongated and at the same time attenuated and compressed. The dorsal fin extends the whole length of the back, and the ventral fins consist only of a single long ray and often are dilated at the end; the mouth is small. Specimens 20 feet long have been taken. The anterior portion of the dorsal fin is produced so as to suggest a mane, and it is probable that most of the so-called sea serpents are referable to this fish. The only species (*Regalecus Banksi*) is cosmopolitan in its distribution. Compare Unicorn-Fish.



BANKS'S OAR-FISH (*Regalecus Banksi*).

OÁS, ō-äs′. A town of Southern Luzon, Philippines, in the Province of Albay. It is situated on the main road, 16 miles northwest of Albay (Map: Philippine Islands, H 6). Oás is the centre of an important hemp-growing region, and carries on a considerable river trade. Population, in 1896, 15,987.

OASIS, ō′*a*-sĭs (Lat., from Gk. *ὄασις*, oasis; connected with Copt. *ouahe*, dwelling-place, oasis, from *ouih*, to dwell). A fertile place in a desert. As the barren condition of most deserts results from small rainfall, the presence of oases depends upon the occurrence of springs or streams which can be utilized for irrigation. In the Sahara there are mountains of sufficient height to provoke precipitation, and the neighboring lowlands may thus receive sufficient water to support vegetation. A water supply is frequently obtained also from wells located at considerable distances from regions of precipitation. A combination of soil that holds water, but prevents evaporation, is sometimes found, and greatly favors the formation of oases. See Artesian Wells.

OAT (AS. *āte*, of unknown derivation). Numerous species of plants of the genus Avena, belonging to the order Gramineæ, or grasses. The commonest species, characterized by loose panicles instead of spikes of flowers as in the case of wheat, barley, and rye, is of unknown nativity, but it is believed to have been derived from a single prehistoric form, probably a native of eastern temperate Europe and of Tatary.

The common cultivated varieties of oats are classified under two groups, or types, based on the form of the panicles, namely, common oats with open spreading panicles, and Tartarian oats with contracted one-sided panicles. These types are sometimes considered as distinct species, the former as *Avena sativa*, the latter *Avena orientalis*. In general the varieties of oats differ in the color and thickness of the husk, the form of the grain, the length of the straw, and the time of ripening. In color they are usually yellow, white, or black. There are a number of species of but little importance, such as wild oats (*Avena fatua*), which is generally considered as a weed, but has become an abundant and valuable wild pasture grass in California; bristle-pointed oats (*Avena strigosa*), also a weed, but sometimes grown for green fodder; animated oats (*Avena sterilis*), so named from the fact that when the dry awn absorbs moisture it untwists and thus gives motion to the grain; and short oats (*Avena brevis*), cultivated for its grain at high elevation in the mountainous parts of France and Spain, ripening where other kinds do not, and also grown as a forage plant in other parts of Europe. See Colored Plate of Cereals.

The oat is a hardy plant, especially well adapted to temperate climates, and is not cultivated to any great extent in hot countries. It is extensively grown in the United States and Canada, in Great Britain, and in the countries of Northern Europe. It succeeds best in a cool, moist climate, but it will grow quite well in warmer regions if the soil is sufficiently moist. In hot and dry regions it grows very poorly. Oats are not a fastidious crop as to the character of the soil, and will grow on light or heavy soils, but are intolerant of excess of water. The seed-bed for oats is prepared about the same as for wheat and barley, but not quite so deep. In the Eastern United States the land is usually plowed before the oats are sown, but in the Western States, especially in new and fertile regions, they are frequently sown on corn land without plowing and covered with a corn cultivator or disk harrow, the surface of the soil being then smoothed with an ordinary harrow. When sown on unplowed land oats are always broadcasted, and on plowed ground the practices of both drilling and broadcasting prevail. On the whole, the greater portion of the crop is broadcasted. From two to three bushels of seed is the usual quantity sown per acre. Oats are sown in the spring and in the fall. Spring-sown oats represent the bulk of the crop, while fall-sown or winter oats are limited to southern localities. When sown as early in the spring as possible the crop has the advantage of making most of its growth during the cooler part of the season, which is best adapted to its development. In northern latitudes it ripens in ninety days, or even less, but in southern regions a longer time is required.

From forty to sixty bushels per acre is considered a good yield, but much larger yields are sometimes obtained. Russia and the United States are the greatest oat-producing countries of the world. In 1899 the United States produced 796,177,713 bushels. The average yield per acre in the United States for the years 1890 to 1899, inclusive, was about 26.14 bushels. The highest average yields, about 40 bushels per acre, are produced by Germany and Great Britain. The oat, although quite free from insect enemies and plant diseases, is subject to rust and loose smut in a way similar to wheat. (See Rust; Smuts.) Early maturing varieties are usually preferred because they often ripen before rust becomes injurious to the crop, and, on account of being shorter in the straw, they are not so apt to lodge as late varieties. For a concise treatise on the culture of oats, consult Morrow and Hunt, *Soils and Crops of the Farm* (Chicago, 1892).

FOOD AND FEEDING VALUE. The oat plant furnishes green forage, hay, and straw, while the ripe grain and its milling products are of great importance as foods and feeding stuffs. The grain has long been used as a food for man, in the United States chiefly as a breakfast food. In the following table the average percentage composition of a number of oat products is shown:

AVERAGE COMPOSITION OF A NUMBER OF OAT PRODUCTS

	Water	Protein	Fat	Nitrogen-free extract	Crude fibre	Ash
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Oat forage	62.2	3.4	1.4	19.3	11.2	2.5
Oat hay	15.0	9.3	2.3	39.0	29.2	5.2
Oat straw	9.2	4.0	2.3	42.4	37.0	5.1
Whole oats	11.0	11.8	5.0	59.7	9.5	3.0
Oat hulls	7.3	3.3	1.0	52.1	29.7	6.7
Oat bran	7.7	7.1	2.3	57.9	19.3	3.7
Oat shorts, middlings or "feed"	7.7	16.0	7.1	59.4	6.1	3.7
Oat dust	6.5	13.5	4.8	50.2	18.2	6.9
Oat meal	7.3	16.1	7.2	66.6	0.9	1.9
Rolled oats	7.7	16.7	7.3	64.9	1.3	2.1

Oat forage and hay compare favorably with similar products from the common grasses. (See HAY.) Oat straw contains a higher percentage of crude fibre than the hays, due to the fact that as the plant ripens the percentage of crude fibre increases. Hay and straw may be fed whole or chopped. The oat grain is rich in protein and carbohydrates and contains a fairly high percentage of fat. It is very valuable for all classes of farm animals, though it is perhaps most commonly thought of as a feeding stuff for horses. It has been claimed that oats contain a peculiar stimulating principle, 'avenine,' to which is due their especial value as a horse feed. Careful analysis fails to detect 'avenine,' and the common opinion now is that there is no such substance in the oat. Although the reason is not definitely known, practically all are agreed that horses fed oats excel in mettle and general condition—and it is certain that no feeding stuff is eaten with greater relish. Oats are usually fed unground to horses—grinding being necessary only for foals and for animals whose teeth are not good. New oats should not be fed to work-horses, as they cause looseness of the bowels and render the animals liable to sweat easily and put them out of condition. The reason for the bad effects of new oats is not definitely known. For very young pigs, oats should be ground and the hulls removed by sieving. For more or less mature pigs and for breeding stock some oats, either ground or unground, are very desirable.

When oats are low in price they may be profitably fed to sheep for the production of mutton. Like wheat, they induce growth rather than the production of fat. When it is desired to fatten lambs some corn should be fed with the oats. Oats are useful for poultry, ground oats being very valuable as one of the constituents of the morning ration.

The different milling and by-products obtained from oats resemble the whole grain more or less closely. The hulls represent the loose outer covering of the grain, and the shorts (called also middlings or feed) and the bran consist of the outer layers of the kernels. After the grain is hulled in milling the little tuft of hairs on the end of the kernel is removed. These accumulate and constitute the basis of 'oat dust.' The material, which should also contain some broken kernels, is a useful feeding stuff provided it does not also contain too much mill sweepings. The hulls resemble the straw in composition and are not regarded as an especially valuable feed. The bran and middlings contain a large amount of nutritive material in proportion to their bulk. The oat feeds marketed under various trade names are mixtures of the different oat by-products with or without other materials, and differ in nutritive value, some being much more valuable than others. The average coefficient of digestibility of a number of oat products follows:

COEFFICIENTS OF DIGESTIBILITY OF A NUMBER OF OAT PRODUCTS

	Total dry matter	Protein	Fat	Nitrogen-free extract	Crude fibre	Ash
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Oat forage	59.5	71.8	69.2	62.6	52.8	53.4
Oat hay	49.3	54.2	61.9	52.0	43.5	34.6
Oat straw	50.3	......	38.3	53.2	57.6	......
Oats whole	72.4	86.1	82.4	79.4	31.1	33.1
Oats ground	75.7	82.4	79.9	86.1	14.4	29.2
Oat feed	62.0	81.1	89.0	67.4	42.6	......

OATES, ōts, TITUS (1649-1705). The principal informer in the so-called Popish Plot in England. He was born at Oakham, and in 1665 entered the Merchant Taylors' School, but was expelled the first year. After that he went to Sedlescombe School, and from there to Gonville and Caius College, Cambridge, and later to Saint John's College. Though he never took a degree, he contrived to be ordained, and in 1673 was appointed vicar of Bobbing in Kent. The following year he became curate to his father at All Saints in Hastings, but both were expelled for having invented a scandal concerning a schoolmaster there. Moreover, Titus Oates was thrown into prison. Escaping from prison, he became a chaplain in the navy, but was soon expelled. He now obtained the position of chaplain to the Protestant members of the Duke of Norfolk's household. Here he met a number of Catholic priests, and presumably first contrived his plot of informing against Catholics. He associated with himself in 1676 a fellow clergyman, Israel Tonge, and together they planned the various schemes. In order to carry these out, Oates pretended to become Catholic, and in 1677 was sent to the Jesuit College at Valladolid, and afterwards to Saint Omer, but from both he was expelled for misconduct, and in 1678 returned to England. Taking advantage of the hostile state of the public mind toward the Catholics, Oates and Tonge induced, in 1678, a Lancashire gentleman, Christopher Kirkby, to reveal to the persons interested fictitious details of a plot of Roman Catholics to murder Charles II. and make the Duke of York King. Terrible excitement resulted in London, and by the perjured testimony of Oates and his followers, about thirty-five people lost their lives between 1678 and 1681, while Oates himself for a time received a large pension, lived in Whitehall Palace, and enjoyed great favor. A reaction, however, set in, and in 1684 he was imprisoned. Upon the accession of James II. Oates was found guilty of perjury and sentenced to be pilloried, whipped, and afterwards imprisoned for life. Rather unexpectedly he survived the terrible flogging, and after the Revolution of 1688 he was set at liberty. He died July 12, 1705. Consult: Burnet, *History of His Own Time* (London, 1883); Lingard, *History of England*, vols. ix., x. (ib., 1855); Macaulay, *History of England*, vol. i. (New York, 1856-62).

OAT GRASS. A popular name of a number of grasses whose inflorescence somewhat resembles the oat panicles, among them certain species of Avena, to which the oat belongs. Various species of Danthonia are called oat grass, but are not considered valuable either for hay or pasture. The best known oat grass is *Arrhenatherum elatius*, a tufted perennial grass introduced into America from Europe, where it is highly prized for hay. It is common east of the Mississippi River and is grown in the Southern States for hay and winter pasturage. It grows rapidly, resists drought well, and yields a large amount of leafy fodder, especially upon light soils. In some regions upon good soils if cuttings be made as soon as the grass is in flower or before, three or four cuttings may be made during the season. After flowering it quickly becomes woody and less valuable.

OATH (AS. *āþ*, Goth, *aiþs*, OHG. *eid*, Ger. *Eid*, oath; connected with OIr. *óeth*, oath). A declaration or compact, in which the declarant confirms the truth of his assertion by invoking supernatural penalties on his head in the event of perjury. The punishment is often ceremonially represented, as when a victim is sacrificed, and the person making a pledge expresses a desire that he himself, if he prove false, may undergo a like fate. In Aracan, a native swears on a sword, a crocodile's tooth, or a thunderbolt (stone celt). The implication is that the weapon may wound him, the crocodile devour him, or the god who hurls the lightning smite him. In the Hebrew ritual a sacrificial beast was cut in pieces and burned; the oath-taker then passed through the fire, in order to symbolize the fate which would punish his falsehood. Quite similar was the ancient Greek usage, in which an animal was slaughtered, and the pieces thrown into the sea; or the victim might be burned on the altar; hence perhaps it became common to take oaths before altars, where the swearer touched the holy things, or raised his eyes and hands to heaven, where was supposed to dwell the deity who watched over the sanctity of compacts. Oaths were usual in the case of every solemn agreement, public or private, relating to business, war, or politics; of this practice survivals remain in our official and judicial custom.

In law, an oath is a solemn declaration or pledge, made by a person of discretion, before a properly authorized officer, to the effect that a thing stated or promised by him is true, and with some ceremony believed to be binding on the conscience of the declarant, as by an appeal to God to witness his good faith.

With the development of Roman jurisprudence the practice of thus insuring the truthfulness of witnesses in legal actions became fixed and common, and continued in the civil law. In England, up to the time of the reign of William and Mary, no one could testify in a court of justice who did not believe in God, and recognize the doctrine of future punishment for sins. By the Toleration Act, 1 William and Mary, c. 18, § 13, Quakers were permitted to make a declaration of fidelity to the State, instead of the oath of allegiance; and by 7 and 8 William and Mary, the solemn affirmation of Quakers was made of equal weight with an oath, and was allowed in judicial proceedings when the privilege was claimed. In 1854 Parliament passed the 'Common Law Procedure Act,' 17 and 18 Vict., c. 66, § 1, permitting any one whose conscience prevented him from taking an oath, or who did not believe in its binding efficacy, to make a solemn affirmation instead. The 'Oaths Act,' 51 and 52 Vict., c. 46, made further liberal provisions in regard to oaths and affirmations.

With reference to their legal effect, oaths are considered assertory, judicial, or extra-judicial. An *assertory* oath is one required by law other than one for use in judicial proceedings, as an oath of office, or a revenue or custom-house oath. False swearing in such a case does not amount to perjury, but in most jurisdictions, and in the acts of Congress, there are statutory provisions making it a crime. A *judicial oath* is one required by law in, or for use in, a judicial proceeding, and a false statement made under such an oath is punishable criminally. An *extra-judicial* oath is one which is voluntarily taken, and not intended for use in a legal proceeding, as an oath taken merely to convince some one in a private transaction of the good faith of the declarant. Its falsity does not constitute a criminal offense.

The most important class of oaths affecting the general public are those which are required to enforce the truth from witnesses in courts and legal proceedings. Where a statute requires an oath to be administered, it is held that only persons having sufficient understanding to know the nature and obligations of such a ceremony may be sworn. Therefore, children and mentally deficient persons who are not able to comprehend the difference between right and wrong are often excluded from testifying in legal actions. In most of the United States a witness may either swear or affirm. False testimony in either case amounts to perjury. An extra-judicial oath is said to be binding only *in foro conscientiæ*—that is, morally; but it is not legally binding upon the person taking it. An example of such an oath is the common one to abstain from the use of intoxicating liquors.

The statutes of each State prescribe the various officers who shall administer oaths for different purposes. Judges, clerks of courts, referees, justices of the peace, and coroners usually administer oaths to witnesses, and notaries and commissioners of deeds commonly take oaths outside of court for use in judicial proceedings, or to authenticate legal instruments. A person authorized to administer oaths cannot delegate his powers, except that where an officer, such as a sheriff, is authorized to appoint a deputy, it is usually held that the deputy represents his principal for all purposes including the administration of oaths. An oath should be administered strictly in the form prescribed by statute and by a competent officer. For example, it has been held, where a statute prescribed the form of an oath which ended with the words, "so help me God," that the omission of such words would invalidate it. The oath administered to a person subscribing and swearing to an affidavit is usually in the following form: "You do solemnly swear that the contents of this affidavit by you subscribed are true, so help you God." Hebrews are often sworn on the Pentateuch, keeping on their hats, and their oath ends with the words, "so help me Jehovah." A Mohammedan is sworn on the Koran; a Chinese witness in the Western States is sometimes sworn by his kneeling, breaking a saucer, and uttering an imprecation that his "soul may be broken into as many pieces as the saucer" if he does not tell the truth. The tendency at present is to consider that the statutes against perjury and false swearing have a more potent effect than religious fears in deterring a witness from making false statements, and accordingly it is not considered of as great importance whether a witness swears or affirms that his testimony will be true. See AFFIDAVIT; EVIDENCE; NOTARY PUBLIC; PERJURY; WITNESS. Consult the authorities referred to under EVIDENCE; PROCEDURE; CRIMINAL LAW.

OATHS, MILITARY. Article 2 of the Articles of War, United States Army, prescribes that every enlisted man shall, within six days after his enlistment, take oath or affirmation in the following form: "I, A. B., do solemnly swear (or affirm) that I will bear true faith and allegiance to the United States of America; that I will serve them honestly and faithfully against all their enemies whomsoever; and that I will obey the orders of the President of the United States and the orders of the officers appointed over me, according to the rules and articles of war." In England all soldiers take a similar oath, swearing fealty, allegiance, and obedience to the King, his heirs, and those placed in authority under him. The most impressive ceremony is that arranged by the German Emperor William II., who follows the custom of the ancient armies, and swears in the recruits of the guards regiments en masse. Officers sitting on courts-martial and witnesses testifying are required to take oath or make affirmation. This latter is a rule in all armies throughout the world.

OAXACA, wȧ-hä'kȧ, or **OAJACA.** A Pacific State of Mexico, bounded by the States of Puebla and Vera Cruz on the north, Chiapas on the east, the Pacific Ocean on the south, and Guerrero on the west (Map: Mexico, L 9). Its area is 35,382 square miles. The whole State, with the exception of a low, sandy belt along the coast, is covered with the numerous southern ramifications of the Sierra Madre, inclosing many fertile and beautiful valleys. The slopes are covered with abundant timber, and the State is watered by a multitude of streams. The climate is for the most part temperate and healthful. The soil is very fertile and yields abundant crops of sugar, coffee, cacao, tobacco, cotton, and other tropical and semi-tropical products. Stock-raising is also an important industry, but the mineral deposits, though very rich, are but little worked. The State is traversed by two railway lines and has good roads. There is also steamship communication through the ports of Salina Cruz and Puerto Angel. Population, in 1900, 947,910. The capital is Oaxaca (q.v.).

OAXACA, OAJACA, or OAXACA DE JUAREZ. The capital of the State of Oaxaca, Mexico. It is situated in a beautiful valley in the centre of the State, 82 miles from the Pacific coast and 225 miles southeast of Mexico City (Map: Mexico, K 9). It is the chief centre of population in Southern Mexico, the terminus of the Mexican Southern Railroad, and is well built, with large squares and public parks. The notable buildings and institutions are the Government building, the Cathedral, the Institute of Arts and Sciences, the public library, and the Museum of Antiquities and Natural History. Owing to its isolated position, it is not one of the important industrial cities of the Republic, but it has some thriving local industries, especially the spinning and weaving of the pita fibre. A United States consular agency is located here. Population, in 1895, 32,641. Oaxaca was founded by the Zapotecs in 1486, under the name of Huaxyacac, and was occupied in 1522 by the Spaniards, who named it Antequera. Juarez was born here.

OAXACA, RUINS OF. Enormous works of the ancient Mexicans near the city of Oaxaca. The whole range of Monte Alban as seen in profile gives evidence of artificial modification. On ascending the summits one is amazed at the display of pyramids, terraces, quadrangles, and mounds covering every available space, and one finds that the whole mountain has been remodeled by the hand of man at cost of immense labor. The greatest of these works is located on the summit of Monte Alban at 1000 feet elevation, and covers an area of 3400 by 1200 feet, sculptured into a vast series of level courts, inclosed by successive terraces and bordered by pyramids. The quadrangles are flanked at the corners by pyramids, and in the centre is a mound, the ruins probably of a temple. One of these pyramids is 400 feet square and rises 40 feet to the summit, which is 300 feet square. Another court, or plaza, is a level, sunken field 600 feet wide and 1000 feet long, inclosed by pyramids and terraces and having a line of four pyramids ranged along its centre. It has been found that these constructions, no matter how situated with regard to the mountain profile, are accurately oriented, as are the ruins of Mitla (q.v.), some thirty miles away, and it is conjectured that the same people were their authors. In the absence of suitable building stone at Monte Alban, the builders employed cores made up of small stones and adobe faced usually with small rough blocks, but sometimes with dressed masonry, and covered with cement on the exterior. There is no evidence that the surface was finished in fresco as at Mitla. Cement floors may also be observed in the ruins, and there are traces of strong walls. Little sculpture has been found, the principal examples being a serpent carved from quartzite originally on the face of a pyramid, and two colossal turbaned heads in low relief cut in limestone. The pottery scattered on the surface and in the débris is of slate color like the ware sold in Oaxaca market. The makers of the old ware decorated their vessels with raised ornaments and modeling. Innumerable small amulets of jadeite and other hard stone in form of a rudely carved human figure are found. These objects show drilling, sawing, and other methods of stone-working. A few gold and copper objects have been taken from the ruins.

Prof. W. H. Holmes, who made a careful examination of Monte Alban in 1896, concludes that we have there the remains of a hill-top city occupied by a population which utilized for their crops the rich valley in which the city of Oaxaca stands, and covered the mountain slopes with their garden plots. There are also evidences of other cities in the valley. In the State of Guerrero, directly west of Oaxaca, are many square miles of similar ruins covering the slopes of the mountains, indicating an extension of this culture. The local museum at Oaxaca contains a large and instructive collection of archæological objects from Monte Alban and other ruins in the State.

Consult: Bandelier, *Report on Archæological Tour in Mexico* (Boston, 1885); Bancroft, *Native Races of the Pacific States*, vol. iv. (New York, 1875); Holmes, *Archæological Studies Among the Ancient Cities of Mexico* (Chicago, 1897).

OB. A river of Siberia. See OBI.

O'BADI'AH (Heb. *'Obadyāh*). The author of the fourth book of the minor prophets according to the arrangement in the Jewish canon, and the shortest book of the Old Testament. Concerning Obadiah nothing is known; it may even be that the name is a mere symbol, chosen on account of its meaning—'servant of Yahweh' (cf. Malachi, 'my messenger'). The book consists mainly of a prophecy of the destruction of Edom for abetting the destruction of Jerusalem. It must, therefore, be later than B.C. 586, and internal evidence is in favor of a period much later—during the Persian rule, if not, indeed, after the Greek conquest of Palestine. A peculiar problem in the case of Obadiah is presented by the similarity of verses 1-10 to Jer. xlix. 7-22. It appears certain that one of these passages is dependent upon the other, or that both are dependent upon a common source. Perhaps the more probable view is that Jeremiah is dependent upon Obadiah. Consult the works mentioned in the article MINOR PROPHETS; Caspari, *Der Prophet Obadja ausgelegt* (Leipzig, 1842); Winckler, in *Alttestamentliche Untersuchungen*, part iii. (Leipzig, 1892); Perowne, "Obadiah and Jonah," in the *Cambridge Bible for Schools and Colleges* (Cambridge, 1882); Peters, *Die Prophetie Obadias* (Paderborn, 1892).

OBADIAH. (1) In Mrs. Centlivre's *Bold Stroke for a Wife*, one of the guardians of Anne Lovely. He is a hypocritical Quaker. (2) In Howard's farce *The Committee*, and in Knight's adaptation, *The Honest Thieves*, a brainless clerk given to drinking.

OBAN, ō'ban. A seaport and fashionable watering place in Argyllshire, Scotland, on the Bay of Oban, 20 miles northwest of Inveraray (Map: Scotland, C 3). The bay, protected by the island of Kerrera on the west, and by the high shores of the mainland, has the appearance of a lake. Oban is the great rendezvous for tourists in the west Highlands. The town owns its water supply. Population, in 1891, 4500; in 1901, 5374.

OBANDO, ō-bän'dō, JOSÉ MARÍA (1797-1861). A South American general and statesman, President of Colombia. At twenty-five he joined the Republican forces; and as leader of the Liberals opposed Urdaneta when the latter became Dictator, and defeated his army at Palmira (1831). The Republic of New Granada, with a constitutional government, was formed immediately; Obando was elected Vice-President (1831-32) and then served for five years as Secretary of War. He led a rebellion against Marquez (1838-41), but was defeated and exiled until his party was restored to power in 1849. He was elected President in 1853, proclaimed himself Dictator in 1854, and was forced out of office. Obando sided with the Federalists in the Revolution of 1860 and was killed at Cruz Verde.

OBBLIGATO, ōb'blē-gä'tō (It., bound, compelled). A term in music signifying that the instrumental part so marked is absolutely necessary to the performance of the composition, and cannot be omitted. The word is especially applied to an instrumental accompaniment to a vocal solo.

Ó-BECSE, ō'bĕch'ĕ. A town of Hungary. See BECSE.

OBEDIENCE (Lat. *obœdientia*, from *obœdire*, *obedire*, to obey, from *ob*, before + *audire*, to hear). In canon law, the duty by which the various gradations in ecclesiastical organization are held subject to the several superiors placed immediately above each, respectively, in the hierarchical scale. Thus priests and inferior clergy owe canonical obedience to the bishop, and priests are bound thereto by a solemn promise administered at ordination. The bishop primitively took a similar oath to the metropolitan; but by the modern law, the jurisdiction of the metropolitan is confined to the occasions of his holding a visitation, or presiding in the provincial synod. Bishops, by the present law of the Roman Catholic Church, take an oath of obedience to the Pope. This obedience, however, is strictly limited by the canons, and is only held to bind in things consistent with the divine and natural law. In ecclesiastical history the word obedience has a special signification, and is applied to the several parties in the Church which, during the great Western schism, adhered to the rival popes. Applied to the monastic institute, obedience means the voluntary submission which all members of religious Orders vow, at the religious profession, to their immediate superiors, of whatever grade in the Order, as well as to the superior general, and still more to the rules and constitutions of the Order. This forms, in all Orders, one of the essential vows. It is, however, expressly confined to lawful things. The name obedience is sometimes given to the written precept or other formal instrument by which a superior in a religious Order communicates to one of his subjects any special precept or instruction—as, for example, to undertake a certain office, to proceed upon a particular mission, to relinquish a certain appointment, etc. The instruction, or the instrument containing it, is called an obedience, because it is held to bind in virtue of religious obedience.

OBELISK (Lat. *obeliscus*, from Gk. ὀβελίσκος, *obeliskos*, spit, pointed pillar, diminutive of ὀβελός, *obelos*, spit, pointed pillar). A word applied to prismatic monuments of stone, terminating in a pyramidal top. In Arabic they are called *mesellah*, 'pack needle.' The ancient Egyptians called them *tekhen*, a name of unknown etymology, and stated that they were dedicated to the sun-god; they were therefore most numerous in the sacred city Heliopolis, whence most existing obelisks come. As most Egyptian gods were sooner or later identified with the sun, it eventually became appropriate to place obelisks at the entrance of every temple; even Isis had, in Ptolemaic times, two obelisks before her temple in Philæ. We first meet small private obelisks in the time of the pyramid builders; in the Fifth Dynasty some gigantic monuments, half obelisk, half pyramid, which were also dedicated to the sun-god, seem to be an attempt to develop the obelisk into larger proportions by sacrificing the monolithic principle. The pairs of obelisks flanking the entrances of temples were always monoliths, usually of granite from Syene (Assuan). From unfinished specimens in these quarries, we can form an opinion of the way in which they were roughly separated from the rock, by means of borings and moistened wooden pegs. How these gigantic monuments were, during the inundation, transported by water on rafts or specially constructed boats is depicted in a relief at Deir el-Bahri, reproduced in the *Archæological Report of the Egypt Exploration Fund* for 1895-96; unfortunately, in regard to the machinery used for erecting them, we know nothing. Judging from the difficulties experienced by mediæval and even modern engineers in transporting and erecting them, it is difficult to conceive how the ancient Egyptians, with the simple apparatus at their disposal, could handle these great blocks of a hundred and more feet in length. One of the tallest obelisks—that of Queen Hat-shepsut (Hatasu) at Karnak—is estimated at 97½ feet in length, its diameter at the base is 8½ feet, its mass is estimated at 4873 cubic feet, and its weight at 367 tons. The inscriptions state that this obelisk, together with its companion, was cut in 7, and finished in 19 months. Inscriptions mention still taller obelisks. All obelisks have four faces, and are broader at the base than at the top; the pyramidion or cap on the top is sometimes round. The pyramidion was often covered with metal (brass or gold), as were also the hieroglyphic inscriptions running down the sides of the obelisk. The pyramidion frequently contained more elaborate sculptures than the obelisk itself. These sculptures merely represent the King engaged in worshiping and making offerings before the god; the inscriptions also are always of a very simple character, containing nothing more than the titles and praises of the dedicating King. The obelisk always stood on a cubical pedestal, slightly broader than the base of the obelisk, and on this pedestal significant ornaments were sometimes sculptured. For example, on the pedestal of an obelisk in Karnak may be seen the cynocephali worshiping the rising sun. In later times, the Romans put decorations on the top, like brazen spheres.

The earliest obelisk yet standing is that of Heliopolis (modern Matarieh), erected by Usertesen I. (the second King of the Twelfth Dynasty) before the sun-temple; another of the Twelfth Dynasty is the fallen obelisk of Begig in the Fayum. In Karnak, of two obelisks of Thothmes I., one is still standing, 76 feet high. Obelisks of Thothmes III. were specially numerous. One was removed in antiquity to Constantinople (now in the Atmeidan or Hippodrome); it is only the upper part of an obelisk originally much over 100 feet in height. Another is that of Saint John of the Lateran at Rome, now 106 to 107 feet high. The two famous 'needles of Cleopatra' were first erected by Thothmes III. at Heliopolis, and were, in Ptolemaic times, transported to Alexandria. One came thence to London in 1879 (now on the Thames embankment), the other to New York by the ship *Dessoug*, at the expense of William H. Vanderbilt, in 1880 (erected in Central Park, February 22, 1881). Both these monuments were richly reornamented by Rameses II. The Paris obelisk, whose companion still stands at Luxor, dates from the time of Rameses II. It was removed in 1831 and erected in the Place de la Concorde in 1833. The Flaminian obelisk is the work of Rameses II., though his father, Seti I., commenced it. It was removed to Rome by Constantius, and in the Pontificate of Gregory XIII. it was found 16 feet under the surface of the earth. The architect Fontana reërected it under Sixtus V. with great difficulty. Of the numerous obelisks brought to Rome, that of the Monte Citorio (brought to Rome by Augustus, rediscovered in 1748) dates from the Twenty-sixth Dynasty, having been sculptured by Psammetichus II. Two obelisks in the British Museum bear inscriptions of Nekht-har-heb of the fourth century B.C.; others from the reign of Ptolemy VIII. once stood before the Temple of Philæ. These monuments were so popular at Rome that the emperors had several of them cut; for example, the Pamphilian obelisk, erected by Bernin, in 1651, in the Piazza Navona, was originally erected before the Serapeum at Rome by Domitian, whose name it bears; thence it was removed to the circus of Maxentius. The Barberini obelisk originally stood before the mausoleum (or cenotaph?) of Antinous, the favorite of Hadrian, whose death it commemorates. It was found in the circus of Aurelian in 1633, and erected on the Monte Pincio in 1822. The Sallustian obelisk and that of Beneventum belong to the same period. In modern Rome obelisks are always used as ornaments in the centre of public places, sometimes near a fountain, and often with the addition of Renaissance ornaments.

In Assyria several monuments have been found which are called obelisks, although they bear but a slight resemblance to those of Egypt, being merely stelæ in the shape of truncated, slanting prisms, with step-shaped apices. The most remarkable is the 'black obelisk' of Shalmaneser II., covered with long inscriptions recording the victories of this King and representations of the tributes brought to him, among them the tribute-bearers of King Jehu of Israel (B.C. 842). A broken 'obelisk' of Assurnazir-pal (B.C. 885-860) is the next in importance; then one of Shamsi-ramman (B.C. 825-812).

Consult: Loega, *De Origine et Usu Obeliscorum* (Rome, 1797); Cipriani, *Sui dodici obelischi di Roma* (ib., 1823); L'Hote, *Notice historique sur les obélisques égyptiens* (Paris, 1836); Birch, Notes under "Obelisks" in the *Museum of Classical Antiquities* (London, 1853); above all, Marucchi, *Gli obelischi egiziani di Roma* (Rome, 1898). See EGYPTIAN ART.

OBER, ō'bẽr, FREDERICK ALBION (1849—). An American traveler and author, born in Beverley, Mass. He was educated at the Massachusetts Agricultural College, and in 1872 he began his tropical explorations. He traveled in the West Indies (1876-80), making a valuable collection of birds; and visited Mexico, Spain, North Africa, and South America. He wrote travels, historical sketches, and novels, including *Camps in the Caribbees* (1879); *Travels in Mexico* (1883); *Porto Rico and Its Resources* (1892); *Josephine, Empress of the French* (1895); *History of the West Indies* (1900); and *The Cacique's Treasure Cave* (1901).

OBERAMMERGAU, ō'bẽr-äm'mẽr-gou. A village in Upper Bavaria, Germany, noted for the celebration of the Passion Play (q.v.).

OBERDIECK, ō'bẽr-dēk, JOHANN GEORG KONRAD (1794-1880). A German pomologist, born at Wilkenburg. He had studied theology at Göttingen, but after a year in pastoral work devoted himself to the improvement of German orchards. He held various clerical charges, made a great collection of fruit trees, and in 1855 became editor of the *Pomologische Monatshefte*. Among his publications, the more important are: *Die Probe- oder Sortenbäume* (1844; 2d ed. 1871); *Illustriertes Handbuch der Obstkunde* (9 vols., with Lucas and Jahn, 1858-79); and *Deutschlands beste Obstsorten* (1881). Consult his *Kurzer Abriss meines Lebens* (Stuttgart, 1870).

OBERGE, ō-bẽr'*ge*, EILHARD VON. A German poet of the close of the twelfth century. Eilhard wrote, from French sources, the first German version of *Tristan and Isolde*. Of his original work there now exist a few fragments, a complete revision dating a century later, another version in prose (1484), and a Bohemian translation. Lichtenstein edited the remains of the work in German verse (Hamburg, 1877), and Pfaff the prose romance of the fifteenth century (Stuttgart, 1881).

OBERHAUSEN, ō'bẽr-hou'z*e*n. An important manufacturing town in the Rhine Province, Prussia, situated near the Rhine, 40 miles north of Cologne (Map: Prussia, B 3). It has extensive iron foundries, rolling mills, railway shops, chemical works, and manufactures of various iron and tin wares, soap, porcelain, wire, glass, flour, etc. In the vicinity are important coal mines and coke ovens. Population, in 1890, 25,249; in 1900, 42,148.

OBERLÄNDER, ō'bẽr-lân'dẽr, ADOLF (1845—). A German caricaturist and painter, born at Regensburg. He studied painting in Munich at the Academy and under Piloty with fair prospect of success, as may be judged by his "Siesta" (Dresden Gallery), and "Resignation" (New Pinakothek, Munich), yet found his true field in those humorous productions of his pencil which he began in 1863 to contribute to the *Fliegende Blätter*. These soon made his name familiar in every part of the world whither that publication has made its way, and placed him among the foremost of the humorists in art. Some of the best of his work is collected in the *Oberländer-Album* (Munich, 1879-98). Consult, also: Whibley, in *Art Journal* (London, 1889); and Pratt, in *The Cosmopolitan* (New York, 1890).

OBERLEUTENSDORF, ō'bẽr-loi't*e*ns-dôrf. A town in the Crownland of Bohemia, Austria, 32 miles south of Dresden. It has a church built in 1690 by the Archbishop of Prague, and a castle dating from 1732. Its principal manufactures are furniture, toys, hats, and woolens; some coal is mined in the region. Population, in 1900, 12,928.

O'BERLIN. A village in Lorain County, Ohio, 33 miles west by south of Cleveland; on the Lake Shore and Michigan Southern Railroad (Map: Ohio, F 3). There are no important industries; the village is noted chiefly as the seat of Oberlin College (q.v.). Settled in 1833, upon the establishment of the college, Oberlin was first incorporated in 1846. The government is vested in a mayor, elected every two years, and a unicameral council, chosen on a general ticket. The village owns and operates the water-works. Population, in 1890, 4376; in 1900, 4082.

OBERLIN, ō'bâr'lăN', JEAN FRÉDÉRIC (1740-1826). An Alsatian Lutheran clergyman and philanthropist. He was born at Strassburg, and studied at the gymnasium and university of his native place. After finishing his theological studies he was ordained to the ministry, but for several years before entering upon its work he gave private instruction in the family of a physician, from whom he acquired considerable medical knowledge. In 1766 he was appointed chaplain in the French Army, but was deterred from entering upon his duties by an appointment in the following year as pastor of Ban-de-la-Roche (Steinthal), a barren district on the borders of Alsace and Lorraine. Oberlin undertook the mission as the call of duty, and during the sixty years of his ministry wrought great changes in the character and condition of the people. His intelligence was superior, his will inflexible, his figure commanding, and in spite of opposition his courage as well as kindness finally won the day. He gave special attention to improving the material condition of the people, himself leading in the work of building roads and bridges. He introduced improved agricultural methods, sent some of the more intelligent young men to Strassburg to learn trades, and opened schools. Three Sabbaths he preached in French, the fourth in German. He created a patriarchal government in its purest form, put to practical use his knowledge of medicine, and founded a bank for lending money without interest or security. An enemy of the aristocracy and clergy, he looked with favor on the French Revolution. The Steinthal became an asylum of refuge for many who fled to escape scenes of violence elsewhere. Outside his little canton he found admiring friends. Oberlin College (q.v.) in Ohio was named for him. His life has been written many times: by Ströber (Strassburg, 1831); Bodemann (Stuttgart, 1855; 3 ed. 1879); Hackenschmidt (Strassburg, 1902); and in English by Josephine Butler (London, 1882).

O'BERLIN COLLEGE. A coeducational institution of higher learning, established in 1833 at Oberlin, Ohio, and chartered as the Oberlin Collegiate Institute. The present name was adopted in 1850. The academy or preparatory school was first opened, but in less than two years the college proper and the theological seminary were in operation. In addition, there are departments of music, drawing and painting, and physical training for women, and a summer school. Oberlin College was among the first institutions of higher learning to admit colored students and was in general a stronghold of the anti-slavery spirit. It was also a pioneer in coeducation. In 1903 the faculty numbered 84, and the student enrollment was 1443, of whom 906 were women. The library contained 69,000 bound volumes and 110,000 pamphlets. The college has 16 buildings, valued with their equipment at $765,900; an endowment of $1,576,153, and an income of $135,122. The total value of its property was $2,342,102.

OBERLIN THEOLOGY. The system of doctrines taught at Oberlin College in its first period by Charles G. Finney (q.v.) and his colleagues. Finney had early come by his own thought to embrace the general system of theology taught by the leading Congregationalists of his time, and known as New School Calvinism. Although it is difficult to establish any direct connection of Finney with New Haven, it is true that the most striking similarity exists between his views and those of N. W. Taylor, even in details. The system is Calvinism modified by the doctrines of the freedom of the will and of benevolence as the constitutive principle of virtue. Sin is conceived as strictly personal to the sinner, and therefore all imputation, whether of Adam's sin or of Christ's righteousness, is denied. Original sin becomes native tendency to evil resulting in actual sin in the case of every man. Regeneration is the act of the Holy Spirit persuading the soul to the choice of the good, which choice is conversion. Great emphasis is laid upon the divine moral government, and the theory of the atonement taught is the governmental. After Finney arrived in Oberlin (1835) the theory of the simplicity of moral action (which had been taught by Emmons) was revived and made the basis of a somewhat new view of sanctification. A volition, it was said, is indivisible in its nature, and must be either right or wrong. In any moment, as having but one act of choice at that moment, the soul is, therefore, either entirely holy or entirely sinful. The ability of man to obey the law of God is complete, for his obligation cannot exceed his ability. Therefore at any moment a man may perfectly and wholly obey the law, and is therefore at that moment perfectly sanctified. If he will only continue thus to choose the right uninterruptedly (which he is able to do in consequence of the freedom of his will), he will maintain a sinless life. Since he can do this, he ought to do it. Hence sinless perfection is both obligatory upon the Christian and possible. To attain this, the aid of the Holy Spirit was to be sought in prayer. This theory, in connection with the great practical earnestness of the Oberlin colony and their conviction of their call to effect large things in the extension of Christ's kingdom, led to efforts and professions in the attainment of holiness which were in time largely modified, but which were at first the occasion of great suspicion and opposition. A still greater occasion of antagonism was the stand taken by Oberlin in favor of the negro, and the introduction of the coeducation of women with men in the institution. The peculiarities of Oberlin were greatly exaggerated; but what peculiarities there were have largely passed away with the progress of time. Consult Finney, *Systematic Theology* (Oberlin, 1847; new ed. 1878).

OBERMÜLLNER. ō'bēr-mụl'nēr, ADOLF (1833-98). An Austrian painter, born at Wels. He studied in Munich, Italy, France, and Holland, and settled in 1860 in Vienna. His splendid views from the high Alps in Bavaria, Tyrol, and Switzerland include the "Goldberg Glacier in Rauris Valley" (1874, Vienna Museum); "Mont Blanc," and "The Nassfeld near Gastein" (Linz Gallery). After sketches and drawings by Julius Payer he painted a series of twelve "Scenes at the North Pole" (1875), and in the Museum of Natural History, Vienna, he executed five mural paintings of Alpine scenery.

O'BERON. In West European folklore, the king of the elves or fairies, and the husband of Titania. Oberon is first mentioned as 'Roi du royaume de la feerié' in the old French poem of *Huon de Bordeaux* (thirteenth century), which was in 1454 made the basis of a popular prose romance. This romance was translated into English by Lord Berners about 1530 (printed in 1534). From this beautiful version Shakespeare must have derived the Oberon and Titania of *A Midsummer Night's Dream.* Chaucer, Greene, and Spenser adopted Oberon. Wieland got the idea of his *Oberon* (1780) from the *Bibliothèque universelle des romans*, published in 1775. Using Wieland, Planché worked up his text for Weber's opera *Oberon.* The mediæval French poem done into modern French by Gaston Paris was edited by Guessard and Grandmaison (Paris, 1860), and Lord Berners' version by Lee for the Early English Text Society (London, 1883-85).

OBES'ITY, CORPULENCE, or POLYSARCIA (Lat. *obesitas*, from *obesus*, fat, p.p. of *obedere*, to eat up, from *ob*, before, near + *edere*, to eat). An abnormal deposit of fat under the skin and around the viscera. The amount of fat possessed by an individual may vary widely within the limits of health, but so long as it does not interfere with the bodily functions or movements, it is not pathological; indeed, a certain quantity is useful and necessary to protect the various organs and to maintain their temperature, as well as to serve as a reserve supply of nutrition. (See FATS.) The normal proportion of fat to the whole body weight is given as about one-fifteenth to one-twentieth. Obesity may occur at any period of life, but the tendency to corpulence is greatest after forty. In women the predisposition is greatest after the first years of child-bearing, and again after the menopause. In the production of obesity three great causes are active as a rule. These are heredity, overindulgence in food and drink, and lack of exercise. Most persons over forty eat too much and exercise too little. Alcohol tends to fatten by substituting itself for food in the oxidizing process. Fat when once deposited favors the deposition of more fat, for by acting as a non-conducting envelope to the body it prevents the radiation of heat, and so decreases the combustion of those substances which, when not used to produce heat, are stored up as fat. The immediate cause of obesity is generally a faulty assimilation due to some digestive derangement by which oxidation of the albuminous elements of the food is interfered with. The carbohydrates are not as was long thought *directly* to blame, since they are readily converted into carbon dioxide and water. On account, however, of the ease with which the carbohydrates are oxidized, the albuminous elements of the food undergo incomplete oxidation, are not so fully decomposed, and the fat is in reality derived from them. The fatty portions of the food are not so prone to cause undue deposition of fat as are the carbohydrates, since they interfere less with the conversion of the nitrogenous elements, and are less easily oxidized.

The symptoms which may attend extreme degrees of corpulence are a falling off of mental and physical activity, shortness of breath on the least exertion, and impairment of the functions of respiration, circulation, and digestion, together with anæmia and muscular weakness. This, however, is an extreme picture. It is a matter of daily observation that obesity is compatible with a high degree of mental and physical alertness and general good health.

Many plans of treatment, based on systems of exercise and diet, have been advocated for the reduction of fat, the most notable being those of Banting, Ebstein, and Oertel. All of these systems have for their object the regulation of exercise in such a way that oxidation may proceed in a normal manner, and regulation of the diet so that a less quantity than normal of the fat-producing elements is taken in. This object is attained in various ways. In the method of Banting the total quantity of food is reduced, the liquids restricted, and the fats and carbohydrates excluded. Ebstein's method permits the use of fats, but eliminates the carbohydrates. Oertel's system is especially intended for individuals with cardiac complications, and consists of three parts. First, the reduction of liquids with promotion, by baths or other means, of perspiration; second, restriction of the diet largely to proteid substances; and third, the taking of graduated exercises in walking up hill. Cathell proposed some years ago a method which was entirely independent of diet and exercise. This was the taking, on alternate days, of Kissingen and Vichy mineral waters, with the addition, in obstinate cases, of lemon juice to the Kissingen, and aromatic ammonia to the Vichy. Thyroid extract enjoyed for a time a reputation as a fat-reducer, but its tendency to interference with the heart, which is apt to be weak in obese persons, makes it a somewhat dangerous drug. Among other substances which have been used for this purpose are iodine, bromine, mercury, lead, arsenic, lemon juice, sour wines, vinegar, Phytolacca, Gulf weed, and bladder wrack. Many of these, while having an influence on the fat, act as slow poisons and damage the assimilative organs, so that their ultimate effect is injurious.

OBI, ō'bē, or **OB.** The westernmost of the great rivers of Siberia (Map: Asia, G 2). It rises in the Altai Mountains, and flows northwest, then north through the Siberian governments of Tomsk and Tobolsk, emptying into the Arctic Ocean through an immense estuary, the Gulf of Obi, which is 600 miles long and 60 miles in average width. The length of the river itself above the estuary is about 2500 miles, and it is nearly two miles wide at its mouth. After emerging from the foot-hills of the Altai range the river flows for the remainder of its course through an almost perfectly level country consisting first of sandy steppes, then of rich tracts of fertile soil, and finally of vast marshes. In its lower course it divides repeatedly into parallel arms connected by cross-channels, forming a network of islands, which during floods are submerged under sheets of water many miles wide. Although not yet extensively used as a waterway, the Obi with its tributaries presents a total navigable length of over 9000 miles. In summer the main river and all its larger tributaries are navigable almost to their sources, and during the spring floods many secondary tributaries can be ascended by light-draught steamers. The river is ice-bound near its mouth from October to June. Of its numerous tributaries the largest is the Irtysh (q.v.), which is considerably longer than the main stream from the point of confluence.

OBIS'PO (Sp., bishop). A Cuban name of the spotted stingray (*Aëtobatus narinari*). It is one of the eagle-rays, and is brown in color, with small, round, pale spots.

O'BIT (OF. *obit*, from Lat. *obitus*, death, approach, from *obire*, to meet, from *ob*, toward + *ire*, to go). Literally, the decease of an individual. But as a certain ecclesiastical service was fixed to be celebrated on the day of death (*in die obitus*), the name can be applied to the service itself. Obit therefore signifies, in old Church language, the service performed for the departed. It consisted, in the Roman Church, of matins and lauds, followed by a mass for the dead.

OBITER DICTUM. See DICTUM.

OBJECT-GLASS. The lens in a telescope (q.v.) or microscope (q.v.), which is placed at the end of the tube nearest the object, and first receives the rays of light. Its function is to produce a real image of the object, and it is generally an achromatic lens.

OBJECT TEACHING. A mode of teaching in which objects are made the studies of young pupils. By this method a systematic attempt is made to exercise and train the senses of the child. Comenius (q.v.) in the *Great Didactic* writes: "Let the senses be applied to the subject as often as possible, e.g. let hearing be joined with vision and the hand with speech. It is not enough to apply to the ears, but the teacher must present to the eyes, that through them instruction may reach the imagination. Leave nothing till it has been impressed by means of the ear, the eye, the tongue, the hand." His *Orbis Pictus* was the first school-book in which pictures were used to illustrate the various topics. In the work of

Comenius, therefore, is to be found the first clear presentation of the principles of object teaching. To Pestalozzi (q.v.), however, may with justice be given the credit of introducing the method as a special feature of primary education. Since Pestalozzi all educators have agreed that the child's activity, manifested through the senses, should be directed to the things about him. In this way, (1) the child's senses are trained, (2) his judgment is aroused, and (3) he acquires a language. The three must go together. Pestalozzi saw that in order to reach clear knowledge of anything the mind must pass through a necessary sequence of processes. From sense-perception it must rise through ideation to clear concepts. Mere presentation of objects is not sufficient. There must be the inner reaction of the learner. There must be, therefore, (1) the sense-material, (2) the inner reaction of mind, (3) the word. Consult: Barnard, *Object Teaching* (New York, 1860); Calkins, *Manual of Object Teaching* (ib., 1890). See KINDERGARTEN; NATURE-STUDY; PEDAGOGY.

OBLATES, ŏb'lāts (ML. *oblatus*, oblate, from Lat. *oblatus*, offered, p.p. assigned to *offerre*, to offer). The name of a class of religious communities in the Roman Catholic Church, which differ from the religious Orders strictly so called in not being bound by regular vows, instead of which they make an offering (oblation) of themselves to the superior or bishop, with a promise of constancy. The principal associations of this class are: (1) The Oblates of Saint Ambrose, or of Saint Charles, whose foundation in 1578 was one of the many works undertaken in his diocese by Saint Carlo Borromeo (q.v.), Archbishop of Milan. The members were secular priests who lived in community, and were merely bound by a promise to the Archbishop to devote themselves to any service which he should consider desirable for the interest of religion. Saint Carlo made use of them chiefly in the wild and inaccessible Alpine districts of his diocese. In the suppression of small communities under Urban VIII. and Innocent X., the institution became extinct, but was revived by Archbishop Romilli of Milan in 1848. In 1856 a community on the same model was established in England by the future Cardinal Manning and his successor as Archbishop, Cardinal Vaughan, for aggressive work in London. The English oblates, whose statutes were confirmed by the Pope in 1857 and 1877, have now several houses. (2) The Oblates of Mary Immaculate was founded in 1816 by Charles Eugène de Mazenod, Bishop of Marseilles (1837-61), to repair the losses to religion caused by the French Revolution. Their rule was confirmed by Leo XII. in 1826. They were introduced into Canada in 1841 and the United States in 1848. The congregation, which has about 70 houses in all parts of the world, now numbers over a thousand members, the majority of them priests. The mother house is in Paris, in which city the great basilica of the Sacred Heart on Montmartre is principally their work.* The general is elected for life; a general chapter is held every six years. They conduct a large number of educational and charitable institutions, among them the Catholic University of Ottawa. For the life of the founder, consult Ricard, *Monseigneur de Mazenod* (Paris, 1892). (3) The Oblates of Saint Frances of Rome, popularly known as Donne di Tor di Specchi. This association grew out of the charitable work of the pious woman whose name it bears, and took up its community life in 1433 in the house in Rome which it still occupies. To this house, still the only one possessed by the institute, Saint Frances went on her husband's death, and here she died as superior in 1440. The oblates are mostly ladies of noble birth, and have done much good in educational and charitable works. They, with the Jesuits, were expressly excepted from the reforming decrees of the Council of Trent affecting the regular Orders; and their statutes gave Saint Francis de Sales the idea of his Order of the Visitation. For the original foundation, consult Lady Georgiana Fullerton, *Life of Saint Frances of Rome* (London, 1855).

OBLIGATE PLANTS (from Lat. *obligare*, to bind, from *ob*, before, toward + *ligare*, to bind). Plants which can grow in but one life condition. This term, which is contrasted with facultative plants, is applied particularly to parasites and saprophytes. For example, dodder is an obligate parasite, because it has not the power to grow independently. Obligate is also used in a still more restricted sense; certain forms of dodder can grow upon only one host plant, and are, therefore, regarded as obligate in that sense.

OBLIGATION (Lat. obligatio, bond, from *obligare*, to bind), AT CIVIL LAW. In the widest sense legal obligation is equivalent to legal duty, but the technical meaning of the expression is much narrower. Continental jurists confine the term, in the first place, to duties toward a particular person or group of persons, excluding duties toward the State or community; in the second place, to duties assumed by or imposed upon a particular person or group of persons, excluding duties which rest upon all members of the community. Further, not all duties of particular persons to particular persons are designated as obligations; they are not so described when the duties result from some preëxisting legal relation between the parties, like marriage. Such duties have indeed been called obligations *ex re*, but this use of the word is not approved by modern writers. Finally, the term obligation is ordinarily restricted to cases where the right which corresponds to the duty imposed upon or assumed by the person obligated has economic value. Technically, then, obligations are special legal relations in which one or more persons, usually described as creditors, are entitled to claim from one or more persons, usually described as debtors, acts or forbearances which are in the economic interest of the creditors. In Roman law, and in the law of Latin countries at the present time, the word obligation is used to describe the legal relation, the duty of the debtor, and the right of the creditor. The German Imperial code has distinct terms, viz. *Schuldverhältniss*, or debt-relation; *Verbindlichkeit*, or obligation; and *Forderungsrecht*, or right of demand.

The creditor's right is a right to performance. In early law this right ran directly and exclusively against the debtor's person. Later the claim could be satisfied by seizure of goods, and ran against the person only in second instance; and execution upon the person was transformed into imprisonment for debt. Since the abolition of imprisonment for debt the creditor's claim has become simply a claim against the goods, i.e. against the estate of the debtor. It is a right *in personam* only in this respect, that from the outset the creditor's claim runs against his debtor and no other person, while a right *in rem* runs against all the world. The duty of a person in possession of property to restore such property to its owner resembles the duty of a vendor to deliver the thing sold to the purchaser; but in the former case the duty results from the owner's right *in rem* and is not properly described as an obligation. See IN REM; IN PERSONAM.

In the Roman Imperial law the courts enforced specific performance whenever this was possible, awarding pecuniary damages also on account of the debtor's delay (*mora*). If specific performance could not be enforced, they awarded pecuniary damages, which were so measured as to put the creditor in as good a position, economically, as he would have occupied if the debtor had performed at the proper time and place. The same rules are applied in modern civil law, although some of the modern codes provide that, in case of money debts, damages shall not exceed the legal interest. The fact that the creditor's claim is, in most cases, enforceable only through the award of damages is the reason why it is usually asserted that no obligation exists unless the creditor's interest is measurable in money. Indirectly, however, an act or forbearance in which the promisee has no pecuniary interest can be secured by an agreement that the promisor shall pay a certain sum of money if he fails to do what he has promised, or does what he has promised not to do. Such 'conventional penalties' were enforced in the Roman law and are enforced at modern civil law; and although some of the modern civil codes do not require that the creditor's interest be measurable in money, claims not thus measurable can be enforced only where a decree of specific performance can be obtained from the court, or where a penalty has been stipulated.

While the obligation is thus sharply distinguished from the right to a thing, it is nevertheless true that the right of a creditor, like the right of an owner, is a property right. Like any other property right, it may be transferred or 'ceded' to a purchaser; it may be pledged or hypothecated by the creditor to his creditor; it may be attached by the creditor's creditor; in case of the bankruptcy of the creditor it passes, with his other assets, to his creditors or to those who represent and act for his creditors; and in case of the creditor's death it passes with the rest of his estate to his legal or testamentary heirs (as in English law it passes to the executors or administrators). Hence the Roman jurists, viewing property as consisting of 'things,' termed the obligation an 'incorporeal thing,' and English law operates with the same conception.

JOINT OBLIGATIONS. Where there are two or more creditors, or two or more debtors, each creditor may be entitled to sue only for his share of the claim, and each debtor may be liable only for his share of the debt. In certain cases, however, any one of the creditors may be entitled to demand full performance, and any one of the debtors may be held liable for the full debt. In such cases the obligation is said to be 'solidary,' 'actively' as regards the creditors, 'passively' as regards the debtors. The effect of performance to one creditor is to extinguish the right of the others, and the effect of performance by one debtor is to liberate the others. All such rules, however, apply only to the relation between the creditor or creditors, and the debtor or debtors, and do not touch the relation of the joint creditors to each other, or that of the joint debtors to each other. If the joint creditors have really (i.e. equitably) a joint interest, the creditor who has received payment must satisfy the other creditors; and if the debt was really a joint debt, the debtor who has paid is entitled to hold the other debtors to 'contribution.' As between joint wrong-doers contribution is regularly excluded.

ESTABLISHMENT. Obligations, as regards their origin, were divided by the Roman jurists into four classes: (1) those established by contract (*ex contractu*); (2) those established by tort of the debtor (*ex delicto*); (3) those which resemble contractual obligation, although no contract has been concluded (*quasi ex contractu*); and (4) those which resemble obligations on tort, although the debtor himself has committed no tort (*quasi ex delicto*). The most important quasi-contractual obligations are those based on unjust enrichment and those which spring from unauthorized agency. The quasi-tortious obligations include all the cases in which a person (father, employer, etc.) is held liable for a tort which he did not commit or authorize. The classification is open to criticism, and while modern civil codes recognize obligations of the third and fourth class, they are sometimes described as 'obligations imposed by law.' This description is also open to criticism, as implying that contractual obligations are not imposed by law. In the new German code all attempt at classification is abandoned, except that contractual obligations and quasi-contractual obligations are thrown together, and that all cases of liability for illicit conduct are placed under a separate title.

EXTINCTION. Obligations are normally extinguished by performance. If the creditor sees fit to accept as performance something other or something less than he is entitled to demand, the obligation is extinguished. Tender of performance does not have the same effect; but if the obligation is to pay a sum of money or to deliver goods, the debtor is liberated by depositing the money or goods in a safe place subject to the creditor's order. Obligations are also extinguished by the substitution of new obligations (novation), if such was the intention of the parties. Obligations are likewise extinguished by merger (confusion) when the claim and the debt are united in the same person (e.g. by inheritance); by set-off (compensation) when a debtor, being sued, is able to put in a counterclaim; by release; and by discharge in bankruptcy proceedings.

NATURAL OBLIGATION. The Roman jurists sometimes used the term natural obligation to mean an obligation recognized by natural law (q.v.), thus including the majority of legal obligations. More technically, however, they employed the term to describe an obligation which was legally imperfect, and which could not be enforced by action at law, but which a scrupulous man would recognize and perform. To all such natural obligations they attributed at least this effect, that voluntary performance was to be regarded as performance and not as gift. Further, money paid or property transferred under the mistaken impression that a legal obligation existed could not be recovered if a natural obligation existed. In many cases, moreover, a natural obligation was a sufficient basis for suretyship or for a new promise, and in a few cases such an obligation could be used as a set-off against a legal obligation. Modern legislators do not regard the conception with favor, but the courts have not been able to dispense with it. Consult the authorities referred to under Civil Law.

OBLIQUE MOTION. See Motion.

OBOE (It. *oboe*, from Fr. *hautbois*, Eng. *hautboy*, high wood, so called from the high notes of the instrument, from *haut*, high + *bois*, wood). The oldest and most important wood-wind instrument. It is of great antiquity and is traced in the sculpture of Egypt and Greece. The oboe is the most elaborate and difficult of reed instruments. It is made of wood, generally of box, ebony, cocoa, or rosewood, and is constructed in three pieces, or joints, forming a continuous tapering tube, about 21 inches long, the bore of which is narrow at the small end, and widens into a bell-shaped opening, one and one-half inches in diameter at the mouth. In the upper and middle piece there are holes, by stopping or opening which with the fingers the player forms the notes of the natural scale, the intermediate semitones being formed by the keys. The reed is fixed upon the end of a small brass tube which fits, socket-like, into the small end of the upper piece. The sound of the oboe is reedy and penetrating, though mild, and from its great power in swelling or diminishing the sound, it is capable of every variety of expression. In the modern orchestra two oboes are employed, the *treble oboe*, a non-transposing instrument, the music for which is written in the G clef, and the *alto-oboe* or *cor anglais* (q.v.), a transposing instrument. The principal solo compositions for the oboe are: Handel's six concertos; Mozart's quintet for oboe and strings; Beethoven's trio for two treble oboes and cor anglais; Hummel's variations, with orchestra; and Kalliwoda's concertino in F, with orchestra. The *oboe d'amore*, in use in the eighteenth century, became obsolete, but was reconstructed by M. Mahillon, of Brussels, at the order of M. Gevaert, in order to perform correctly the works of Bach. See Musical Instruments.

OBOK, ō-bŏk′. A seaport of French Somaliland (q.v.), situated at the western end of the Gulf of Aden (Map: Africa, J 3). It was acquired by France in 1855, and with the surrounding district formed the colony of Obok, which became the nucleus of the French possessions in Somaliland. Population, about 1000.

OB′OLEL′LA (Neo-Lat., diminutive of Lat. *obolus*, from Gk. ὀβολός, *obolos*, small coin). A small fossil brachiopod of oval or rounded outline common in and very characteristic of Cambrian rocks of North America and Europe.

OB′OLUS (Lat., from Gk. ὀβολός, *obolos*). The name of a Greek measure of weight and a Greek coin. Six of these oboli made a drachma. See Drachma.

OBRADOVIČ, ō-brä′dō-vĭch, Dositheus (1739-1811). A Servian author, the father of modern Servian literature. He was born at Csákovár, Hungary, and at the age of fifteen entered the Monastery of Oprovo in Syrmia. He afterwards traveled in the East and in Italy; and in 1783 he published *Zivot i priklučenija*, or "Life and Adventures," partly autobiographic and partly fantastic. This was the first book written in the popular speech of the Servians, and made it a literary language. In Belgrade, where he settled in 1807, he was made Senator and Minister of Public Education. Besides many translations, especially of *Æsop's Fables* (1788), he wrote *Sověti zdravago razuma*, or "Wise Counsel" (1784), and a work on morals, *Sobranie nravoučitelnych veščej* (1793 and 1818). A complete edition of his works in ten volumes appeared at Belgrade (1833-45). Consult Šević, *Dositheus Obradovič* (Neusatz, 1889).

OBRENOVITCH, ō-brĕn′ō-vĭch. A ruling family of Servia which attained power in 1817, when Milosh Obrenovitch (q.v.) was chosen Prince by the nobility and the clergy. Milosh was compelled to abdicate in 1839 and was followed by his sons, Milan, who ruled only for a few weeks, and Michael Obrenovitch (q.v.), who in turn was deposed in 1842, the power passing to the rival house of Karageorgevitch. Alexander Karageorgevitch fell in 1858 and was succeeded by the old Prince Milosh, who died in 1860 and made way a second time for his son Michael. The latter was assassinated in 1868 and Milan I. (q.v.), a grandson of Jefrem, the younger brother of Milosh Obrenovitch, was chosen Prince. He attained the kingly title in 1882, but in 1889 was forced to abdicate in favor of his son, Alexander I. (q.v.), who was assassinated in 1903, leaving no heirs. Peter Karageorgevitch was chosen King by the Skuptchina. See Servia.

O'BRI′EN, Fitzjames (1828-62). An Irish-American poet, story-teller, and journalist, born in Limerick. He was educated at the University of Dublin, served for a time, as is supposed, in the British Army, and squandered a considerable inheritance in London, editing a periodical in aid of the first World's Fair (1851). The next year he came to the United States. His most striking work appeared in the *Atlantic Monthly*—two short stories hardly surpassed for creative imagination in American literature. These are *The Diamond Lens* and *The Wondersmith*. He supplied the stage also with many ephemeral dramas, and with one, *A Gentleman from Ireland*, that held the boards for a generation. In the Civil War he served in the Seventh Regiment, was severely wounded, and after a lingering illness died, in Cumberland, Md. (April 6, 1862). He was a distinguished figure in the Bohemian New York of his day, and witness to the impression that he made in that sprightly circle is preserved in a sheaf of personal recollections prefixed to *The Poems and Stories of Fitzjames O'Brien*, edited by his friend William Winter (1881). O'Brien has never received full praise for his unique, if bizarre, talents, which are most clearly displayed in his stories, but are also visible in a number of poems, such as "The Skaters" and "The Wharf-Rat."

O'BRIEN, Jeremiah (1744-1818). An American patriot, born probably at Kittery, Maine. In 1775 the captain of the British armed vessel *Margaretta* threatened to bombard the town of Machias, where O'Brien then lived, unless the liberty pole were removed. On June 12th O'Brien and his five brothers, accompanied by about thirty-five of their townsmen, many of them armed only with pitchforks, manned a little sloop in the harbor, attacked the *Margaretta* and after a brief engagement captured her. After the battle Captain O'Brien transferred the *Margaretta's* cannon to his own vessel, which he rechristened the *Machias Liberty*, and used as a coast patrol. Later he became a privateer captain sailing under letters of marque from the colony, and while commanding the *Hannibal*, 20 guns, was captured by two British frigates and sent to England, where he was confined in the Mill Prison. After the close of the war he was appointed the first collector of the port of Machias.

O'BRIEN, Lucius Richard (1832—). A Canadian painter, born at Shanty Bay, Ontario, and educated at Upper Canada College, Toronto, where he studied architecture and civil engineering. He came to be considered the best painter in water colors that Canada has produced. As first president of the Royal Canadian Society of Artists, he furthered the interests of other artists, and Canadian art in general. His best paintings are descriptive of scenery upon the Lower Saint Lawrence.

O'BRIEN, William (1852—). An Irish journalist and Parliamentary leader. He was educated at Cloyne Diocesan College and at Queen's College in Cork. In 1869 he became a reporter on the *Cork Daily Herald*, in 1875 he joined the staff of the *Freeman's Journal*, and in 1880 founded the *United Ireland*. Because of his political activity, he was nine times prosecuted by the law officers of the Crown and was imprisoned for more than two years. He represented the Nationalists in Parliament almost continuously from 1883 until 1895, when he retired because of dissensions in the party. In 1890 he visited the United States and collected considerable funds for the benefit of the Irish cause, and after Parnell's conviction he became one of the leaders of the anti-Parnell faction. In 1898 he originated a new agrarian movement under the name of the United Irish League, and founded the *Irish People*, as its organ. He published several books, among them *When We Were Boys* (1890) and *Irish Ideas* (1894).

O'BRIEN, William Smith (1803-64). An Irish politician. He was educated at Harrow School, whence he passed to Trinity College, Cambridge. He entered Parliament for the Borough of Ennis in 1828. In 1835 he was returned for the County of Limerick, and for several years strongly advocated the claims of Ireland to a strictly equal justice with England, in legislative as well as executive measures. Professing his inability to effect this in the United Legislature, and having been committed to prison in the House of Commons by the Speaker's orders for refusing to serve on committees, he withdrew from attendance in Parliament in 1841, and joined actively with Daniel O'Connell (q.v.) in the agitation for a repeal of the legislative union between England and Ireland. In the progress of that agitation, O'Brien sided with the party known as 'Young Ireland,' and when the political crisis of 1848 resulted in a recourse to arms, he took part in an attempt at rebellion in the south of Ireland. He was arrested, convicted, and sentenced to death. The sentence, however, was commuted to transportation for life. He was transported to Tasmania, but in 1856, in common with the other political exiles, he was permitted to return to his native country. He published *The Principles of Government* (1855). Consult: Sullivan, *New Ireland* (London, 1877); Duffy, *Young Ireland* (2d ed., ib., 1883).

OBSERVATORY (from Lat. *observare*, to observe, from *ob*, before + *servare*, to keep; connected with Skt. *sar*, Av. *har*, to protect). An institution supplied with instruments for the regular observation of astronomical, meteorological, or magnetic phenomena. In some observatories all three classes of observation are carried on, but in most cases special attention is paid to astronomy alone, and only such meteorological observations are taken as are required for the calculation of the effect of atmospheric refraction on the position of a heavenly body; there are, however, a few observatories which are devoted solely to meteorological or magnetical observations.

While observation of the heavenly bodies dates from prehistoric times and individuals at intervals made their crude observations of the heavens, the first observatory, in our modern sense of the word, was that of Alexandria, founded about B.C. 300. It continued in activity till A.D. 200; and it was here that Hipparchus discovered the precession of the equinoxes and fixed the positions of the sun, moon, and planets by means of armillary spheres (q.v.) and astrolabes, having graduated circles on which celestial latitudes and longitudes could be read off, when a pair of sights was pointed to the heavenly body. Ptolemy used a quadrant, with which he measured zenith distances on the meridian. In the ninth and tenth centuries the Arabs founded observatories at Bagdad, Damascus, and Mokattam, near Cairo. In the latter place the Hakimite tables were constructed. In the thirteenth century the splendid observatory at Meragha, Persia, and in the fifteenth century that of Samarkand were founded by Mongol Khans. Here planetary tables and star catalogues were constructed. The first observatory in Europe was that of Nuremberg, erected in 1472, and the revival of astronomical observations in Europe dates from its foundation. In 1576 Tycho Brahe began the erection of his famous observatory on Hven, an island in the Sound. He converted the quadrant used by Ptolemy into an altazimuth by mounting it on a vertical axis in connection with a horizontal or azimuth circle. It was not till the middle of the eighteenth century that the improvement of time measurement with pendulum clocks enabled astronomers to rely for the determination of right ascensions on the times of passage across the meridian, instead of measurements with a graduated circle. The quadrant was then fixed in the meridian, and being attached to a massive wall, its dimensions were increased, and greater accuracy thereby secured in the determination of meridian zenith distances. Neither the quadrant nor the mural circle (q.v.) which succeeded it, however, could be relied upon for accurate motion in the plane of the meridian, but Römer remedied this defect by inventing the transit instrument (q.v.), which enabled astronomers to observe the times of meridian passage or transit with great accuracy, and thus to determine the right ascension of the heavenly bodies by means of the apparent diurnal movement. With the transit and quadrant Bradley commenced that series of observations of the positions of the sun, moon, planets, and stars, which have continued ever since at Greenwich, and on which, in combination with less extensive series at Paris, Königsberg, and elsewhere, all our tables of the motions of the heavenly bodies are founded. In modern observatories the transit and mural circle have been combined into one instrument, the meridian circle (q.v.), which determines both right ascensions and declensions at a single observation.

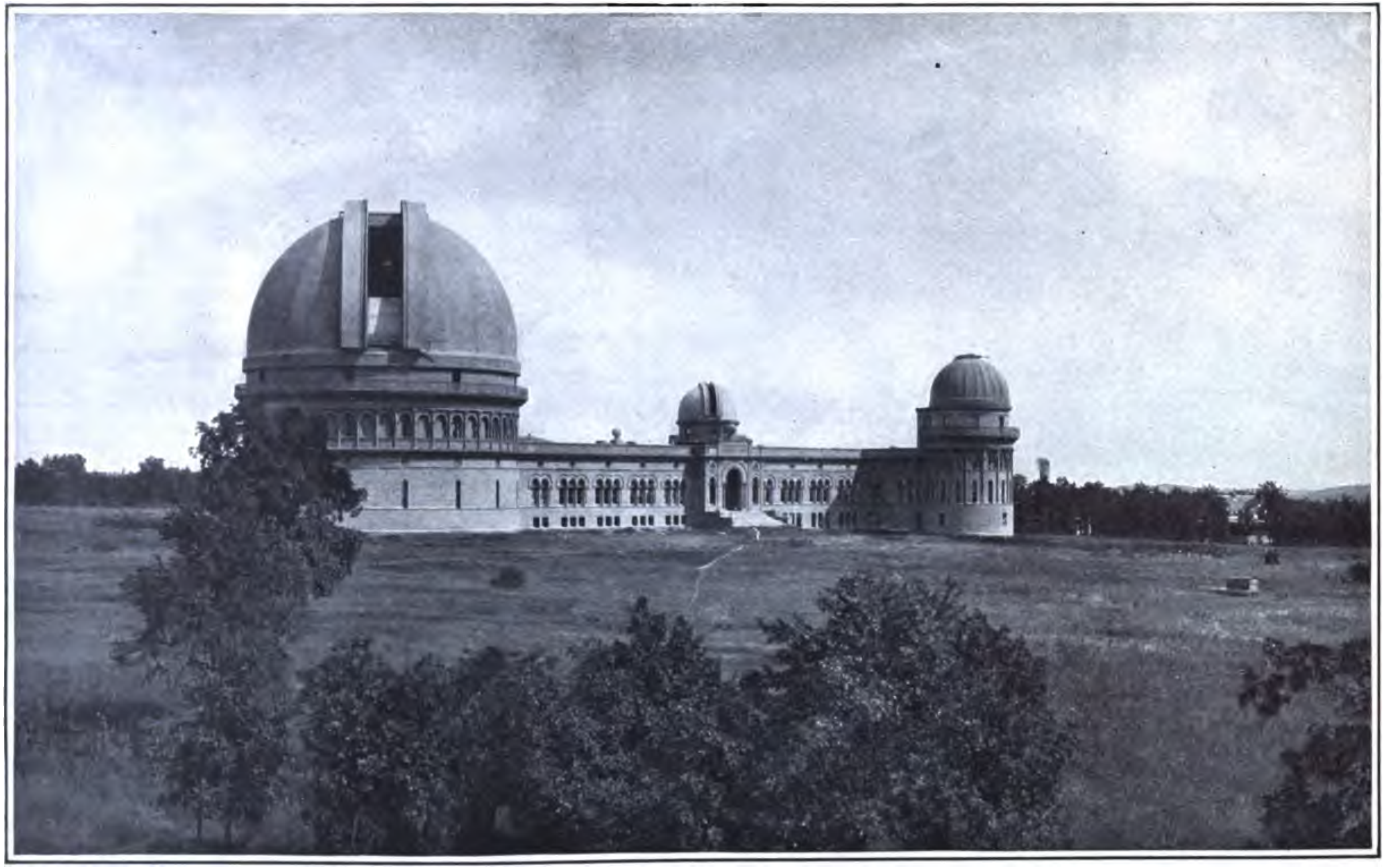
In planning observatories a very usual mistake is an over-supply of instruments and too few astronomers. A large telescope really needs six persons to keep it busy: two astronomers, two assistants, and two computers. Moreover, the 'life' of a telescope is very short. Every few years new instruments are invented, and unless these are supplied to the observatory its astronomers will work at a disadvantage, and its astronomical output will be diminished in quantity and value.

The great observatories of the world may be divided into several classes. In the first place, we have the great Government institutions occupied with continuous observations such as are needed to strengthen our knowledge of the fundamental parts of astronomy. The Royal Observatory at Greenwich, England, is perhaps the most important of this class. It was founded by Charles II. Similar institutions are established at Paris, Berlin, Pulkova (q.v.), near Saint Petersburg, and Washington. At the last-named place the observatory is called the United States Naval Observatory (see NAVAL OBSERVATORY), and the astronomers are professors of mathematics in the United States Navy. Another class of observatories are maintained by universities and other educational institutions. These are intended to combine instruction with research, and in them an effort is usually made to extend the science of special investigations rather than by long continued routine observation. In the United States the principal observatories of this class are the Harvard University Observatory, the Lick Observatory (q.v.) of the University of California, and the Yerkes Observatory (q.v.), belonging to Chicago University. Finally, we have the very important class of astrophysical observatories, which are occupied with a study of the physics of the heavenly bodies. Probably the most important of these is at Potsdam, Germany. Much astrophysical work is also done at the university observatories of Harvard and Chicago. See TELESCOPE; MERIDIAN CIRCLE. For the lately established observatories for the observation of the variations of latitude, see LATITUDE, VARIATION OF.

OBSIDIAN (from Lat. *obsidiana*, false reading for *obsiana*, a sort of mineral, probably obsidian, from *Obsidius*, false reading for *Obsius*, name of a man who is said to have discovered it in Ethiopia). A volcanic glass consisting of silica in combination with aluminum, calcium, iron, potassium, and sodium. It is hard and brittle, with a remarkable vitreous lustre, and a perfect conchoidal fracture, the edges of the fracture, which are semi-transparent or translucent, being very sharp and cutting like glass. Obsidian is generally black or very dark gray, but sometimes has a green, red, or brown color, is striped or spotted, and even chatoyant or aventurine. It occurs in volcanic regions, in round compact pieces, granular or fibrous. It is often found in association with pumice, which is identical with it in chemical composition, but different in structure. Pitchstone is also of similar composition, but contains a larger percentage of water and is without lustre. Obsidian is found principally in the volcanic regions of Iceland, Italy, Hungary, Spain, New Zealand, Siberia, Mexico, Peru, and the western parts of the United States, especially in Georgetown, Col., and at the Obsidian Cliff in the Yellowstone Park, where it occurs in massive form. The famous locality in Mexico is the Cerro de Navajas, or 'Hill of Knives,' in the State of Michoacan. Obsidian takes a high polish, but is very brittle. Nevertheless, it was extensively used among primitive peoples for arrowheads and spearheads, for knives, mirrors, polished figures, and ornaments, the best specimens of which have been found in Mexico. The early Romans obtained obsidian mirrors from Ethiopia. The mineral is still sometimes employed as material for ornamental boxes, buttons, and other articles.

OBSTETRICAL TOAD. See MIDWIFE FROG.

OBSTETRICS (from Lat. *obstetricius*, relating to a midwife, from *obstetrix*, midwife, form *obstare*, to stand before, from *ob*, before, toward + *stare*, to stand), MIDWIFERY, or TOKOLOGY. That branch of medicine which is concerned with the care of women during pregnancy, and during and after labor, whether natural or irregular, with the diseases peculiar to the puerperal state, and with the care of the new-born child. It also embraces a knowledge of the anatomy of the female generative organs and the physiology of reproduction in the human species. While among savages little or no assistance is given to the parturient woman, and the process is left to unaided nature, among civilized peoples from the earliest times there has been a class of persons—usually women—who have attended women during this trying period. The Jews had women (called *mejelledeth*) who acted as midwives, as did the Egyptians; and among the Greeks there was a corresponding class of women known as *mœeutricæ*. Phanarete, the mother of Socrates, was a midwife; and Plato explains the duties undertaken by these women. Hippocrates gave considerable attention to midwifery, and describes the operation of turning the child in abnormal labors. Among the Romans both physicians and midwives (obstetrices) attended confinements. Cæsarian section was performed after the death of the mother, and Pliny mentions that Scipio Africanus and Manlius were born in this way. There was a royal law (*lex regia*) providing for the performance of this operation when necessary. Celsus and Paulus of Ephesus wrote of obstetrics during the first century, and a gradual increase in the knowledge of the physiology and mechanism of labor can be traced in the writings of Galen (second century), Actius (fifth century), and Paulus Ægineta (seventh century). The latter advocated the operation of craniotomy in suitable cases. During the Middle Ages there was little progress in obstetric science in Europe, but the Arabian and Persian schools made many improvements in this branch of medicine as well



THE YERKES OBSERVATORY OF THE UNIVERSITY OF CHICAGO, AT LAKE GENEVA, WISCONSIN

as in others. Midwives did most of the work, but physicians were called in abnormal cases. Rhazes of Bagdad (A.D. 800) first advised artificial rupture of the membranes when spontaneous rupture was unduly delayed; and Avicenna of Ispahan (A.D. 900) described an instrument somewhat like the modern forceps. The teachings of these two physicians became celebrated throughout Europe and the East, and were followed for many years. With the revival of learning the science of midwifery began to receive the attention of the most famous physicians. Vesalius (q.v.) in 1543 first correctly described the bony pelvis, and Levret in France (1754) and Smellie in England (1751) completed his work 200 years later by taking exact measurements of the several diameters of the pelvic cavity.

At the commencement of the sixteenth century Eucharius Rhodion published a little book which is remarkable as being the first book published on this subject in England. In 1573 Ambrose Paré published a small work in which he showed that foot-presentations were not dangerous, and that in mal-presentations it was better to deliver by the feet than to attempt to bring down the head. Guillemeau and Mauriceau, his successors, developed and improved his teachings. About 1640 Dr. Paul Chamberlin, an Englishman, invented the forceps with separate blades, such as are now used. The Chamberlins (father and sons) did not publish their discovery, and it was not until 1815 that the exact nature of the instrument became known. The first scientific book on midwifery was published in 1513 by Eucharius Rösslin; and Justine Siegemund, a court midwife of Brandenburg, attained celebrity by her work on this subject. In 1668 Mauriceau's *Treatise* appeared, and was for a long time the standard work on the subject. A point requiring notice in the history of midwifery in the seventeenth century is the discovery of the use of ergot of rye in accelerating parturition. In 1688 Camerarius stated that midwives in some parts of Germany were in the habit of employing it for this purpose; but it is not till 1774 that we find any further reference to the use of this drug. Important contributions to obstetric knowledge during the eighteenth century were made by Smellie and Ould (1742) in England, who described the engagement of the fœtal head in the pelvis; Levret (1747), Solayrés de Renhac (1771), Baudeloque (1781), and Madame Lachapelle (1795) in France; and Boer and Schmitt in Germany. The first, however, to give a clear and correct explanation of the entire mechanism of labor was Naegele the elder (1819), who may be considered the founder of modern obstetric science. In the nineteenth century many notable improvements in the art of midwifery were made; among them may be mentioned the induction of premature labor (first in England about 1756; in Germany in 1804; in France 1831); the use of auscultation to detect the fœtal heart-beat; the perfection of the obstetric forceps, and its more frequent use in place of craniotomy; and the employment of general anæsthesia in both normal and complicated labors. Partial anæsthesia by the injection of cocaine into the spinal canal in the lumbar region has been introduced within a few years to take the place of general anæsthetics when these have been contra-indicated. Obstetrics is now an important part of the curriculum of medical schools, and lying-in hospitals in connection with these schools have been established. Vienna has long been recognized as the centre of obstetrical teaching, the hospital in that city confining about 10,000 women annually. Good schools are also to be found in Paris, Berlin, Dublin, and New York. The latter city, on account of its large foreign population, affords unusual clinical advantages. On the Continent and to a less extent in Great Britain, regularly licensed midwives are still extensively employed, but in the United States and among the better classes of Great Britain confinements are intrusted exclusively to physicians.

The science of midwifery may be considered under three main divisions: the anatomy of the female generative organs; the physiology of these organs during the process of reproduction; and the pathological conditions which may arise during this period.

Anatomy. The generative organs of the female consist of the uterus; the two ovaries, connected with the uterus on either side by the Fallopian tubes, which open into its cavity; and the vagina, or canal leading from the uterus to the external parts. The breasts are also included, although only active after the birth of the child.

Physiology. Reproductive activity, including the functions of menstruation, conception, gestation, parturition, and lactation, is limited in the female to a period of life beginning at about the twelfth year and ending about the forty-fifth. These limits vary by a few years, according to climate, an earlier maturity being characteristic of hot countries. When conception has taken place, the impregnated ovum makes its way through one of the Fallopian tubes to the cavity of the uterus, where it lodges and develops through the agency of a convoluted mass of blood vessels called the placenta, from which a cord of vessels (the umbilical cord) runs to the abdomen of the fœtus. The duration of normal pregnancy varies from 275 to 280 days (nine calendar or ten lunar months), but gestation may be prolonged beyond this time in very rare cases to 300 or 306 days. Pregnancy is terminated with the expulsion of the child by the contractions (labor pains) of the powerful muscular fibres of the uterus. The more important signs and symptoms of pregnancy are the perception of the fœtal heart-beats by the ear (auscultation); 'quickening,' or active movements of the child *in utero;* passive movements (ballottement) elicited by manipulation; suppression of the menses, morning nausea, gradual enlargement of the abdomen and breasts, and pigmentation of the area immediately surrounding the nipple. Of these only the first three can be considered certain indications of pregnancy, the existence of which can rarely be diagnosed with precision before the third month. During gestation the fœtus floats freely in a sac of water called the amniotic fluid, and changes its position frequently. When parturition begins, however, the long axis of the fœtus usually coincides with that of the mother, with the head downward, or *presenting* at the pelvic outlet. This is by far the most common presentation, occurring in about 96 per cent. of all cases. In about 3 per cent. the buttocks or feet present. About once in 200 labors what is known as a transverse presentation is met with (that is, the long axis of the child is at right angles to that of the mother). Delivery being impossible in this position, artificial correction of the presentation, usually by turning and bringing down the feet, must be resorted to. Labor is arbitrarily divided into three stages: The first stage begins with the earliest premonitory pains and ends with the complete dilatation of the uterine outlet; this stage may last several hours or even days. During the second stage the bag of water ruptures, the uterine contractions become stronger, and the child passes through the parturient canal and is born. This event completes the second stage. The third stage ends with the expulsion of the placenta and fœtal membrane, and lasts usually about half an hour. The duration of labor in first confinements is on an average about twelve hours; in succeeding labors, six to eight hours; although much longer periods are not dangerous or uncommon. The puerperal or lying-in state begins at the completion of labor and lasts about six weeks. During this time lactation is inaugurated and the uterus gradually resumes its wonted size and shape (involution). The length of the lying-in period varies in different countries and races; among uncivilized people and in parts of the East the mother resumes her usual occupations immediately after parturition; but in civilized countries the woman is confined to her bed for a week or ten days.

The Pathology of Pregnancy. While the pregnant woman is liable to disease equally with other individuals, there are certain disorders which are peculiarly apt to arise during gestation, or are dependent on it. The teeth may undergo decay, owing to the fact that the mineral elements necessary for their nutrition are appropriated by the embryo. Constipation from both mechanical and sympathetic causes is a common disorder. The kidneys, owing to the increased functional activity demanded of them, not infrequently become diseased, as evidenced by the appearance of albumen in the urine. These organs failing in their function, poisonous products of metabolism accumulate in the blood, pronounced nervous symptoms, such as headaches, vomiting, and impairment of sight and hearing, appear, and if not relieved, uræmic convulsions (the so-called eclampsia) are induced, ending often in coma and death. Besides these and many other affections incident to pregnancy, there are certain chronic diseases which, by reason of the increased strain upon the vitality at this time, are likely to prove fatal. The heart normally undergoes a measure of hypertrophy in pregnant women in order to meet the increased demands of circulation. When, however, there exists chronic disease either of the substance or the valves of this organ, it may prove unequal to the strain. The danger from this condition increases with each succeeding pregnancy. When pulmonary phthisis exists in the mother, gestation in the majority of cases accelerates the progress of the disease.

Pregnancy may be terminated at any time before the normal period of 280 days. When this occurs during the first six months, it is called abortion or miscarriage; when it happens during the three succeeding months, it is termed premature delivery. A fœtus born before the fifth month does not ordinarily survive. Abortion is always a serious accident, either from loss of blood, or blood poisoning and peritonitis. This is particularly the case in forcible or criminal abortion, in which the mortality is very high. Extra-uterine (ectopic, tubal, or abdominal) pregnancy occurs when the impregnated ovum fails to reach the interior of the uterus and lodges in the Fallopian tube or drops into the abdominal cavity. The fœtus develops in this situation, and unless the condition is recognized early and operated upon, death is likely to occur during the third or fourth month from rupture of the tube, hemorrhage, and peritonitis. A similar condition of affairs takes place in what is termed 'missed labor' when the fœtus fails to be expelled at term. Operation for tubal pregnancy was advocated by Tait, Veit, Mundé, and others, and is now a common procedure.

The progress of natural labor may be obstructed by certain conditions of the mother and child. In the former, deformities of the bony pelvis, disease of the uterus resulting in rupture, and malposition of the placenta (placenta previa) are the most important. The child may be too large, or ill-formed, or present abnormally. These abnormal conditions render necessary various obstetric operations. Among these are: the induction of abortion or premature labor, when the mother's life is in danger, or the size or shape of the bony pelvis is such as to preclude delivery at full term; the extraction of the child with forceps; the Cæsarian operation (delivering the child through an opening in the abdomen); version or turning when the fœtus presents abnormally or labor needs to be rapidly completed; and perforation of the head (craniotomy). The chief danger to which the woman is liable after delivery is puerperal or child-bed fever, which is now known to be simply septicæmia (q.v.) or blood poisoning, due to infection from unclean hands, instruments, or appliances. Since the discovery of antisepsis, child-bed fever has been constantly on the decline, and at the present day is a comparatively infrequent complication, both in hospitals and private practice. See Phlegmasia Alba Dolens.

OBVERSION (from Lat. *obvertere*, to turn toward or against, from *ob*, before, toward + *vertere*, to turn). In logic, the process of transforming a judgment into one of opposite quality, i.e. affirmative into negative, and vice versa. The change may be effected provided due compensation is made by changing the quality of the predicate. E.g. 'All men are mortal' becomes by obversion 'No man is immortal.'

OCALA, ô-kä′lȧ. A city and the county-seat of Marion County, Fla., 101 miles south by west of Jacksonville; on the Plant System and the Florida Central and Peninsular railroads (Map: Florida, F 2). Emerson Memorial Home and School, a Methodist Episcopal institution for colored girls, is located here. Ocala is surrounded by one of the most productive sections of the State—a region interested largely in the cultivation of oranges and vegetables. It is the centre of extensive phosphate interests. There is a public market; and the electric light plant also is owned by the municipality. Population, in 1890, 2904; in 1900, 3380.

O'CALLAGHAN, ô-kăl′ȧ-hȧn, Edmund Bailey (1797-1880). An American historical scholar and editor. He was born in Ireland, and was educated in medicine in Paris. He removed to Canada in 1823. Then he became interested in the Irish national movement, was one of the organizers of the Society of the Friends of Ireland, and editor of its organ, *The Vindicator*. In 1836 he was elected to the Provincial Parliament. In the year following he took a leading part in the Canadian insurrection (1837), and on the failure of the movement fled to the United States. Resuming practice in Albany, N. Y., he became greatly interested in the records of colonial New York, and it was largely through his efforts that the work of publishing them was undertaken. His published works include: *History of New Netherlands* (1846); *Documentary History of the State of New York* (4 vols., 1849-51); and *Documents Relating to the Colonial History of New York* (11 vols., 1855-61). The two latter series were edited by him with introductions and elaborate and careful notes.

O'CALLAGHAN, John Cornelius (1805-83). An Irish historian, born in Dublin. He was educated for the law, but went into journalism. His chief claim to remembrance rests upon his editorial work in the secret history of the revolution in Ireland in 1688-91, written by Charles O'Kelly, an officer in the service of James II., which was published under the title *Macariæ Excidium* (1846), and upon his *History of the Irish Brigades in the Service of France, from the Revolution in Great Britain and Ireland under James II. to the Revolution in France under Louis XVI.* (1869).

OCAÑA, ō-kän′yȧ. A town of the Department of Santander, Colombia, 235 miles north of Bogotá, on the upper courses of the Taira River. The town is situated in the midst of a fertile plain noted for its production of coffee, and in addition is the centre of a brisk trade between Western Venezuela and the Magdalena Valley in anise and hides. In the vicinity are deposits of coal and lead. Ocaña was founded in 1572. Its population is about 6200.

OCARINA, ŏk′ȧ-rē′nȧ (It., diminutive of *oca*, goose; so called from its resemblance to a goose-egg). A musical instrument of Tyrolese or Austrian origin, improved by French musicians. The ancient prototype of the ocarina is the Chinese hsüan, which was invented about 3000 B.C. The modern instrument was at first a molded piece of clay a few inches long, with holes for keys, a mouthpiece, and hollowed within. Five different sizes are now made for the different parts in music, and a piston at the end is used to temper the note. A row of keys in the improved instrument takes the place of the original holes.

O'CAROLAN, ō-kär′ō-lan, Turlogh (1670-1738). An Irish bard, and one of the last of his calling, born in Newtown, Meath. He was blind from the age of sixteen, and spent his life wandering through Ireland, singing to the accompaniment of his harp. Many of his songs, all of which were vigorously national in character, are still to be heard in parts of Ireland. A collection of his ballads was published during the eighteenth century, but others of them have been handed down by tradition among the peasantry. He died in Roscommon.

OC'CAM, William of, or William Ockham (?-1349). A famous schoolman, surnamed *doctor singularis et invincibilis*. Little is known of his early life. There is some reason to believe that he was born at the village of Ockham in Surrey, England. He took the degree of B.D. at Oxford and afterwards studied in Paris. He was a Franciscan, and about 1321 became involved in a controversy which arose in his Order concerning the question whether Jesus and the Apostles owned property. A certain Narbonnese priest affirmed that the founders of the Christian religion had all things in common, and the doctrine was vigorously supported by William of Occam and other influential Franciscans, notwithstanding its condemnation by the Pope, John XXII. In 1328 Occam and the others, fearing for their safety at Avignon, fled from that city and made their way to Munich, where they were received and protected by Louis, Holy Roman Emperor. The remainder of Occam's life was passed in that city, where he continued his dispute with the popes and labored to perfect his system of philosophy. Whether he ultimately became reconciled with the head of the Church is disputed. He died at the convent of his Order in Munich in 1349 or shortly after that year. Occam's most important work was done in the field of logic and philosophy. His system is commonly classed as nominalism (q.v.), which had never before received so vigorously logical and rational a treatment. Occam's chief works upon logic were the *Summa Logices* and *Expositio Aurea Super Totam Artem Veterem*. On philosophy and theology he wrote *Quæstiones* and *Summulæ in Octo Libros Physicorum; De Sacramento Altaris; De Corpore Christi; Quæstiones in Quattuor Libros Sententiarum,* based on Peter Lombard's *Sententiæ*, and containing nearly the entire theology of Occam. His polemical writings against the Pope include the *Opus Nonaginta Dierum; De Dogmatibus Papæ Johannis XXII.; Compendium Errorum Papæ; Defensorium Contra Johannem Papam;* and *Dialogus in Tres Partes Distinctus, Quarum Prima de Hæreticis, Secunda de Erroribus Johannis XXII., Tertia de Potestate Papæ, Conciliorum, et Imperatoris*. Consult: Ueberweg, *History of Philosophy* (Eng. trans., London, 1872-74), and the article "Ockam" in Herzog's *Realencyclopädie*.

OC'CANEE'CHI. An eastern tribe of Siouan stock, living, when first noted in history in 1670, in southern Virginia, having their chief town upon an island called by their name, at the confluence of the Staunton and Dan rivers, just above the present Clarksville. The principal trading paths between the northern and southern tribes of Virginia and the Carolinas crossed at this point, which fact made their language the general trade language throughout the region, while their town contained always a considerable reserve store of corn and skins. In 1676 they aided the Virginians against the invading northern Indians, but were repaid by being attacked in turn by the whites, determined to plunder the town. The Occaneechi repelled the attack, but with such heavy loss that they soon after abandoned their island settlement and retired southward into Carolina. In 1701 they were found living at the Occaneechi hills, about the present Hillsboro, N. C., but evidently declining, and shortly afterwards they united with the Saponi.

Tutele, and one or two other broken tribes. Consult Mooney, *Siouan Tribes of the East.*

OCCASIONALISM (from *occasional*, ML. *occasionalis*, relating to occasion, from Lat. *occasio*, opportunity, cause, occasion, from *occidere*, to fall, perish, set, from *ob*, before, toward + *cadere*, to fall, Skt. *sad*, to fall). The name given to the philosophical system devised by the school of Descartes (q.v.) for the purpose of explaining the interrelation between mind and matter. It is a palpable fact that certain actions or modifications of the body are preceded, accompanied, or followed by corresponding acts of mind, and vice versa. This fact, although it presents no difficulty to the popular conception, according to which each is supposed to act directly upon the other—body upon mind, and mind upon body—has long furnished to philosophers a subject of much speculation because, accepting the erroneous principle that cause and effect must be similar, they could not conceive the possibility of any direct mutual interaction of substances so dissimilar as mind and body. And more than one system has been devised for the explanation of the problem. According to the occasionalists, the action of the mind is not, and cannot be, the cause of the corresponding action of the body. But they hold that whenever any action of the mind takes place, God directly produces, in connection with it and by reason of it, a corresponding action of the body, and conversely. This simply pushed the difficulty a step further back. If mind cannot act upon matter. then God, conceived as mind, cannot act upon matter; but, conceived as other than mind, cannot act upon mind. See Geulincx, the leading occasionalist; Preëstablished Harmony.

OCCLEVE, ŏk′klêv, Thomas. An early English poet and man of law. See Hoccleve, Thomas.

OCCLUSION (from Lat. *occludere*, to shut up, from *ob*, before, toward + *claudere*, to shut; probably connected with OHG. *sliozan*, Ger. *schliessen*, to close, provincial Eng. *clot*, bolt, and with Gk. *κλαίειν*, *klaiein*, to close). A special case of absorption (q.v.). The word is used to express the fact that gases are absorbed by solids. Sometimes it is a true solution, as in the case of hydrogen and palladium, carbon dioxide, cast iron, etc.; other times it is a condensation on the surface or within the pores, as in the case of charcoal and ammonia or oxygen.

OCCOM, ŏk′*o*m, or **OCCUM**, Sam(p)son (c.1723-92). An American Indian preacher and missionary. He was born at Mohegan, Conn., and was converted during the religious revivals of 1739-40. He acquired some ability to read. and, desiring to serve as missionary to his tribe, at the age of nineteen entered an Indian school kept by Rev. Eleazar Wheelock of Lebanon. After four years' study he opened a school at New London, but later went to Montauk, L. I., and taught among the Indians for ten years. He became a member of the Suffolk Presbytery in 1759. In 1765-66 he went to England with the Rev. Nathaniel Whitaker to raise funds for Moor's Indian charity school, and while there preached in many parts of England, and secured nearly £10,000. The school thus reënforced was subsequently transferred to New Hampshire and became the nucleus of Dartmouth College. The latter part of his life was occupied mainly with missionary work among the Indians of central New York. He died at New Stockbridge, N. Y. For his account of the Montauk Indians, consult the *Massachusetts Historical Society's Collections*, first series, vol. x. He published a hymnbook (1774). The hymn "Awaked by Sinai's awful sound" is attributed to him.

OCCULTATION (Lat. *occultatio*, concealment, from *occultare*, to conceal, from *occulere*, to cover, from *ob*, before, toward + *calere*, connected with *celare*, to hide). A term used in astronomy. When the moon, in the course of her orbital motion around the earth, passes between us and a star or planet, the latter is said to be *occulted*. The phenomenon is thus quite analogous to eclipses. Observations of the exact instant when occultations occur were formerly used to determine the longitudes of places on the earth. But this is now done more accurately by telegraphing time signals, and the principal use of modern occultation observations is to determine the angular diameter of the moon. This is done by observing the exact times when certain stars disappear behind the moon, and also the exact moments when the same stars reappear again. From these observed data, we can determine the moon's angular diameter by a process of calculation. See Eclipse.

OCCULTISM (from *occult*, from Lat. *occultus*, hidden, p.p. of *occulere*, to conceal). An 'occult' property of matter is, in mediæval phraseology, a property that requires to be made manifest by experimentation; and occult science is simply experimental science. The term has undergone a curious transformation of meaning. As such science was the occupation of the few, and was not seldom suspect to the reigning theology, the word 'occult' gradually assumed the significance that it now possesses, of something magical or uncanny or supernormal. See Magic; Spiritualism; Theosophy.

OCCUPANCY (from Lat. *occupare*, to occupy, from *ob*, before, toward + *capere*, to take). A mode of acquiring title to property by taking possession of an unappropriated corporeal thing with the intention of becoming its owner. This mode of acquiring property came into the common law from the Roman civil law, which considered occupancy a mode of acquiring property belonging to no one, but subject to appropriation by the first comer. The finder of unclaimed lost goods has a title to them by occupancy. So has the captor of beasts of a wild nature so long as he keeps possession of them, but there can be no complete property in them till they are domesticated; and if they make their escape. with no intention of coming back, the ownership of the original owner ceases, and their next captor acquires a title in them by occupancy. But if they be once domesticated the title by occupation becomes indefeasible. The owner of property by accession acquires his title by occupancy, and so does the owner of goods obtained by confusion; it being held that where a person with fraudulent intent mixes his property indistinguishably with that of another, the latter is not compelled to distinguish his property from that of the former, but is entitled to the ownership of the whole. (See Accession; Confusion.) Blackstone refers the title to literary property to the head of occupancy, and here also belongs the title to trade-marks, which is acquired by a person using such marks to indicate his ownership of certain articles, or of certain business.

The acquisition of title to land by occupancy is also recognized by the law. Land left bare by the gradual action of the sea, or deposited by a river, is acquired by occupancy. While this country was a colony of Great Britain, the ownership of land was held to be vested in the Crown, and individual titles to land were derived from the Crown. Since the separation of the colonies from Great Britain, titles are derived from the grant of the United States or the individual States. The right of the discoverer of uninhabited lands to assume jurisdiction over them is to be referred to the same general principle of title by occupancy. See REAL PROPERTY; TITLE; and consult the authorities there given.

OCCUPATION NEUROSIS. A nervous condition characterized by a partial paralysis due to excessive fatigue of a set of muscles which have been constantly used by a neurasthenic; muscletire. Among occupation neuroses are chorea scriptorum, or writer's cramp, telegrapher's cramp, etc. For discussion of these diseases, see NEUROSIS.

OCEAN (OF. *ocean*, Fr. *océan*, from Lat. *oceanus*, from Gk. *ὠκεανός*, *ōkeanos*, ocean; connected with Skt. *āśayana*, ocean, from *ā*, toward + *śi*, to lie). The great expanse of salt water occupying the larger depressions of the earth's surface. With the rivers and lakes it constitutes the water envelope or hydrosphere between the gaseous atmosphere and the solid lithosphere. Continental lands lie mostly in one hemisphere and may be regarded as large islands and peninsulas, while the ocean is a continuous water body communicating throughout its entire area. The relative proportion between the land and water surfaces has not been accurately determined, as there are still large unexplored areas in the Arctic and Antarctic regions; but, using the proportion for the known parts of the earth, it is estimated that the ocean covers 72 per cent. of the entire surface, or approximately 142,000,000 square miles. With an estimated average depth of two miles the ocean's volume is 284,000,000 cubic miles, or $\frac{1}{913}$ of the earth's volume.

DIVISIONS OF THE OCEAN. The continents which are massed as great triangles within the hemisphere having Southern England for its pole separate the included portion of the hydrosphere into three broad arms—the Atlantic Ocean, between America and Europe-Africa; the Pacific Ocean, between America and Asia-Australia; and the Indian Ocean, between Asia-Australia and Africa. Of these the Atlantic and Pacific communicate at their northern extremities through the Arctic Sea, which may be regarded as an extension of the Atlantic basin. The three oceans are further divided into northern and southern parts by the equator, but this division is conventional and not based upon physical grounds. Southward, beyond the limits of the continents, they open out into a vast expanse of shoreless water to which the name Southern Ocean may be conveniently given, the Antarctic Ocean being restricted to the area within the Antarctic Circle.

The borders of the ocean are often partially shut in by chains of islands, or they form deep reëntrants into the continental lands, and such portions may have distinctive physical features. The mediterraneans, illustrated by the classic Mediterranean and the Gulf of Mexico, are inclosed seas, communicating with the ocean only by narrow passages; their depths range from 1000 to 2000 fathoms and over limited areas even exceed the latter figure. Marginal or fringing seas, partially inclosed by island groups, include waters of great depth like the Yellow Sea and the Japan Sea, and shallower bodies like the North Sea. Deep reëntrants on continental borders with broad openings toward the main ocean are illustrated by the Bay of Biscay and the Gulf of Guinea.

THE OCEAN FLOOR. The ocean basins are vast depressions, whose surface rises and falls in gentle undulations. Throughout most of its extent the bottom lies at depths exceeding 2000 fathoms, and there are many depressions or 'deeps' lying below 3000 fathoms. The greatest depth yet reported is 5269 fathoms, or 31,614 feet, in the Pacific near the island of Guam. Soundings of 5155 fathoms and 5147 fathoms have been obtained in the same ocean, while the greatest known depth of the Atlantic is 4561 fathoms off the coast of Porto Rico. In the deeper or pelagic regions the floor consists of soft oozes, formed from the calcareous shells of minute animals living near the ocean surface, and from volcanic dust. The most widespread deposit is globigerina ooze, an accumulation of fossil casts of foraminifera. When the depths exceed 2500 fathoms, however, the calcareous shells are dissolved by the water and there remain only the siliceous remnants and volcanic materials which accumulate very slowly over the floor as red clay. On the borders of the continents, the ocean sometimes overlaps the land in a broad belt of shallow water whose floor is commonly called the continental shelf; here the depths do not often exceed 100 fathoms for considerable distances off shore, and the bottom consists of sand and clays that have been derived from the adjacent land surface by the erosive and transporting action of rivers. The littoral islands are mostly located on such platforms, which are prominent on the eastern coast of America, the western coast of Europe, and the southwestern coast of Asia. The deeper ocean is almost free from large islands, although by volcanic activity many small islands have been built up from great depths, as in the South Pacific. See DEEP-SEA EXPLORATION.

OCEAN WATER. By the continuous process of interchange between the surface waters of the land and the ocean, the latter has become a depository of vast quantities of mineral matter that have been dissolved out of rocks through the agency of springs and streams. The principal constituents of sea-water are the more soluble salts—the chlorides and sulphates of the alkalies and alkaline earths. The less easily soluble compounds, although playing a much more important rôle in the formation of rocks, are present in sea-water in only minute quantities. On the average 100 parts of water contain 3.5 parts of solid materials whose composition is about as follows: Sodium chloride, 77.76 per cent.; magnesium chloride, 10.88 per cent.; magnesium sulphate, 4.74 per cent.; calcium sulphate, 3.60 per cent.; potassium sulphate, 2.46 per cent; magnesium bromide, 0.22 per cent.; and calcium carbonate, 0.34 per cent. Small amounts of various other substances, including silicon, phosphorus, fluorine, iodine, boron, aluminum, barium, strontium, manganese, iron, copper, nickel, lead, and even of the much rarer metals, gold and silver, are also known to be present. The slight portion of dissolved calcium carbonate is of great importance to marine life, being the source from which the corals and shell-building organisms derive their supplies of lime. The amount of salts dissolved in the water varies in different localities, though the range of such variation is small. In regions of heavy rainfall, such as the equatorial calms and off the mouths of large rivers, the salinity is lowered, as it is also in high latitudes, where evaporation takes place slowly. On the other hand, the waters of inclosed seas, like the Red Sea and the Mediterranean, and of trade-wind belts which receive little precipitation and are subject to rapid evaporation, are slightly above the average in salinity.

The freezing point for sea-water of average salinity is 28° F., which is also the point of maximum density, while fresh water attains its greatest density at 39° F. As the surface of the ocean is cooled its density increases steadily, so that the upper layers by sinking distribute the low temperature throughout the mass. Owing to the ocean currents which tend to equalize the temperatures and to chemical changes which lower the freezing point, the ocean, however, never freezes solid even in the coldest regions. Its surface waters show a smaller range of temperature than does the air over it and much smaller than the land in the same latitudes. This tendency to preserve an equable temperature has great influence upon the climate, especially as it tempers the winds which blow over its surface. In the polar regions when the surface waters are freezing, the minimum temperature is somewhat less than 30°, while the waters of the Red Sea attain a maximum of more than 90°, showing an extreme range between the warmest and the coldest parts of over 60° F. The greatest annual variation in any one locality is probably off the coast of Newfoundland, a region affected at different seasons by cold currents from the north and by warm currents from the tropics. With depth there is a rapid decrease in temperature (more rapid in regions near the equator) until a depth of about 400 fathoms is reached, when there is a very gradual lowering to the bottom, where the temperature remains practically uniform at from 32° to 35° and is independent of latitude. In inclosed seas shut off from communication with the deeper parts of the ocean by shallow barriers, the temperature corresponds to that of the ocean only in the upper portions above the level of the barrier; below this depth the temperature remains constant to the bottom and is determined by the coldest surface waters in winter or by the influx of waters at the deepest inlet. Thus the Mediterranean shows a uniform temperature of 55° below 190 fathoms (the depth of the Strait of Gibraltar) to the bottom in 2400 fathoms, while the Atlantic at the latter depth has a temperature of 35°. The Gulf of Mexico and the Caribbean Sea, with inlets 700 fathoms deep, have bottom temperatures of 39°, and the Red Sea below 200 fathoms, which is the extreme depth of the Strait of Bab-el Mandeb, has a temperature of 70°. The abnormally high temperature of the Red Sea is due to the concentration of its surface waters by evaporation, causing them to sink and thus to maintain a constant vertical circulation.

The average density of sea-water is 1.026, there being a slight variation corresponding to the difference in salinity. Between the surface and great depths the density shows no material change, notwithstanding the enormous pressure exerted upon the lower layers. The color of pure ocean water, examined by transmitted white light, is pale blue, but becomes a deep blue, changing to sky-blue, when it reflects the light of the clear sky, and to gray or almost black under heavy storm clouds. Along the shore, however, it may assume a brown or yellowish color from suspended mud, while in shallow portions or near the coast it is green. Minute vegetable and animal organisms sometimes lend a whitish or reddish color to the surface.

Movements of Ocean Waters. The surface waters of the ocean are in constant motion under the influence of waves, tides, currents, and drifts. Waves are vertical oscillations caused by the winds, and have little movement of translation except in shallow water when the upper portions rush forward with great force. Great waves caused by earthquakes move across the oceans. (See Earthquake.) Tides resemble waves in their motion, but they owe their origin to the attractive force of the sun and moon. (See Tides.) The horizontal movements of the surface waters are known as drifts and currents. A drift is a general movement under the influence of the wind, but slower and more changeable in direction than a current. (See Ocean Currents.) Inclosed seas also have circulatory movements, usually arising from the fact that their waters differ in density from the ocean. Thus in the Baltic Sea the waters are so freshened by the contributions of the numerous rivers that they flow out into the North Sea as a surface current, while the heavier ocean water sets in as an undercurrent. The waters of the Red Sea and the Mediterranean, on the other hand, are salter and denser than the ocean, and as their level is lowered by evaporation a surface current flows in from the ocean, and the heavier waters move out along the bottom.

Origin of the Oceans. The study of the geological history of the oceans is largely speculative. It is apparent, however, that the form of the oceanic basins has undergone changes corresponding to the variations in the continental outlines (see Continent), and it is also probable that the submarine portion of the lithosphere is involved in similar oscillations to those affecting the areas above sea-level. According to Suess, the Atlantic Ocean has resulted from the enlargement northward and southward of the mediterranean sea which during the Cenozoic era extended from Central America to Southeastern Europe. The Pacific Ocean in recent geological times has increased its area by encroachment upon Australia; and the island chains of Polynesia, which are largely of coral formation, may also mark an area of submergence. The Indian Ocean probably occupies a depression in a former land surface (Gondwanaland) that once extended from Central Africa to India.

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don, 1873); Thomson and Murray, *Report of the Scientific Results of the Voyage of the Challenger During 1873-76* (ib., 1876-1900); Wild, *Thalassa* (ib., 1877); Sigsbee, *Deep-Sea Sounding and Dredging* (Washington, 1880); Williams, *Geography of the Oceans* (London, 1881); Michelet, *La mer* (7th ed., Paris, 1882); Attlmayr and others, *Handbuch der Ozeanographie und maritimen Meteorologie* (Vienna, 1883); Maury, *The Physical Geography of the Sea, and Its Meteorology* (19th ed., New York, 1883); Simmonds, *Commercial Products of the Sea* (London, 1883); Boguslawski and Krümmel, *Handbuch der Ozeanographie* (Stuttgart, 1884-87); Woodward, "On the Form and Position of the Sea Level," in *United States Geological Survey, Bulletin 48* (Washington, 1888); id., *Allgemeine Meereskunde* (Leipzig, 1893); Daubrée, "Deep-Sea Deposits," in *Smithsonian Institution Report for 1893* (Washington, 1894); Thoulet, *Océanographie* (2d ed., Paris, 1895); Buchan, *Report on Oceanic Circulation* (London, 1895); Wharton, "The Physical Condition of the Ocean," in *Smithsonian Institution Report for 1894* (Washington, 1896); Supan, *Physische Erdkunde* (2d ed., Leipzig, 1896); id., "Die Bodenformen des Weltmeers," in Petermann's *Mitteilungen* (Gotha, 1899); *Oceanic Depths and Serial Temperatures . . . from Indian Marine Survey and British Submarine Telegraph Companies* (London, 1899); Kirchoff, "The Sea in the Life of Nations," in *Smithsonian Institution Report for 1901* (Washington, 1902); Krümmel, *Der Ocean* (Leipzig, 1902).

OCEAN (in Law). See HIGH SEAS.

OCEAN CURRENTS. The consensus of scientific opinion at the present day is to the effect that there are two independent circulations involved in the movement of the waters of the sea, the first, the horizontal, having its source in the energy supplied by the wind; the second, the vertical, sustained by differences of temperature. The phenomena ordinarily described as ocean currents, consisting of the horizontal motion of the layer of water immediately at and near the surface, belong wholly to the former. The vertical circulation applies to the much more comprehensive creeping movement of the warm equatorial waters of the ocean toward the poles, a movement which is confined to the upper strata, and of the cold polar water toward the equator, confined to the depths of the ocean.

SURFACE CURRENTS. As our knowledge of the movement of the surface waters of the ocean has increased, it has become more and more apparent that these so-called currents are very unstable both in velocity and direction. The source—indeed, the only source—from which information concerning them is to be derived is found in the log-books of ships at sea, in which the difference between the observed and the computed position at noon of each day is entered as the current experienced by the ship during the preceding twenty-four hours. Upon assembling a number of such observations, extending over any period of time and covering a limited portion of the surface, a one-degree or five-degree square, for instance, it will be seen that these exhibit the utmost lack of agreement, the only indication of consonance being, indeed, that currents in a certain given direction appear with somewhat greater frequency than those in any other. These irregularities stand in close relation to the agency by which the currents themselves are produced, viz. the winds, the movements of the surface water being in response to the impulse communicated to it by the moving air. To explain, however, the fact so frequently noted, that the recorded set of the waters is in direct opposition to that which the prevailing wind would lead us to expect, some little consideration is necessary.

If through any cause a thin layer of liquid is set in motion in its own plane, the layer immediately below it and with which it is in contact does not remain stationary, but likewise receives an impulse. This second layer exercises a like influence over the third, the third over the fourth, and so on, the velocity ultimately attained by each successive layer being proportional to its distance from the bottom layer, which is supposed to be at rest. In the case of sea-water the rapidity with which the surface velocity is propagated downward is exceedingly slight. It has been calculated, for instance, that a period of 239 years would elapse before a layer at a depth of fifty fathoms would attain a velocity equal to half that at the surface, the current at the latter being supposed to flow steadily all the time. In a similar manner, a sub-surface current, once established, exhibits a like reluctance to modify its direction. Immediately at the surface the set of the waters will thus be in close accordance with the direction of the wind; at some little distance below the surface, however, the variations will be by no means so closely followed, owing to the sluggishness with which the impulse is communicated downward; and at a moderate depth it may be assumed that the minor fluctuations are eliminated, and that the mean direction and strength of the current become apparent, being those due to the resultant of the winds.

The system of winds covering each of the great oceans, the North Atlantic, the South Atlantic, the North Pacific, the South Pacific, and the Indian, is practically identical, consisting as it does of a general westward motion of the air on the equatorial side of the tropical belts of high pressure, and of a like easterly motion on the polar side—the former constituting the trade winds, northeast in the Northern Hemisphere, southeast in the Southern; the latter, the prevailing westerly winds of higher latitudes. In each of the oceans there is a general movement of the surface waters in response to these winds; in the tropical latitudes of either hemisphere toward the west—the north equatorial and the south equatorial drift—in extra-tropical latitudes toward the east. The north equatorial and the south equatorial drift carry the waters of the Atlantic toward the shores of America, and the waters of the Pacific toward the shores of Asia and Australia, at a rate varying from 12 to 24 miles per day. The central line of either drift is well defined; along its marginal limits, however, north and south, compensation currents manifest themselves, due to the disturbed equilibrium, which, spreading out at first in sheaf-like form, ultimately reverse their direction and flow to the eastward, those on the equatorial side of the main drifts uniting to form the eastward flowing counter-equatorial current, most apparent during July, August, and September, when it is reënforced by the southwest monsoon winds of the African and the Central American coasts; those on the polar side becoming merged in the general easterly drift of higher latitudes.

The immense mass of water carried by the equatorial drifts in the great oceans causes an accumulation upon the eastern continental shores and a consequent disturbance of equilibrium, which is in each case partially adjusted by a *stream* current, or current due to gravity alone, which in every case follows the shore line and is directed away from the equator. In the North Atlantic Ocean this current is known as the Gulf Stream; in the South Atlantic as the Brazilian Current; in the North Pacific as the Kuro Sivo; in the South Pacific as the Australian Current; in the Indian Ocean as the Mozambique Current. These are more constant in direction and force than the ordinary drift currents, but likewise are subject to stoppage or even to reversal. Upon attaining middle latitudes the combined effect of the deflective force of the earth's diurnal rotation and of the prevailing westerly winds serves to turn them off shore, and their identity is henceforth lost in the general easterly drift of the temperate zone. The easterly drift of extra-tropical latitudes exhibits none of the persistency of the westerly drift of the tropical, the currents reported being apparently quite as variable as the winds themselves.

In the case of the North Atlantic Ocean, the easterly drift divides to the northwestward of the Azores, one portion carrying to the southward along the Peninsular and African shores, and finally reuniting with the north equatorial current, the whole system forming a vast gentle eddy in close agreement with the prevailing winds; the remaining portion carries eastward and northward toward the shores of Great Britain, Scandinavia, and Iceland. Analogy would suggest a like division in the case of each of the other oceans, with the possible exception of the North Pacific. The information as to these oceans thus far accumulated is, however, not sufficient to establish the hypothesis.

Vertical Circulation. The theory of a vertical oceanic circulation rests almost entirely upon the study of the thermal conditions existing in the Atlantic. The main facts in support of the theory may be summarized as follows: (1) The bottom water of every ocean in free communication with the pole has a temperature but little different from that in polar latitudes; (2) this is true even in the equatorial regions, where the entire mass of the ocean, in case an influx of cold water did not exist, would by virtue of the insolation attain in the course of time a temperature not lower than 75° F.; (3) the bottom temperatures in the case of those oceans to which the cold polar water has free access are somewhat lower than the bottom temperatures where this communication is restricted; (4) the thickness of this bottom stratum of cold water (600 fathoms) is too great to admit of the explanation that it is the return flow of the warm water carried poleward by the drift surface currents; (5) there is a continual ascent of glacial water under the line, shown by the moderation of the surface temperatures along the equator, and also by the fact that polar temperatures are here attained at less depth than in somewhat higher latitudes; (6) on the basis of this hypothesis the presence of the cold band along the eastern coast of North America can be explained as the ascent toward the surface of the polar water, diverted from its original equatorial course by the effect of the earth's rotation, and forced up the Atlantic slope.

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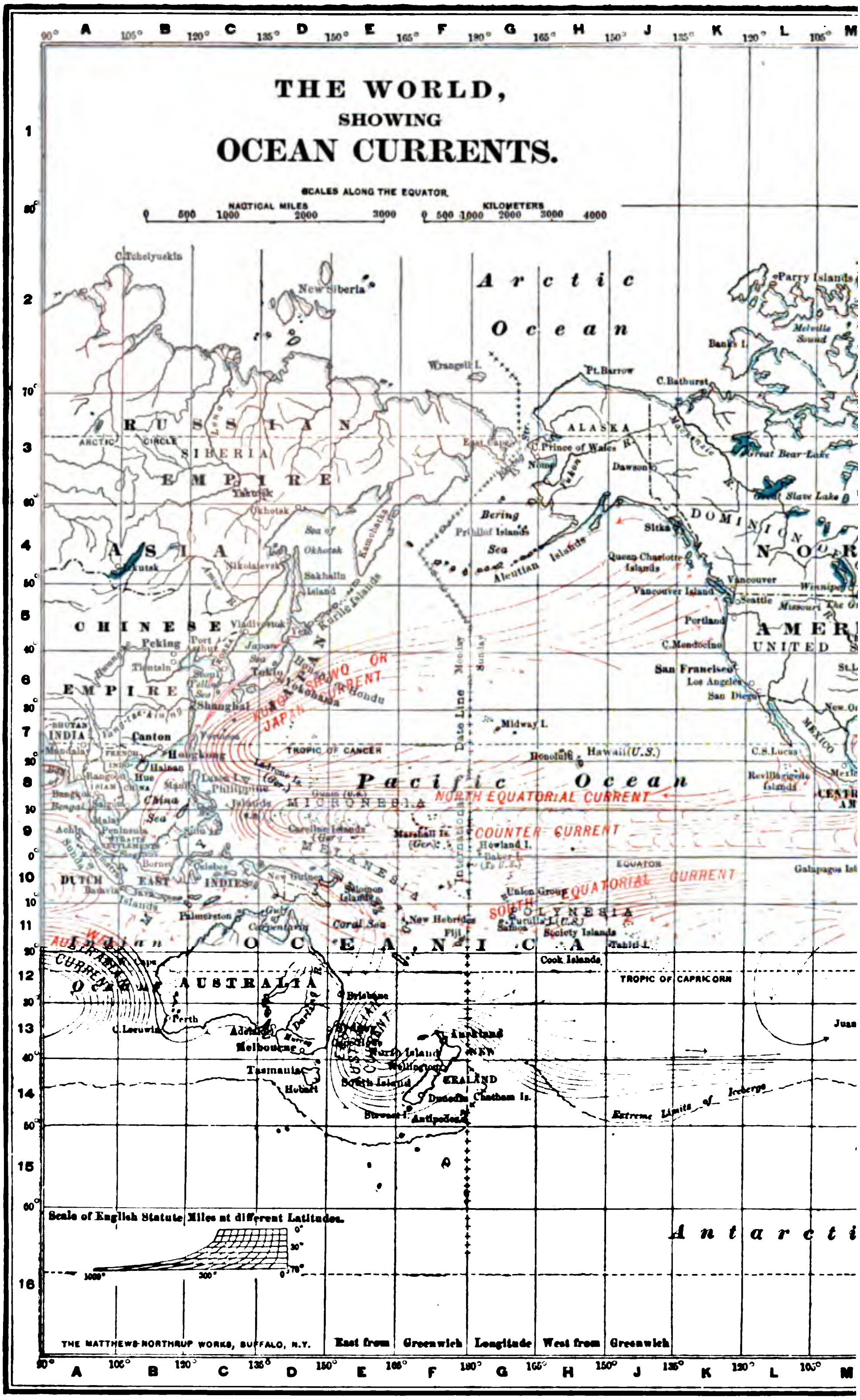
OCEAN GROVE. A summer resort in Monmouth County, N. J., 29 miles (51 by rail) south of New York City; on the Pennsylvania and the Central of New Jersey railroads (Map: New Jersey, E 3). Situated directly on the Atlantic Ocean, south of Asbury Park, from which it is separated by Wesley Lake, Ocean Grove is on the splendid beach for which watering places of the New Jersey coast are noted. It is characterized, moreover, by rigid moral and religious observances due to its management by a church organization. The town, inclosed mostly by natural boundaries, is controlled by a camp meeting association of the Methodist Episcopal Church, founded in 1869, whose regulations enforce a strict respect for the Sabbath, and prohibit theatrical performances and the sale of intoxicants and tobacco. There are three large public buildings: the Auditorium, post office, and school. In the Auditorium, which seats 10,000 persons, religious meetings are frequently held. The Neptune Township high school was erected at a cost of $72,000. The water-works and electric light plant are owned and operated by the association. The number of summer visitors is estimated at over 25,000, though the permanent population is only about 2775.

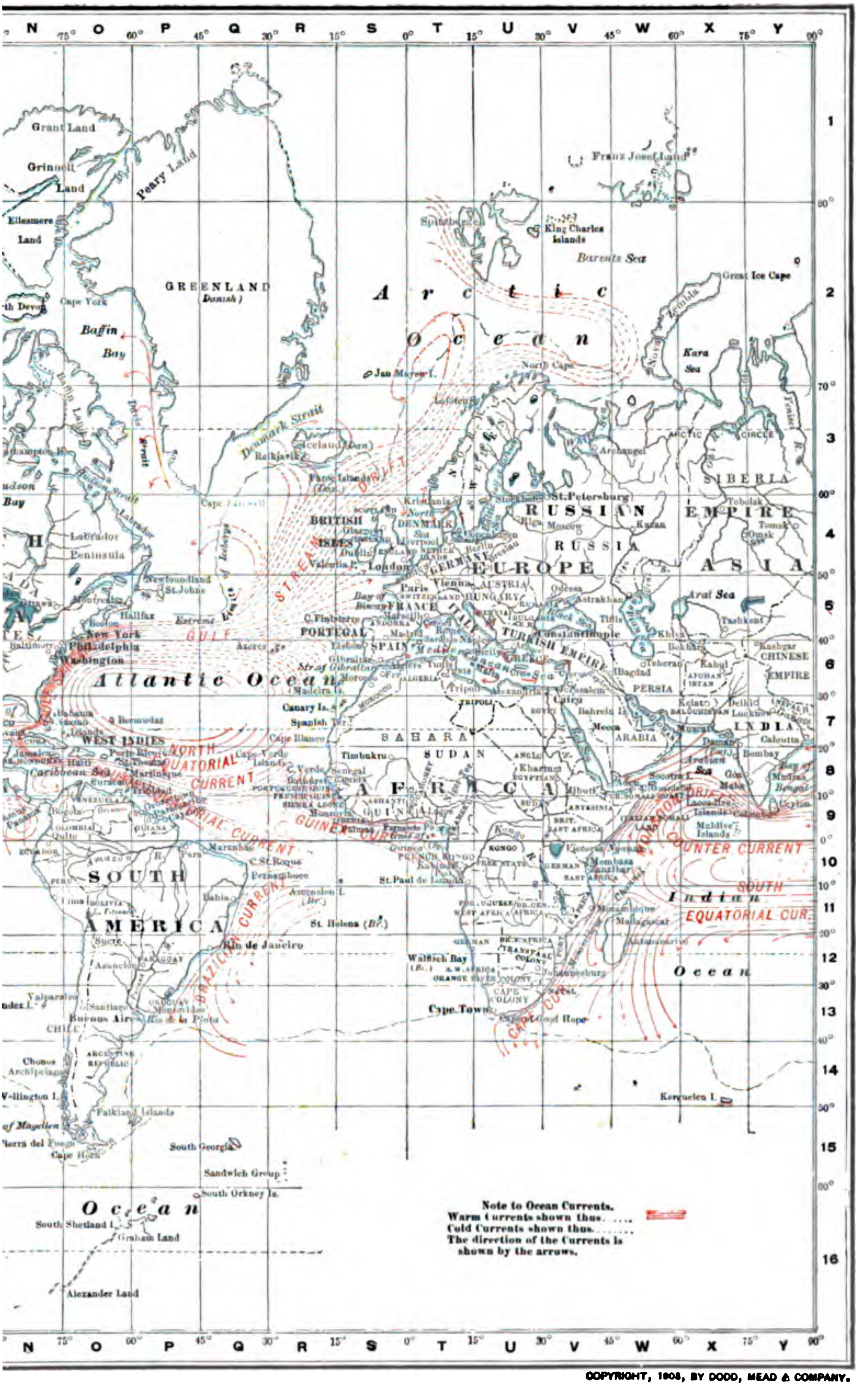
OCEANICA, ō'shē-ăn'ĭ-kȧ, or **OCEANIA.** An ill-defined term used by some geographers to designate all the islands situated in the Pacific Ocean. Others include under that name also the East Indian Archipelago. The best usage seems to confine the name to the small islands lying between Australasia on the west and the American continent on the east. These islands fall ethnologically, and to a certain extent geographically, into three main divisions: Melanesia (q.v.), in the southwest, nearest to the Australian continent; Micronesia (q.v.), in the northwest; and Polynesia (q.v.), the largest in extent, including all the islands east of the former two. Consult: Gill, *The South Pacific and New Guinea Past and Present* (Sydney, 1892); Baessler, *Neue Südsee-Bilder* (Berlin, 1900); Schanz, *Australien und die Südsee an der Jahrhundertwende. Kolonialstudien* (Berlin, 1901).

OCEANIC DEPOSITS. The materials forming the floor of the ocean may be classed as terrigenous deposits, which have been derived from the waste of the adjacent land, and as pelagic or abysmal accumulations, which are found in the open ocean beyond the influence of the land. The terrigenous deposits, comprising gravel, sand, and clay, are limited in their distribution to the continental shores, seldom occurring at a distance of more than 200 miles from the land. As



THE WORLD,
SHOWING
OCEAN CURRENTS.

THE MATTHEWS-NORTHRUP WORKS, BUFFALO, N.Y.



Note to Ocean Currents.
Warm Currents shown thus. . . . .
Cold Currents shown thus. . . . . . .
The direction of the Currents is shown by the arrows.

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a rule the coarser materials occur in the shallow marginal waters, while the fine sands and muds are found in the deeper portions, where they have been carried by the drifts and currents. In the free ocean the character of the bottom shows little variation over great areas. When the depth is comparatively slight the deposits consist of the shells of minute organisms that live at or near the surface, of volcanic dust, bones and teeth of fish, and chemical precipitates. The most widespread and characteristic material in the tropical and temperate regions is globigerina ooze, an accumulation of the fossil calcareous casts of foraminifera. In the colder waters, such as those of the South Atlantic and the Southern Ocean, the principal organisms are of siliceous character, and their remains compose the diatom ooze that is so characteristic of those regions. When the floor lies at a depth of 2500 fathoms or more, only the most refractory materials can resist the solvent action of the water, and the deposits take the form of a red or brownish clay composed of the insoluble portions of shells, mixed with meteoric and volcanic dust. These deposits cover great areas in the middle portion of the Atlantic and the northern part of the Pacific Ocean. See OCEAN; DEEP-SEA EXPLORATION; OOZE, etc.

OCEANIC FAUNA. See DEEP-SEA EXPLORATION; OOZE; PELAGIC ANIMALS.

OCEANIDS (Gk. 'Ωκεανίδες, *Ōkeanides*). The three thousand daughters of Oceanus and Tethys, nymphs of the sea.

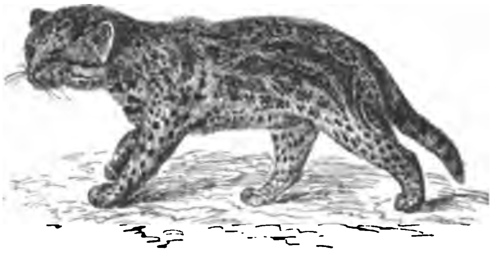
OCEAN LIFE. Ocean life embraces the great company of marine animals, which includes representatives of every phylum. It appears certain that life originated in the ocean (see PROTOZOA), and for a long period at the beginning of the living world remained there exclusively, developing a wide variety and considerable advancement in organization before living beings obtained any foothold on dry land. Great numbers of low forms remain in the oceans (see PELAGIC ANIMALS; OOZE) in substantially the primitive form and condition, owing to the comparative immutability of their environment. Some are very widely distributed, others kept within narrow bounds by inability to dwell except under accustomed conditions of temperature, pressure (according to depth), or within definite food-yielding areas. Great numbers are fixed and stationary in adult life. Hence zones and areas of distribution, both lateral and vertical, exist. (See DISTRIBUTION OF ANIMALS.) That the land was populated primarily from the sea is conceded by all naturalists; it is also true that many creatures once terrestrial have been relegated to a wholly marine existence by force of circumstances acting through long past ages, a conspicuous example of which is the group Cetacea (q.v.). See DEEP-SEA EXPLORATION.

O′CEANOG′RAPHY (from *ὠκεανός*, *ōkeanos*, ocean + *-γραφία*, *-graphia*, description, from *γράφειν*, *graphein*, to write). The name given to the branch of geography which deals with the phenomena of the collected waters of the earth—the oceans and seas. The name has only recently come into general use, as a result of the great expansion in our knowledge concerning the ocean during the last thirty years. See DEEP-SEA EXPLORATION; OCEAN; GEOGRAPHY.

OCE′ANUS (Lat., from Gk. 'Ωκεανός, *Ōkeanos*). In classical mythology, the eldest of the Titans, son of Uranus and Gæa, and father, by his sister Tethys, of the 3000 Oceanids, or ocean nymphs. In Homer Oceanus is the ever-flowing stream which surrounds the circular plain of the earth. From him come all streams and fountains, and even the sea. Hesiod first gives the accepted genealogy. He does not appear in any of the myths as a governing personality like Poseidon, but only as a spectator. In the *Prometheus Bound*, Æschylus introduces him as advising the captive to submit to Zeus. Representations in art are very rare before the Hellenistic period, when he is depicted, like the river gods, as a bearded man, often with horns, and is characterized by the steering oar, or the sea animals surrounding him.

OCEL′LUS LUCA′NUS (Lat., from Gk. Ὄκελλος, *Okellos*). A Lucanian Greek and member of the Pythagorean School; perhaps of the fifth century B.C. Stobæus, i. 13, has preserved a fragment of his work in Dorian dialect; and we hear of various philosophical writings which have now been lost. The extant work *On the Nature of the Universe* (Περὶ τῆς τοῦ Παντὸς Φύσεως) in the Ionic dialect, which bears Ocellus's name, is certainly a work of the later Peripatetic School, and cannot be earlier than the first century B.C.; it may be still later, as it shows remarkable coincidences with the similar work of Nicolaus Damascenus. In four chapters the book handles the themes of the eternity of the cosmos, the distinction between the permanent and the transitory, the divisions of the universe, the heavens, earth, and the human race, the nature of time, etc., all being based on the writings of Aristotle. The work closes with a consideration of the relation of the propagation of humankind to certain cosmic and moral questions. It is best edited in vol. i. of Mullach's *Fragmenta Philosophorum Græcorum* (Paris, 1860); English translation by Thomas Taylor (London, 1831).

OCELOT, ō′sê-lŏt (Mexican *ocelote*). A beautiful wild cat (*Felis pardalis*) of tropical America, from Louisiana to Brazil. It inhabits forests, is an agile tree-climber, and preys mainly on birds. It is from two feet six inches to three feet long, exclusive of the tail, which is from 11 to 15 inches, and nearly of uniform thickness. The ears are thin, short, and pointed. The muzzle is rather elongated. The colors vary considerably, but the ground tint is rich reddish gray or tawny, blending finely with the dark brown on the margins of the elongated spots, of which there are chains on the sides; the head, neck, and legs being also variously spotted or



THE OCELOT.

barred with dark brown or black. The ocelot is easily tamed, and is very playful, but excessively mischievous and bloodthirsty. This animal is often called a 'panther-cat.'

ÖCHELHÄUSER, ĕk'el-hoi'zẽr, WILHELM VON (1820-1902). A German economist and Shakespearean scholar. He was born at Siegen; was educated for a commercial career, and held several posts in the Imperial Ministry of Commerce. Oechelhäuser was appointed to the colonial council in 1893, and in the same year received an honorary doctor's degree from Erlangen. In the field of economics he wrote: *Die Tarifreform von 1879* (1880); *Die Arbeiterfrage* (1886); and *Soziale Tagesfragen* (1889). He did much to further the study of Shakespeare in Germany as founder and president of the *Shakespearegesellschaft*, as editor of a stage edition of Shakespeare (1878; 14th ed. 1894), and as author of *Einführungen in Shakespeares Bühnendramen* (3d ed. 1895) and *Shakespeareana* (1894).

OCHER. See OCHRE.

OCHINO, ō-kē'nō, BERNARDINO (1487-1566). An Italian preacher and theologian, born at Siena. He entered the Franciscan Order, and then the still more ascetic Order of the Capuchins, of which he was made general in 1538 and reëlected in 1541. Remarked for his preaching by Charles V., he rose to be confessor to Pope Paul III. The Reformation had begun to make converts in Italy, and Ochino's friends, among whom were Juan de Valdés and Vittoria Colonna, were suspected of leanings toward heresy. His sermons delivered at Venice (1539) showed the influence of the Reformation, but no active step was taken until 1542, when he was commanded to appear before the Inquisition in Rome and answer certain charges. Fearing the consequences, Ochino made his way to Geneva. Here he published some more sermons of a Calvinistic nature, under the title *Prediche* (1542-44), translated into German (1545), French (1546 and 1561), and English (1548). But with Calvin himself he could not agree. He left Geneva and wandered into Germany, spending some time at Augsburg (1545-47) as pastor of the Italian Protestant church there. He then went to London (1547-53), where he became a prebendary of Canterbury, and was pensioned by Edward VI. His *Tragedy*, written in London, is supposed to have influenced Milton's *Paradise Lost*. In 1555 he went to Zurich, but his congregation was scandalized by his doctrines concerning polygamy and the Trinity, and he moved on to Cracow. Here, again, his sermons were criticised, and he died not long afterwards at Schlackau in Moravia. Consult Benrath, *B. Ochino von Siena* (Leipzig, 1875, and Brunswick, 1892; English translation, New York, 1877).

OCHOA, ō-chō'ȧ, EUGENIO DE (1815-72). A Spanish poet, critic, and scholar, born at Lezo, in the Province of Guipúzcoa. He studied in Madrid and then went to Paris (1829), where he worked at the Ecole des Arts et Métiers. On his return to Madrid he contributed to the *Gaceta de Madrid*, directed by Alberto Lista. After the defeat of his political friends, he went back to Paris, and, with Baudry, edited the *Colección de los mejores autores españoles*, and prepared some new editions of Spanish classics. His volume of poems, *Ecos del alma*, appeared in 1841, and in 1844 he made a *Catálogo razonado* of all Spanish manuscripts in the Paris libraries. In the same year he returned to Madrid, and was appointed under-librarian of the National Library, and a member of the Spanish Academy and of the Academy of History. His works include: *Incertidumbre y amor* (1836); *Paris, Londres y Madrid* (1861); and *Miscelánea de literatura, viajes y novelas* (1867).

OCHRE, ō'kẽr (Fr. *ocre*, from Lat. *ocra*, from Gk. *ὤχρα*, yellow ochre, from *ὠχρός*, *ōchros*, pale). A mineral paint consisting of clay colored with some oxide of iron, rarely of manganese, in various proportions, giving to the clay a lighter or deeper color. Ochres are common in many geological formations, more especially the younger ones, in which the materials are consolidated. For use the material is dried, ground, and mixed with oil. The commercial value of the material depends on its shade of color, the regularity of distribution of the iron coloration, and the quantity of oil which is required to mix it up. Calcination is sometimes resorted to in order to produce the desired tint; the operation adds much to the depth of color, by increasing the degree of oxidation of the contained iron. The common color of ochre is yellow. Umber and sienna differ from ochre in containing manganese in addition to the iron. Raw umber has a brown color, while burnt umber is of a red tinge. Raw sienna is brownish yellow, but when burned it yields a rich russet brown pigment. The finer grades of ochres are used by painters, the coarser by carpenters for marking out their work, etc. Common ochre is found in many parts of the United States. The most important States producing it are Alabama, Arkansas, California, Georgia, Iowa, Maryland, Massachusetts, Missouri, New York, Pennsylvania, Texas, Vermont, and Virginia. Umber and sienna are produced by New York, Pennsylvania, and Missouri, but much is also imported. France leads the world in the production of ochre, with Germany second, and the United States third. Consult: Volumes of *Mineral Resources*, issued by United States Geological Survey (Washington, annually); Hill, "Report on Metallic Paint Ores Along the Lehigh River," *Annual Report of the Pennsylvania Geological Survey* (Harrisburg, 1886).

OCHRO. A vegetable. See HIBISCUS.

OCHTERLONY, ŏk-tẽr-lŏ'nĭ, Sir DAVID (1758-1825). A British general in India. He was born in Boston, Mass., of Scotch ancestry, and in 1777 went to India as cadet. In 1814, after the rising of the Nepalese, Ochterlony was put in command of the forces west of the Gurkha frontier, and was successful in storming the forts in the hills, when the three other divisions were defeated or inactive. He closed the campaign at Malaun, where he received the surrender of Amar Singh. Again, in the following year, when the Gurkha Government failed to ratify the peace, Ochterlony with great energy and brilliancy reduced all opposition.

OCHTMAN, ŏk'man, LEONARD (1854—). An American landscape painter, born at Zonnemaire, Zeeland, Holland. His family removed to America in 1866 and settled at Albany, N. Y. For a time he worked at engraving, but afterwards studied painting at the Art Students' League in New York City. His subjects are usually country scenes on or about the Mianus

River. He chose tranquil, quiet stretches of water, shaded by trees, and bathed in moonlight, as in his "Night on the Mianus River," which won a medal at the World's Fair in 1893; "Autumn Moonlight;" "Moonlight Night in Spring." His "Winter Morning," "The Enchanted Vale," "Among the Hills," "View from the Great Hill," "Early Morning," and "A Morning Symphony" are day scenes of equal charm and truth. His work is all distinguished by broad painting, simplicity of expression, serenity of effect, and a certain largeness of treatment that is very characteristic.

OCK'EL, Eduard (1834—). A German landscape and animal painter, born at Schwante, Brandenburg. As a pupil of Steffeck in Berlin, he painted portraits and animals, then studied under Couture in Paris (1858), and from nature in Normandy and in the forest of Fontainebleau, adopting the realistic conception and poetic color treatment of the school of Barbizon, where he lived for several years. The National Gallery in Berlin contains "Cows at the Fairy Pond, Fontainebleau," "Autumn Evening in the Mark," and two others. His other principal works include: "Ploughing Oxen" (1866); "Stags Before the Fight" (1876); "Steinitz Lake in Autumn" (1884); and "The Four Seasons" (1892).

OCKLEY, ŏk'lĭ, Simon (1678-1720). An English Orientalist. He was born at Exeter, entered Queen's College, Cambridge, in 1693, and in 1705 became vicar of Swavesey. He devoted himself with great assiduity to the study of the Oriental languages. From Arabic manuscripts in the Bodleian Library, Oxford, he prepared *The History of the Saracens* (1708-18), a work containing much serviceable information. In 1711 he was made professor of Arabic in the University of Cambridge. His further works, all noted for their accuracy and erudition, include: *Introductio ad Linguas Orientales* (1706); a translation of Leon Modena's Italian *History of the Present Jews Throughout the World* (1707); and *The Improvement of Human Reason, Exhibited in the Life of Hai ebn Yokdhan* (1708).

OCMUL'GEE. A river of Georgia, formed by several headstreams, near Atlanta, in the northern part of the State (Map: Georgia, D 4). It flows south-southwest, finally turning eastward, and joins the Oconee in Montgomery County to form the Altamaha. It is about 275 miles long, and navigable for small steamers to Macon about half way to its source. Its upper course is broken by many rapids, and furnishes water power, while its lower course is through pine barrens.

O'CON'NELL, Daniel (1775-1847). An Irish politician. He was the eldest son of an ancient but unimportant family of County Kerry, Ireland, and was born on August 6, 1775. O'Connell received his first education from a hedge schoolmaster, but afterwards, under the patronage of his uncle, Maurice O'Connell, attended Father Herrington's school at Cove, and the Catholic colleges of Saint-Omer and Douai, France. His scholarship had just begun to win for him promises of a brilliant future when he was driven home prematurely by the outbreak of the French Revolution, and in 1794 he entered as a law-student at Lincoln's Inn. In 1798 he was called to the Irish bar. By degrees, the Roman Catholic party having begun to rally from the prostration into which it had been thrown by the rebellion of 1798, O'Connell was drawn into public life, and his unquestioned ability soon made him a leader. He was an active member of all the successive associations which, under the various names of 'Catholic Board,' 'Catholic Committee,' 'Catholic Association,' etc., were organized for the purpose of procuring the repeal of the civil disabilities of the Catholic body. Of the Catholic Association he was himself the originator; and by means of this association he created so formidable an agitation throughout Ireland that it gradually became apparent that the desired measures of relief could no longer be safely withheld. The crisis was precipitated by the bold expedient adopted by O'Connell, of causing himself to be elected member of Parliament for Clare in 1828, notwithstanding his incapacity to serve in Parliament, in consequence of his being obliged to refuse the prescribed oaths of abjuration and supremacy, which then formed the ground of the exclusion of Roman Catholics from the Legislature. This step, although it failed to procure for O'Connell admission to Parliament at the time, led to discussions within the House, and to agitations outside so formidable that in the beginning of the year 1829 the Duke of Wellington and Sir Robert Peel found it expedient to give way; and deserting their party in the face of strenuous Tory and Royal resistance, they introduced and carried through, in the spring of that year, the well-known measure of Catholic emancipation. O'Connell was at once reëlected and took his seat for Clare, and from that date until his death continued to sit in Parliament. During all these years he received, by means of an organized annual subsidy, a large yearly income from the voluntary contributions of the people, by whom he was idolized as their 'liberator,' and who joined with him in all the successive agitations against the Act of Union, against the Protestant Church establishment, and in favor of reform, in which he engaged. In the progress of more than one of these political agitations his associations were opposed by the Government. The agitation for the repeal of the Union, begun in 1841, was carried on by 'monster meetings' throughout Ireland, at which O'Connell himself was the chief speaker. This agitation assumed proportions so formidable that O'Connell, in common with several others, was indicted for a seditious conspiracy in 1843, and was convicted and sentenced to a year's imprisonment, with a fine of £2000. This judgment was reversed by the House of Lords; and O'Connell, on his discharge, resumed his career. But his health had suffered from confinement, and still more from dissensions and opposition in the councils of his party; and since, on the return of the Whigs to power in 1846, he consented to support their Government, the malcontents of the repeal association openly separated from him, and a bitter feud between 'young' and 'old' Ireland ensued. In this quarrel O'Connell steadfastly maintained his favorite precept of 'moral force,' and was supported by the great body of the Catholic bishops and clergy; but his health gave way in the struggle. He was ordered to try a milder climate, and on his journey to Rome in the spring of 1847 he was suddenly seized with paralysis, and died at Genoa on May 15th of that year. As a public speaker, and especially as a master of popular eloquence, he was almost unsurpassed in his day. His ability as a lawyer was of a high order. He published a single volume, *A Memoir of Ireland, Native and Saxon*, and a few pamphlets, the most important of which, as illustrating his personal history and character, is *A Letter to the Earl of Shrewsbury*. Consult: O'Connell (son), *Life and Times of Daniel O'Connell* (Dublin, 1846); id., *Recollections and Experiences During a Parliamentary Career from 1833 to 1848* (London, 1849); Fitzpatrick, *Correspondence of Daniel O'Connell* (ib. 1888): Daunt, *Recollections of Daniel O'Connell* (ib. 1848); Fagan, *Life of Daniel O'Connell* (Cork, 1847).

O'CON'NOR, ARTHUR (1763-1852). An Irish revolutionist, born at Mitchelstown, County Cork. He graduated at Trinity College, Dublin, in 1782, and in 1788 was called to the bar. In 1796 he joined the 'United Irishmen,' and was arrested and imprisoned for six months. On regaining his liberty he became editor of the *Press*, the organ of his society. During a visit to England he was arrested and tried for high treason, and though acquitted was kept in prison on other charges until June, 1803. He then went to France, where he entered the military service under Napoleon. He published *A Speech on the Catholic Question* (1795); *State of Ireland* (1798); *Actual State of Great Britain* (1804); and *Monopoly, the Cause of All Evil* (1848).

O'CONNOR, FEARGUS EDWARD (1794-1855). An Irish politician and Chartist leader, born in County Meath. In 1832 he sat in Parliament for Cork, and when reëlected in 1835 was unseated through the lack of property qualifications. He thereupon engaged in the Radical agitation in England, spoke frequently, and founded at Leeds a weekly organ, the *Northern Star*. In 1838 he was foremost in the consolidation of the Chartists, and to that party his somewhat incoherent eloquence lent valuable support. In 1846 he organized the National Land Company, for the purpose of buying up agricultural estates and dividing them into small holdings. Several estates were bought, but the scheme came to nothing. The next year he reëntered Parliament for Nottingham, and in 1848 presented to the Lower House his monster petition containing nearly two million names. The movement disappeared soon afterwards and O'Connor became insane in 1852.

O'CONNOR, RODERIC (1116-98). King of Ireland. He was the son of Turlough O'Connor, King of Connaught, whom he succeeded in 1156. After a protracted contest with the O'Briens and others, he took the title of King of Ireland in 1166, though he had no hereditary claim. He drove Dermot, King of Leinster, out of his kingdom, but afterwards reseated him on the throne. He worsted Strongbow and the English in a number of battles, but in 1175 entered into a convention with them, by which Henry II. was recognized as overlord, while O'Connor was to retain the crown of Connaught, and continue to be the head of the Irish chiefs. Roderic kept the crown till 1186, when he was deposed by a revolt of one of his sons. In 1189 he was again King for a short time, after which he entered a monastery, where he passed the rest of his life.

O'CONNOR, THOMAS POWER (1848—). An Irish journalist and politician. He was born at Athlone, in the County of Roscommon, Ireland, and was educated at the College of the Immaculate Conception, Athlone, and at Queen's College, Galway. He commenced life as a journalist, and after being connected for three years with the Dublin press, was employed on several London journals. In 1880 he was elected member of Parliament for Galway, and soon became one of the most active and prominent members of the party led by Parnell. In 1881 he made a tour through the United States, attended the Irish-American convention and lectured on the Irish cause to large gatherings in nearly all the important cities, raising large sums of money. In 1883 he was elected president of the Irish National League of Great Britain. Since 1885 he has been four times elected member of Parliament for a division of Liverpool. From 1888 to 1890 he edited the *Star*, of which he was the founder. He also founded and edited the *Sunday Sun*, the *Sun*, and *M. A. P.*, a society journal. Besides numerous tales, essays, and magazine articles his published works include: *Lord Beaconsfield: A Biography* (6th ed. 1887); *The Parnell Movement* (1887); *Gladstone's House of Commons* (1885); and *Napoleon* (1896).

OCON'OMOWOC. A city in Waukesha County, Wis., 31 miles west by north of Milwaukee; on the Chicago, Milwaukee and Saint Paul Railroad (Map: Wisconsin, E 5). It is a noted summer resort, picturesquely situated on lakes La Belle and Fowler, and in the heart of a beautiful lake region, popular for its fishing. It has a sanatorium and a public library. Farming, dairying, and stock-raising are the leading industries of the vicinity. The water-works and electric light plant are owned and operated by the municipality. Population, in 1890, 2729; in 1900, 2880.

O'CON'OR, CHARLES (1804-84). An eminent American lawyer. He was born in New York City, and was admitted to the bar in 1824. He devoted himself with great energy and enthusiasm to his profession, and in a very few years was recognized as one of the ablest and most brilliant members of the New York bar. He was an active supporter of the Irish nationalist movement, and for many years after 1848 was a member of the directory of the Friends of Ireland. He was a strong believer in the doctrine of States' rights, and throughout the Civil War was warmly in sympathy with the South. After the close of the war he voluntarily offered his services as counsel for Jefferson Davis when indicted for treason, and afterwards with Horace Greeley went on his bail bond. He was associated with William M. Evarts and Wheeler H. Peckham in the prosecution of the 'Tweed Ring' conspirators, and the organization of the suits against them was largely his work. In 1872 he was nominated, in the face of his absolute refusal, for President of the United States, by a convention held at Louisville, Ky., composed of that portion of the Democratic Party which declined to indorse the Liberal Republican nomination of Horace Greeley. John Quincy Adams, the nominee for Vice-President, also declined, but the ticket remained in the field and 29,489 votes were cast for it.

OCON'OSTO'TA (properly, *Agana-stata*, Ground-hog sausage). A Cherokee chief and leader of his tribe in their war with the English (1759-61). Before the actual outbreak of hostilities a delegation of 32 chiefs, headed by Oconostota, had come down from the mountains to arrange a peaceable settlement of the questions at issue, but by order of Governor Lyttleton of South Carolina the whole party was seized and thrown into prison at Fort Prince George, where they were kept under close confinement until it was thought that the Indians had been terrorized into submission, when Oconostota and two others were set at liberty, the rest being still held as hostages. Oconostota collected his warriors and besieged the post, completely cutting off communication for about two months. In February, 1760, on pretense of a desire for a conference, he decoyed the commander outside the stockade, where, upon a concerted signal, the officer was shot down from ambush. All the hostages in the fort were immediately massacred by the garrison in retaliation. War now broke out along the whole Carolina border, Oconostota being the leading spirit among the Cherokee. In June, 1760, a force of over 1600 troops under Colonel Montgomery invaded the Cherokee country and destroyed one town after another almost without resistance until Nikwasi was reached, near the present Franklin, N. C., where Montgomery was defeated and forced to retire upon Fort Prince George with heavy loss. Six weeks later the garrison of Fort Loudon, near the present Loudon, Tenn., was compelled to surrender to Oconostota in person, on promise of permission to withdraw in safety on surrender of their war stores. Finding, however, that the compact had been broken by the concealment of a large quantity of arms and ammunition, the Indians attacked the departing troops and killed 30, including the officer in charge, holding the rest as prisoners until ransomed later. In June, 1761, Colonel Grant with 2600 men again invaded the Cherokee country, and by the destruction of their fields and settlements so nearly reduced the Indians to starvation that they were finally compelled to sue for peace. Oconostota retained his authority in his nation and in 1768 headed a delegation which, at Johnson Hall in New York, concluded a lasting peace with their old-time enemies, the Iroquois. He took no active part in the Revolutionary struggle, being already worn out by infirmities, and in 1782 formally resigned his chiefship in favor of his son. He was still living in 1809.

OCON'TO. A city and the county-seat of Oconto County, Wis., 157 miles north of Milwaukee; at the mouth of the Oconto River on Green Bay, and on the Chicago and Northwestern and the Chicago, Milwaukee and Saint Paul railroads (Map: Wisconsin, F 4). It has large lumber interests and an extensive trade in fish; the industrial establishments, besides the lumber manufactories, include flouring mills, a brewery, canning factories, etc. A productive farming, stock-raising, and dairying region is adjacent to the city. There are fine court-house and high-school buildings and a public library ($15,000). Settled in 1850, Oconto was first incorporated in 1882. It is governed, under a revised charter of 1891, by a mayor, elected every two years, and a council. Population, in 1890, 5219; in 1900, 5646.

OCTAGON (Gk. *ὀκτάγωνος*, *oktagōnos*, eight-cornered, from *ὀκτώ*, *oktō*, eight + *γωνία*, *gōnia*, angle). A polygon (q.v.) of eight sides. If the sides and angles are respectively equal, the figure is called a *regular* octagon. In this case each interior angle is 135° and each exterior angle is 45°. If the alternate vertices of a regular octagon be joined, a square is formed; and since the angle between a side of the octagon and a side of the square is one-fourth of a right angle, the regular octagon may easily be constructed from a square as a basis.

OCTAHEDRITE, or Anatase. A mineral composed of titanium oxide, identical in composition with rutile and brookite, but differing in crystal habit. It crystallizes in the tetragonal system, usually in pyramidal form, has a metallic adamantine lustre, brown or black color, and a hardness of 5.5 on the mineral scale. It is found at Smithfield, R. I., in Burke County, N. C., and at various localities in Europe.

OCTAHEDRON (Gk. *ὀκτάεδρον*, *oktaedron*, neu. sg. of *ὀκτάεδρος*, *oktaedros*, having eight bases, from *ὀκτώ*, *oktō*, eight + *ἕδρα*, *hedra*, base). A solid bounded by eight faces. If the faces are equilateral triangles, four meeting at each vertex, the figure is called a *regular* octahedron. (See Polyhedron.) This solid has four axes of symmetry, passing through opposite vertices, and is one of the five Platonic bodies, or regular polyhedra. The octahedron is a common form in crystallography, appearing as regular, square, and rhombic. Native sulphur is an example of the rhombic system.

OCTAVE (Fr. *octave*, from ML. *octava*, octave, from Lat. *octavus*, eighth, from *octo*, Gk. *ὀκτώ*, *oktō*, Skt. *aṣṭan*, Lith. *asztůni*, OIr. *ocht*, Goth. *ahtáu*, AS. *eachta*, OHG. *ahto*, Ger. *acht*, Eng. *eight*). The interval between any musical note and its most perfect concord, which is double its pitch, and occupies the position of the eighth note from it on the diatonic scale. The name octave is often given to the eighth note itself as well as to the interval. There is between a note and its octave a far closer relation than between any other two notes; they go together almost as one musical sound. In combination, they are hardly distinguishable from one another, and their harmonics agree invariably, a coincidence which occurs in the case of no other interval. For the purpose of absolute pitch every tone is regarded as belonging to a particular series of octaves. The octave from middle C (q.v.) to the C below is called the *small* octave, the next lower the *great* octave, because in numerical notation (q.v.) these tones are indicated respectively by the small and capital letters of the alphabet. The octave C-$_1$C is called the *contra* octave. The octave from middle C upward is the *one-lined* octave, the next the *two-lined* octave, etc.

OCTA'VIA. The sister of the Roman Emperor Augustus, and wife of Marcus Antonius. She was distinguished for her beauty, her noble disposition, and her womanly virtues. Her first husband was C. Marcellus, to whom she was married in B.C. 50. He died in B.C. 41, shortly after which she consented to marry Antonius, to make secure the reconciliation between him and her brother. The event was hailed with joy by all classes. In a few years Antonius forsook her for Cleopatra. When the Parthian War broke out, Octavia wished to accompany her husband, and actually went as far as Corcyra, whence Antonius sent her home, that she might not interrupt his guilty intercourse with the Egyptian Queen. In B.C. 35 Octavia made an effort to rescue him from a degradation that left him indifferent even to the honor of the Roman arms, and sailed from Italy with reënforcements; but a message reached her at Athens ordering her to return home. She proudly obeyed, but, with a magnanimity that reminds us of the Roman character in earlier and better days, she forwarded the supports to her husband. Her brother was indignant at the treatment she had received, and would have had her leave her husband's house, and come and live with him; but she refused. When, in B.C. 31, war, long inevitable, broke out between her brother and Antonius, the latter crowned his insults by sending Octavia a notice of divorce. After her husband's death, she brought up with maternal care not only her own children, but also those of Cleopatra. Her death took place in B.C. 11. Her son Marcellus (q.v.) was adopted by Augustus as his successor, but died in B.C. 23.

OCTAVIA (c.42-62). A Roman empress, wife of Nero. She was the daughter of Claudius and Messalina and married Nero when he was sixteen and she eleven. He deserted her for Acte, and then for Poppæa, at whose request she was divorced and sent to Campania. She was soon recalled because of the outburst of anger on the part of the Roman populace; but, through Poppæa's jealousy, a charge of adultery was brought against her and she was sent to the island of Pandataria and there killed when she was only twenty. The tragedy *Octavia*, of which she is the heroine, usually attributed to Seneca, is probably by some other author, perhaps Curiatius Maternus.

OCTAVIAN. See AUGUSTUS.

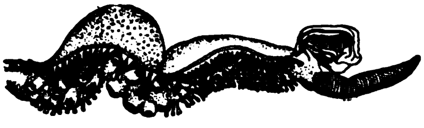
OCTO-BASS. A double bass invented by Vuillaume in 1851. It is of enormous dimensions, four meters high, and has three strings (C_1, G_1, C), which are stopped by mechanism. The tone is powerful and mellow, but, owing to its enormous size, it is not used in orchestras.

OCTOBER. See MONTH.

OC'TOCORAL'LA (Neo-Lat., from Lat. *octo*, eight + *corallum*, coral). A subclass of cœlenterates. The families Alcyonidæ, Pennatulidæ, and Gorgonidæ are represented by scattered fossil remains throughout the Mesozoic and Cenozoic formations. Another family, the Helioporidæ, appears in the Tertiary and Mesozoic, and seems to be represented in the Paleozoic by the Heliolitidæ, an important group of reef-building corals of somewhat uncertain affinity that exhibits analogies to the Favositidæ and Chætetidæ. See CORAL; and HELIOLITES.

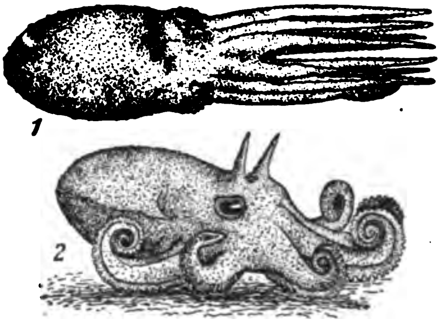
OCTOP'ODA (Neo-Lat. nom. pl., from Gk. ὀκτώπους, *oktōpous*, having eight feet, from ὀκτώ, *oktō*, eight + πούς, *pous*, foot). An order of dibranchiate cephalopods having eight arms, the suckers on which are sessile and devoid of horny rims. It includes the argonaut and the various species of Octopus (qq.v.).

OC'TOPUS (Neo-Lat., from Gk. ὀκτώπους, *oktōpous*, having eight feet). The type genus of the Octopoda (q.v.), differing from the squid and cuttlefish in having eight instead of ten arms, all of the same size, and a pear-shaped or sack-like body. The arms are connected at the base by a web. Two cartilaginous stylets imbedded in the dorsal mantle are said by Owen to represent the shell. The body of the 'poulpe,' 'devilfish,' or octopus, is baggy, short, soft, with no fins. It lives in interstices of coral reefs, among rocks, and the like. The right arm of the third pair is hectocotylized in the male, i.e. the arm is modified in various ways, but is never detached and left within the female, as in the argonauts. The best known species is *Octopus vulgaris*, of the Mediterranean and West Indies, which may reach a length of nine feet and weigh upward of 60 pounds. A tropical species (*Octopus granulatus*) is shown on the Colored Plate of OCTOPODS AND DECAPODS, under DECAPODA.



A HECTOCOTYLIZED ARM.

Octopus Bairdii inhabits the Gulf of Maine at a depth of from 50 to 100 fathoms. On the southern coast of the Eastern United States from Cape Hatteras down is an octopus whose arms expand nearly four feet. The Pacific coast species is *Octopus punctatus*, which is known to expand 14 feet from tip to tip of the outstretched arms. It lives just below low-water mark and is caught and impaled by means of a pointed stick by Chinese and Italians, who use it as an article of food. At times pearl-divers and shell-collectors on the coral reefs may be attacked and hurt by octopods, as they are armed with formidable teeth; the difficulty of tearing away their arms and the fright caused by their hideous appearance are said to have resulted in death. The ordinary food of this animal is shellfish and other invertebrates. Consult: *The Standard Natural History* (Boston, 1885); Packard, *Zoology* (New York, 1897); Cooke, *Cambridge Natural History*, vol. iii. (London, 1899).



OCTOPUS BAIRDII.

1. Attitude in swimming (toward the left). 2. Attitude when at rest.

OCTOSTYLE (Lat. *octastylus*, from Gk. ὀκτάστυλος, *oktastylos*, having eight columns, from ὀκτώ, *oktō*, eight + στῦλος, *stylos*, column). The name given in classic architecture to a temple or other building with eight columns across the front.

OCTROI, ŏk'trwä' (Fr., grant). The term applied to the toll or tax in kind levied from a very early period in France, and other countries of Europe, on articles of food which were brought past the barrier or entrance of a city or town. The octroi came eventually to be levied in money, and was abolished in France at the Revolution. In 1799, however, it was reëstablished, under the pretext that it was required for purposes of charity, and since then it has been successively changed and modified. The proceeds of the octroi duty which is at present levied at the gates of the French towns are divided so that one-tenth goes to the national treasury, and the rest to local expenses. These duties are allowed on drinks, eatables, fuel, fodder, and building materials. A new octroi must be established by statute, and every increase in the rates requires the approval of the higher authorities. The octroi duties are not popular, since they increase considerably the cost of living in towns and cities; but it would be difficult to abolish them, since the towns depend upon them very largely for revenue. Outside of France they are found also in Italy, and in a few towns of Bavaria and Austria.

O'CUR'RY, Eugene (1796-1862). One of the most distinguished of Gaelic scholars. He was born at Dunaha, County Clare, Ireland, in 1796, and worked as a boy on his father's farm. From 1834 to 1837 he was employed in the topographical and historical section of the Ordnance Survey. Then for many years he was chiefly occupied in copying important Irish manuscripts for the Royal Irish Academy, Trinity College (Dublin), the British Museum, and other institutions. In this way O'Curry acquired a knowledge of the contents of Irish manuscripts that has been seldom equaled. He published nothing, however, till he was well past middle life. In 1851 he contributed to a work by Dr. Reeves, a translation of some Irish poems in the Codex Maelbrighte. In 1853 he became a member of the council of the newly organized Celtic Society, which two years later published an edition by him of the *Battle of Magh Leana and Tochmare Momera.* In 1855-56 he gave his first course of lectures as professor of Irish history and archæology in the Catholic University at Dublin. The lectures were published in 1860 under the title, *The Manuscript Materials of Irish History.* From 1857 till 1862, the year of his death, he continued to lecture at the university, and the material of his courses was afterwards gathered together in two volumes, *On the Manners and Customs of the Ancient Irish People*, edited by W. K. Sullivan and published in 1873.

O'CYDROME. A form of rail. See Weka.

ODAL, or **UDAL** (from Icel. *oþal*, AS. *ēþel*, OHG. *uodil*, hereditary possession; connected with Icel. *aþal*, OHG. *adal*, Ger. *Adel*, race, nobility). The name of an ancient system of land tenure in northern Europe, in which the land was held absolutely, and not from a superior, as was the case where feudalism prevailed. The odal tenure prevails to this day to a large extent in the Orkney and Shetland islands, the right to land being complete, without writing, by undisturbed possession proved by witnesses before an inquest. Consult Stubbs, *Constitutional History of England*, vol. i. (6th ed., Oxford, 1897).

ODD FELLOWS, Independent Order of. A fraternal benevolent order, probably founded in England early in the eighteenth century, but in what precise year the records do not show. The ancient guilds had degenerated into social and convivial clubs, and were replaced by workingmen's beneficial societies, out of which were later evolved the Odd Fellows, or Friendly Societies. The earliest record of any of these societies available is that of Aristarchus Lodge No. 9 of the Order of Odd Fellows, which met in 1748 at the Globe Tavern, London. There were many orders of Odd Fellows in England at the beginning of the nineteenth century, of which the Imperial Odd Fellows of Nottingham; the Ancient Noble Odd Fellows, Bolton; the Grand United Odd Fellows, Sheffield; Economical Odd Fellows, Leeds; National Odd Fellows, Salford; and the London United Odd Fellows were the principal ones. Between these there were no official or friendly relations existing. The enactment of severe laws by the English Parliament against secret associations in the last years of the eighteenth century tended to retard the progress of friendly societies, and the Odd Fellows accordingly suspended public operations.

In 1803 the London Union Odd Fellows Society was organized by some of the city lodges under the title of the Grand Lodge of England, and it succeeded in establishing its authority over the greater part of the Odd Fellow societies in the United Kingdom. A member of one of the city lodges had meantime, in 1809, removed to Manchester, and, having received a dispensation to form a lodge in the latter city, the first Victory Lodge was created, and it immediately declared its independence of the Grand Lodge of England. This was the beginning of the movement for independence. In 1810 a union was effected at Salford between a social club and the Prince Regent Lodge of Odd Fellows, and out of it arose the Lord Abercrombie Lodge, based on the principles of mutual relief to the members, an improved financial system, and other new features. Several of the existing lodges, including Victory Lodge of Manchester, gave in their adherence to the new movement, and in 1811 the Lord Abercrombie Lodge assumed supremacy over the lodges working on the new system, proclaiming itself as the 'Lord Abercrombie Grand Lodge of Independent Odd Fellows,' a step which led to considerable opposition among the older lodges of the order. In 1813 a convention was called of the lodges in and around Manchester in sympathy with the new movement. An organization of the lodges was effected, and the title 'The Manchester Unity of the Independent Order of Odd Fellows' adopted. In 1814 a formal organization was effected, a grand committee or district grand lodge was provided, a form of government adopted, and a grand master and a deputy grand master appointed. The formation of provincial districts with a provincial district grand master for each was the most important act of the session of the grand convention of 1815. The adoption of a funeral fund system was part of the work of the annual session of 1816. The question of adopting degrees into the order was also discussed, the degrees of White, Royal Blue, and Scarlet being established. The Patriarchal, the Covenant, and Remembrance degrees were added later. In 1819 the question of a site for the central government of the order was settled by the establishment of a movable committee to hold annual sessions at points agreed upon at a preceding session. In 1822 the first grand movable committee convened; it was composed of past and present officers of districts and lodges, and had the power to adopt or reject laws proposed by districts. In the same year the Loyal Saint Olive's Lodge, in affiliation with the Manchester Unity, was opened in London. In Liverpool considerable discord marked the early operations of the various Odd Fellow lodges until about 1820, when they came under the authority of the Manchester Unity. The order was introduced into Wales in 1820, and into Scotland in 1838. The formation of lodges in Ireland, Germany, and Australia was effected in 1840, and the following year in the Isle of Man.

The first lodge of the Independent Order of Odd Fellows in the United States was formed in 1819. Thomas Wildey and another, both English Odd Fellows, arrived in Baltimore in 1818, and in the spring of the following year associated with three others to form Washington Lodge No. 1 in Baltimore. Wildey was elected Noble Grand. Franklin Lodge No. 2 was created in the same year, also in Baltimore. On February 1, 1820, Wildey and his companions received a charter from one of the English lodges, the Duke of Preston Lodge, constituting it the 'Washington Lodge, the Grand Lodge of Maryland and of the United States of America of the Independent Order of Odd Fellowship.' It thus bore the character of both a subordinate and a grand lodge. The dual character of this charter did not commend itself to the order, and in 1821 it was surrendered, and Washington Lodge became merely a local lodge. Steps were taken to model the government of the order in America after the political system of the United States. The management was to be vested in the representatives of each State Grand Lodge, who together with the past grand masters of the Maryland Grand Lodge were to constitute the governing body of the order. Five of these latter were authorized by charter, dated February 22, 1825, to form a grand lodge for Maryland to take the place vacated by Washington Lodge in 1821. The titles of the chief officers were changed from grand master and deputy grand master to grand sire and deputy grand sire in 1829. A German lodge, William Tell Lodge, chartered in 1827, was the first lodge formed for work in the German language, and became the mother German lodge. The order was incorporated by the Maryland Legislature in 1833. In 1843 all connections with the Manchester Unity were severed, and it was resolved "that to the Grand Lodge of the United States belonged the exclusive authority to erect lodges and encampments of Odd Fellows upon any part or section of the globe."

Meanwhile Odd Fellowship was being established in New York without any knowledge of the previous establishment of the order in America. Solomon Chambers and his two sons, members of the Loyal Westminster Independent Lodge of Odd Fellows, England, came to New York in 1806, and, meeting two other Odd Fellows, organized Shakespeare Lodge of Odd Fellows in New York. This lodge lasted only about four years, when it dissolved. Several other self-instituted lodges sprang into existence during the next ten or twelve years, when Shakespeare Lodge was revived. A lodge was established in Brooklyn—Columbia Lodge—which held a dispensation from an English lodge, the Duke of Sussex, and for some years there was a struggle for the mastery between the New York and Brooklyn lodges, which were in affiliation with the Manchester Unity. The contesting lodges were finally brought to acknowledge the authority of the Grand Lodge of the United States, from which a charter for a New York Grand Lodge was subsequently obtained. Dissension and division, however, did not cease until 1865.

There is no record of Odd Fellowship in Canada before 1815, although it is stated that what are known as 'Prehistoric' lodges were to be found at various points. In September, 1843, Prince of Wales Lodge No. 1 of British North America was instituted at Montreal under a charter issued by the Grand Lodge of the United States. The following year a Canadian Grand Lodge was created, and in September, 1846, the Canadian branch of the order was declared free and independent by the Grand Lodge of the United States, which issued to the Canadian lodges a charter under the title of the Grand Lodges of British North America. By 1852, however, this Grand Lodge had practically died of inanition, and in 1853, the Montreal lodges having formally disbanded, the Grand Lodge of the United States recalled the Canadian charter and resumed jurisdiction over the order in Montreal.

In 1868 Australia was added to the domain of the Grand Lodge of the United States, and from time to time other countries have been entered with more or less success. Mexico, the West Indies, Chile, Cuba, Peru, Japan, Denmark, Germany, England, France, Italy, Holland, etc., have been admitted, but the continent of North America has proved the best field for cultivation. In 1879 the Grand Lodge of the United States, recognizing its undisputed sway in the world of Odd Fellowship, changed its title, and is now known as the Sovereign Grand Lodge of the Independent Order of Odd Fellows.

Three degrees are conferred in the subordinate lodge, and any Odd Fellow who has attained the third degree is eligible for membership in an encampment, a branch or department chartered within the order by the Grand Lodge of Maryland in 1827. The encampment confers three degrees, the Patriarchal, the Golden Rule, and the Royal Purple. The Patriarchal is an English degree, and the others are American. The first Right Worthy Grand Encampment was created and officers installed in Baltimore in 1831. Membership in an encampment is dependent on good standing in a lodge, but otherwise the two are independent.

The Patriarchs Militant, a uniformed degree of the order, came into existence in 1884. For many years the desire for greater display had been manifest throughout the order, although the more conservative element had opposed it. A resolution was adopted at the annual convention in 1874 delegating to grand encampments the power to permit encampment members who had taken the Royal Purple degree to wear a uniform for street parades. The wearing of the uniform was optional with the members. The agitation was continued until 1880, when the Sovereign Grand Lodge finally refused to permit the organization of regular uniformed encampments. This refusal resulted in the establishment, a year later, of the Patriarchal Circle, a body composed of Odd Fellows who had taken the Royal Purple degree. This body was independent of the Sovereign Grand Lodge and conferred its own degrees. The local organizations were known as 'temples.' The movement spread, and the danger of a schism impelled the Sovereign Grand Lodge in 1884 to yield to the demand for a recognized military degree. The Patriarchs Militant were then organized and the new military degree was approved. Only encampment members who have taken the Royal Purple degree are eligible. The patriarchs have a complete military organization. The subordinate bodies are known as 'cantons,' and each is commanded by a captain. The cantons are organized into battalions, the battalions into regiments, the regiments into brigades, and the brigades into divisions, with officers of corresponding rank. The whole 'army' is commanded by a lieutenant-general, and the grand sire of the Sovereign Grand Lodge is ex-officio general-in-chief.

The Rebekah degree for women members is an important branch of the order. It was established in 1851, and is intended to bring the social benefits of Odd Fellowship within the reach of the female members of the families of living or deceased members of the order. Males are also admitted under the Rebekah degree into the encampment branch of the order.

The symbols in use in the lodges for the purpose of imparting instruction are: the *All-Seeing Eye*, representing the omniscience of God; the *Skull and Cross Bones*, a reminder of mortality; the *Three Links*, representing Friendship, Love, and Truth; the *Scythe*, denoting man's fading character; the *Bow and Arrow and Quiver*, designating the feeling of mutual defense to be cultivated; the *Bundle of Rods*, emblem of strength in union; the *Heart and Hand*, incentives to love and mercy; the *Globe*, man's earthly home; the *Ark of the Covenant*, the repository of God's grace and His goodness to man; the *Serpent*, teaching the wisdom of prudence; the *Scales and Sword*, emblematic of justice; the *Bible*, the source of truth; the *Hour-glass*, the flight of time; and the *Coffin*, emblematic of death.

The emblems in use in the Encampment and Patriarchs Militant are as follows: the *Three Pillars*, representative of Faith, Hope, and Charity; the *Tent*, hospitality; the *Altar of Sacrifice*, reminder of the simple worship offered by the Patriarchs; the *Tables of Stone*, the Ten Commandments; the *Pilgrim's Scrip, Sandals, and Staff*, representing the journey of life; the *Crown*, the Patriarch's power and dignity; and the *Shepherd's Crook and Warrior's Sword*, defense of the helpless.

The emblems of the Rebekah degree are the *Bee Hive*, representing order and industry; the *Dove*, constancy; the *Moon and Seven Stars*, denoting national truth; and the *Lily*, emblem of purity.

The results shown by the records of the order in the fulfillment of the objects of its existence, viz. the visitation of the sick, the relief of the distressed, the burial of the dead, and the education of the orphan, from 1830 to the close of the year 1901, are as follows: There were, besides the Sovereign Grand Lodge, 6 quasi-independent Grand Lodges in foreign countries; 66 Grand Lodges in the United States and Canada; 55 Grand Encampments; 12,792 subordinate lodges; 2780 subordinate encampments; 1,002,272 lodge members; 145,138 encampment members; 40 Rebekah assemblies; 5756 Rebekah lodges; 373,653 Rebekah lodge members; number of members relieved, 2,565,904; and widowed families succored, 256,606. The total revenue for the period was $240,430,422, and the total expenditure for relief $92,665,214. The chief officer of the order is known as the Grand Sire.

ODE (Lat. *oda*, ode, from Gk. *ᾠδή*, song, from *ἀείδειν*, *aedein*, *ᾄδειν*, *adein*, to sing). Originally, a poem to be sung to the accompaniment of some musical instrument, as the lyre. The poem and the music were inseparable. The simpler form of the Greek ode for a single voice was cultivated by Sappho, Alcæus, Anacreon, and other Æolian poets. The choral ode to be sung, not by a single voice, but by a group, was invented by the Dorians. To Alcman of Sparta belongs the innovation of dividing the chorus into two parts, called the strophe (the turn) and the antistrophe (the counter-turn), in which the performers turn to the right and to the left, the one group answering the other. Stesichorus of Sicily added a third part called the epode (after-song), which was sung by the entire chorus after their movements to the right and to the left. The choral ode, consisting thus of the strophe, the antistrophe, and the epode, was adapted by Simonides of Ceos to the warlike Dorian music. He was followed by Pindar, the greatest lyric poet of Greece. Of Pindar's work there are extant, besides several fragments, forty-four odes of victory, composed for the national games. Each ode has its own complicated metrical structure, corresponding to its own music. The simpler Greek measures were imitated in Latin by Catullus and Horace. See GREEK MUSIC.

The modern ode, dating from the Renaissance, was inspired by Horace and Pindar. It has, of course, undergone many modifications, consequent upon the divorce of verse and musical accompaniment. But it generally shows whence it came by its stanzaic structure and its direct address to some person or object. It is lofty in theme, and more impersonal than the ordinary lyric. Among the first English writers of odes, in imitation of Horace or Pindar, or of both, are Ben Jonson, Crashaw, Milton, Cowley, Marvell, Dryden, Collins, and Gray. Marvell's ode on the return of Cromwell from Ireland is one of the best in the Horatian manner; but Gray best understood Pindar. Gray divides his *Progress of Poesy* into three stanzas, each having forty-one lines; each stanza is further divided into strophe, antistrophe, and epode; and the three parts of each stanza are identical in form. Collins, with admirable art, employed a less elaborate structure, and most English poets have followed him rather than Gray. Indeed, the ode as now written is only a succession of stanzas in lines of varying length and metre. These stanzas, in verse and rhyme, may pursue either a regular or an irregular order, so falling into one or the other of the two great classes into which modern odes are divided. Each type creates its own specific forms, which in either case may be of an almost endless variety; but in the regular ode the stanzaic form is either the same from stanza to stanza, or varies according to a fixed principle, while in the irregular ode the form is determined solely by the poet's varying mood and alters in the freest manner from verse to verse and from stanza to stanza. The irregular ode is thus the most purely subjective of lyric forms and capable of the most delicate adjustments of music and mood; but, because of its very pliancy, it is also perhaps the one form in which success is least often attained. Of musical settings for odes the most famous are those of Purcell, twenty-eight in number, and the four by Handel.

Among the great English odes of the nineteenth century are Wordsworth's *To Duty* and *Intimations of Immortality;* Coleridge's *To France;* Shelley's *To the West Wind, To Liberty, To Naples*, and *To a Skylark;* Keats's *To a Nightingale, To Autumn,* and *On a Grecian Urn;* Tennyson's *On the Death of the Duke of Wellington;* and Swinburne's *To Victor Hugo.* Among those produced in the United States there are Bryant's *To a Waterfowl, The Winds,* and *Hymn of a City;* and Lowell's great *Commemoration Ode* to those who fell in the Civil War. As an occasional poem addressed to a friend, the ode is cultivated by many poets on both sides of the Atlantic. Consult: *English Odes*, selected (London, 1881); *Great Odes, English and American,* selected by Sharp (Canterbury Poets); and for more recent odes, the poems of Coventry Patmore and William Watson. See also the various poets mentioned in this article, and Lyric Poetry.

ODELL′, Benjamin B., Jr. (1854—). An American political leader, born at Newburg, N. Y. He studied at Bethany College, W. Va., spent three years at Columbia, and then entered business and politics almost simultaneously. He became a member of the New York State Republican Committee in 1887, and chairman of the Executive Committee in 1896. From 1895 to 1901 he was a member of Congress, and was chairman of the Committee on Accounts during the Fifty-fifth Congress. In 1900 he was elected Governor of New York, and signalized his administration by cutting down the expenses of government through the application of 'business principles.' This and his attitude toward Senator Thomas C. Platt, head of the New York Republican organization, made Odell a conspicuous national figure. In 1902 he was reëlected Governor.

ODELL, Jonathan (1737-1818). An American loyalist poet, born in Newark, N. J., September 25, 1737. After graduating in 1754 at the College of New Jersey in Newark, he studied medicine, and was a surgeon in the British Army. In 1766 he took orders and shortly after became rector of the church at Burlington, N. J. He was devoted to the loyalist cause during the Revolution, was driven out, and on the evacuation of New York went to England; but he returned to America and filled positions in the Council of the Province of New Brunswick. He died in Fredericton, N. B., November 25, 1818. Odell is chiefly known as the most effective satirist on the Tory side and also for strong odes and other lyrics. He shares the honors of Tory laureate with Joseph Stansbury, with whose verses his own were collected in 1860 by Winthrop Sargent.

OD′ENA′THUS. King of Palmyra and husband of the celebrated Zenobia. See Palmyra; Zenobia.

ÖDENBURG, ẽ′den-bōōrk (Hung. *Soprony*). A royal free city and capital of the county of the same name in Hungary, situated a short distance from the Neusiedler See and 53 miles by rail southeast of Vienna (Map: Hungary, E 3). It is a fine town with a number of interesting churches and monasteries, a theatre, a casino, a higher gymnasium and *Realschule*, a Protestant lyceum, and a number of other educational establishments. The vicinity of Oedenburg has long been famous for its wine and fruit. The manufactures of the town include sugar, spirits, preserved fruit, agricultural implements, wagons, etc. The trade is mostly in agricultural products. Oedenburg is identified with the Roman *Scarabantia*. Population, in 1900, 33,478, mostly German Catholics.

ODENHEIMER, ŏ′den-hī′mẽr, William Henry (1817-79). A bishop of the Protestant Episcopal Church. He was born in Philadelphia, graduated from the University of Pennsylvania in 1835, and was ordained priest in 1841. His sole ministerial charge was Saint Peter's, Philadelphia, where he was considered one of the model parish priests of the United States. In 1859 he was consecrated third Bishop of New Jersey. At the division of the State into two dioceses he chose that of Northern New Jersey. He was the author of *The Origin and Compilation of the Prayer-Book* (1841); *The True Catholic No Romanist* (1842); and *Canon Law* (1847). He died at Burlington, N. J. Consult the volume of his sermons with introductory memoir by his widow (New York, 1881).

ODENKIRCHEN, ŏ′den-kêrk′en. A town in the Rhine Province, Prussia, on the Niers, 25 miles northwest of Cologne (Map: Prussia, B 3). It has manufactures of velvets, silks, leather, harness, and sealskin. Population, in 1900, 14,745.

ODENSE, ŏ′den-så. The largest city on the island of Fünen, Denmark, capital of Odense Amt, constituting the northern half of the island, and the third city in population in the Kingdom. It is situated on the Odense River near its mouth in the Odense Fiord (Map: Denmark, D 3). Its streets are well paved, and the city has many handsome modern houses. It is lighted by gas and electricity, and was the first city in Denmark to have water distributed to the houses through pipes. The most notable building is the Cathedral of Saint Canute, built in the thirteenth century, the best example of Gothic architecture in Denmark. Here are buried several distinguished Danish monarchs. The Church of Our Lady, built in the twelfth century, is the oldest edifice in the town. Other buildings worthy of note are the Odense Castle, erected by Frederick IV., and surrounded by a beautiful park, the large monumental city hall, and the new post-office. The chief educational institutions are a seminary, a technical and an agricultural school, two libraries of 36,000 volumes each, and an archæological museum.

The city is of great industrial and commercial importance. The chief industrial establishments are breweries, distilleries, glass, chemical, and tobacco factories, machine shops, textile mills, and sugar refineries. The harbor consists of two elongated basins forming the forked extremity of the Odense Ship Canal, opening into the fiord. Further improvements and extensions are now being made, and the town is the chief railroad and commercial centre of Fünen, exporting butter, cheese, hides, and bacon in considerable quantities. The population has increased sevenfold during the past century. In 1890 it was 30,277, and in 1901, 40,138.

Odense dates from the legendary period of Danish history. It became a bishop's see early in the eleventh century, and several councils of archbishops were held here. In the sixteenth century the city was the meeting place of several parliaments. It suffered severely during the Swedish occupation in 1658-60. Odense is the birthplace of Hans Christian Andersen.

ODENWALD, ō'den-vält. A mountain region in Southern Germany, covering parts of Hesse and Northern Baden. It lies east of the Rhine, between the Main and the Neckar, the latter separating it from the northern extension of the Black Forest, and the former from the Taunus Range (Map: Germany, C 4). The eastern part, which consists mainly of sandstones, is the more level, and slopes gradually toward the plain. The western part consists of granite, gneiss, and crystalline slate, and falls abruptly toward the Rhine Valley. There are many beautiful valleys, and several peaks reaching a height of about 2000 feet. Large portions are covered with magnificent beech and oak as well as pine forests, and the region is dotted with castles and ruins possessing historical and legendary associations.

ODÉON, ō'dā'ôɴ'. A theatre in Paris, opposite the gardens of the Luxembourg Palace, ranking next to the Théâtre Français, and receiving an annual Government subvention of 100,000 francs. It is given over chiefly to classical dramas. The theatre was erected in 1782 and has been several times destroyed by fire and restored under various names.

ODER, ō'dẽr. One of the principal rivers of Germany (Map: Germany, F 2). It rises on a southern extension of the Sudetic Mountains, near Olmütz, in Moravia, and flows in a generally northwest direction through Prussian Silesia, Brandenburg, and Pomerania. It empties into the Stettiner Haff, from which its waters flow into the Baltic Sea through three arms which form the islands of Usedom and Wollin. Its length is 562 miles. Only in its extreme upper course does it flow through a hilly and forested country; for the greater part of its length its banks are low and flat, often marshy, and in some places diversified with sand dunes. In its lower course it divides repeatedly into parallel arms, which in the last twenty miles form a long, narrow delta. The river is in general shallow, and the current is very swift and there are sudden and great variations in volume. Extensive and costly engineering works have been necessary to confine it to its bed and render it navigable, but in dry summers navigation is still uncertain. The total navigable length for small vessels is 445 miles, ending at Ratibor, in Southern Silesia. Sea-going vessels can ascend as far as Stettin, at the head of the Stettiner Haff, but the chief port used by ocean commerce is Swinemünde, on the central outlet into the Baltic. The principal tributary of the Oder is the Warthe, which rises in Poland and nearly equals the main river in size. The chief cities on the Oder are Stettin, Frankfort (Brandenburg), Breslau, and Oppeln. Consult: *Der Oderstrom, sein Stromgebiet und seine wichtigsten Nebenflüsse* (Berlin, 1896); Brämer, "Die Oder und ihr Gebiet," in *Zeitschrift des königlichen preussischen Statistischen Bureaus* (Berlin, 1899).

ODES'SA. The most important city and seaport of Southern Russia and the fourth city of the Empire in population, situated in the Government of Kherson, on an elevation sloping toward an inlet of the Black Sea (Map: Russia, D 5). It lies about 32 miles northeast of the mouth of the Dniester and 938 miles by rail southwest of Moscow. The general appearance and atmosphere of Odessa are rather European than Russian. The climate is temperate, the annual temperature being about 50° F., ranging from 70° in July to about 26° in January. The city was built up during the nineteenth century, and is therefore one of the youngest among the large cities of Russia. It is regularly laid out around the bay and has a number of fine streets and squares, from which a magnificent view of the sea is obtained. The most popular boulevard is the Nikolayevsky Boulevard, from which a grand stairway leads to the bay. At the head of the stairway is the bronze statue of the Duc de Richelieu, the first Governor of the district, to whom Odessa owes much of its progress and architectural beauty.

There are many fine buildings, both ecclesiastical and secular. The chief among them are the cathedral, the exchange, the theatre, the Governor's palace, the city hall, the municipal library, containing 80,000 volumes, and the university building. Monuments to Alexander II., Catharine II., and Pushkin adorn various sections of the town. There are about twenty-five orthodox churches, a number of monasteries, synagogues, and a few reformed churches. In the southern and eastern parts of the city are situated a number of parks, among which the chief are the Alexandrovsk Park and the Botanical Garden. At the head of the educational institutions is the university ('Novo-Rossisky Universitet'), founded in 1864, and having faculties of medicine, philosophy, law, history and philology, physics and mathematics. The number of its students is about 700. It has a library of over 130,000 volumes, a museum, and an observatory. There are a number of gymnasia and preparatory, commercial, art, and industrial schools. Odessa has various learned societies, four theatres, and a number of philanthropic institutions. The city is lighted by gas, and the port mainly by electricity. Water is conducted from the Dniester, a distance of over 26 miles. The harbor is modern and very extensive. It is of sufficient depth for the admission of deep-draught vessels. It is divided by large moles into several ports.

While Odessa is primarily a commercial place, it is also of considerable industrial importance. In 1899 it had over 500 large industrial establishments, employing about 21,000 persons, and with an output of over $30,000,000. The chief establishments are flour mills, sugar refineries, match factories, breweries, tanneries, soap factories, iron works, etc. Situated on the coast of one of the largest grain-producing areas of Russia and in close proximity to the estuaries of the Dnieper and the Dniester, the city is naturally well equipped for its position as the chief grain-exporting centre of Russia, and the first port of Russia in regard to exports in general. Of the annual exports of over $50,000,000, grain, mainly wheat, forms from 65 to 75 per cent. The remainder consists of animals and animal products, sugar, and lumber. The imports, valued at about $25,000,000, consist of machinery, coal, chemicals, and various manufactured products. In its imports Odessa is exceeded only by Saint Petersburg and Reval. At the head of the administration of the city is the prefect, or gradonatchalnik, appointed by the central Government. The municipal assembly, or duma, consists of 60 members, elected by all citizens owning real estate. The mayor is elected by the city council. The budget of the city balances at about $2,000,000. For further details as to municipal government, see article RUSSIA, section on *Government*.

The environs of Odessa are very picturesque and offer numerous seacoast resorts. The three salt-water lakes, or limans, Kuyalnik, Khadji-Bey, and Klein Liebenthal, are much frequented by invalids.

The population increased with remarkable rapidity during the last century. The first settlers were mostly Greeks, Italians, and Albanians, and in 1802 numbered 9000. In 1901 the population was 450,218, of whom nearly one-third were Jews. The foreign population is about 30,000.

Odessa takes its name from the Greek settlement, Odessus, which existed here in ancient times. In the fifteenth century the Turks constructed on the present site the fortress of Khadji-Bey, which was taken by the Russians in 1789. In 1793 the place was fortified by the Russians and a year later received its present name. The growth of the town was fostered by Paul I. and by the wise and beneficent administration of the Duc de Richelieu. In 1817 it was declared a free port, and this decree, remaining in force till 1859, made possible Odessa's commercial supremacy in Southern Russia. In 1854 it was bombarded by the allied English and French naval forces.

ODE'UM (Lat., from Gk. *ᾠδεῖον*, *ōdeion*, from *ᾠδή*, *ōdē*, song). The Greek name for a public building devoted to musical performances. The earliest Odeum in Athens seems to have been built by Pericles, and was a circular building with a conical roof in imitation of the tent of Xerxes. It had many pillars within, and thus did not resemble the theatre. It was intended for the musical competitions at the Panathenæa, but was later used for other purposes. It was burned during Sulla's siege of Athens (B.C. 86), but was soon rebuilt by Ariobarzanes II., King of Cappadocia. In Roman times the name was employed to designate a small theatre, with a roof, and such buildings became common in Grecian cities. In Athens there were two: one erected by Agrippa, near the market; the other, of which the walls still remain, at the southwest of the Acropolis, built by Herodes Atticus shortly after A.D. 160 in memory of his wife, Regilla. Consult Dörpfeld, "Die verschiedenen Odeen in Athen," in *Mittheilungen des deutschen archäologischen Instituts in Athen*, vol. xvii. (Athens, 1892).

O'DIN (Icel. *Oþenn*, AS. *Wōden*, OHG. *Wuotan;* probably connected with Goth. *wōds*, possessed, AS. *wōd*, OHG. *wuot*, frenzied, Ger. *Wut*, frenzy, OIr. *fáith*, Lat. *vates*, poet). The chief god of Northern mythology. According to the sagas, Odin and his brothers, Veli and Ve, the sons of Boer, or the first-born, slew Ymir or Chaos, and from his body created the world, converting his flesh into dry land; his blood, which at first occasioned a flood, into the sea; his bones into mountains; his skull into the vault of heaven; and his brows into the spot known as *Midgard*, the middle part of the earth, intended for the habitation of men. Odin rules heaven and earth, and is omniscient. His seat is Valaskjalf, from whence his two black ravens, Hugin (Thought) and Munin (Memory), fly daily to gather tidings of all that is being done throughout the world. As god of war, he holds his court in Valhalla, whither come all brave warriors after death to revel in the tumultous joys in which they took most pleasure while on earth. His greatest treasures are his eight-footed steed Sleipner, his spear Gungner, and his ring Draupner. By drinking from Mimir's fountain he became the wisest of gods and men, but he purchased the distinction at the cost of one eye. Frigga is his queen, and the mother of Balder, but he has other wives and favorites, and numerous sons and daughters.

O'DO, or **EUDES**, ēd, OF BAYEUX (c.1036-97). The half-brother of William I. of England. He was made Bishop of Bayeux about 1049. He took part in the Norman conquest of England in 1066, and received the earldom of Kent; but it is possible that he never received the title of earl. During William's absence from England in 1067 he was one of the two regents and seems to have ruled very tyrannically. Later he fell under William's displeasure and was imprisoned for over four years. He was released by William Rufus, against whom he rebelled in 1088 and was consequently banished from England. He died at Palermo in 1097, while on his way to join the crusading armies. Consult Freeman, *Norman Conquest*, vol. iv. (Oxford, 1871).

ODO, or **EUDES**, OF PARIS (c.857-98). King of France from 888 to 898. He was the son of Robert the Strong, progenitor of the Capetians. Odo was Duke of France, Count of Paris, and the defender of the city during the siege by the Northmen in 886. His father's popularity and his own valor caused him to be chosen King of the West Franks in 888, after the deposition of Charles the Fat. His reign was troubled by rebellions on the part of the supporters of Charles the Simple, the Carolingian heir. Odo kept the kingdom, but before his death, January 1, 898, recommended his followers to recognize Charles as his successor.

OD'OA'CER, or **OD'OVA'CER** (?-493). Ruler of Italy from 476 to 493. He was the son of Ædico, a noble of the race of the Scyrii, and saw his first military service probably in the army of Orestes, father of the young Romulus Augustulus, last Emperor of the West. Odoacer perceived the weakness of the new ruler, and resolved to profit by it. He had little difficulty in persuading the barbarian soldiery that Italy belonged to them, and in their name demanded of Orestes the third part of the land as the reward of their help. Orestes refused; and Odoacer, at the head of his Scyrii, Herulians, Rugians, and Turcilingians, marched against Pavia, which Orestes had garrisoned, stormed the city, and put his opponent to death (476). Romulus abdicated and withdrew into obscurity. Odoacer showed himself to be wise, moderate, and politic. He took the title of king only, and caused the Senate to dispatch to Constantinople a flattering letter, in which it declared one Emperor to be enough for both East and West, renounced its right of appointing the emperors, expressed its confidence in the civil and military talents of Odoacer, and begged Zeno to confer upon him the administration of Italy. After some hesitation the Byzantine Emperor yielded to the entreaties of the Senate, and Odoacer received the title of Patricius. This is commonly taken as the date for the fall of the Western Empire.

Odoacer fixed his residence at Ravenna. According to his promise, he divided among his companions the third part of the land of Italy—a measure far less unjust than at first sight may seem, for the peninsula was then almost depopulated, and many domains were lying waste. He maintained peace throughout the peninsula and conquered Dalmatia. In matters of religion, though an Arian himself, he acted with great impartiality; nevertheless he was intensely hated by the native Italians. The success of Odoacer excited the jealousy and alarm of Zeno, the Emperor of the East, who encouraged the Ostrogoth King, Theodoric (q.v.), to undertake an expedition against Italy, hoping at the same time to get rid of the Goths, who were a menace to Constantinople. The first battle was fought on the banks of the Isontius (the modern Isonzo) in 489. Odoacer was beaten, and retreated. During his retreat he hazarded another battle at Verona and was again beaten. He now hastened to Rome to rouse the inhabitants, but the gates of the city were closed against him. Returning northward to his capital, Ravenna, he reassembled the wrecks of his army, and in 490 once more marched against the Ostrogoths, whose advance guard he defeated and pursued to the walls of Pavia. Another great battle now took place on the banks of the Adda, when Odoacer was vanquished for the third time. He now shut himself up in Ravenna, where Theodoric besieged him for three years. Odoacer then capitulated, on condition that the Kingdom of Italy should be shared between him and Theodoric. This agreement was solemnly sworn to by both parties, February 27, 493; but on March 5th Odoacer, invited to a banquet by Theodoric, was killed by the Gothic King's own hand. Consult: Pallmann, *Geschichte der Völkerwanderung* (Gotha, 1863); Hodgkin, *Italy and Her Invaders*, vol. iii. (Oxford, 1885); and Dahn, *Könige der Germanen*, vol. ii. (Munich, 1861).

ODOMETER (from Gk. ὁδός, *hodos*, road + μέτρον, *metron*, measure). An instrument used in connection with a vehicle or other wheel for measuring lengths of road or other distances. The odometer consists of a series of gear wheels so arranged that the first and smallest wheel revolves either once or some definite fraction of a revolution for every revolution of the vehicle wheel to which it is attached. This is usually accomplished either by a star wheel with which a projection on or near the hub of the vehicle comes in contact, or some similar device. As the circumference of the wheel can readily be measured, it is, of course, possible to arrange the gear wheels so that there will be recorded finally and shown by dials or other indicators the distance in feet, yards, miles, or kilometers. The odometer, which was at one time used but rarely except by road surveyors, especially in preparing county maps, is extensively employed with bicycles and automobiles, and in this form is known as a cyclometer. It is a very convenient instrument in a rough survey or reconnaissance where it is necessary to measure certain distances along a road, as it can be attached to the axle of a wagon or bicycle and readings made from time to time by the observer between points on the same line.

OD′ONA′TA (Neo-Lat., from ὀδούς, *odous*, tooth). An order of insects comprising the dragon-flies. See DRAGON-FLY.

O'DON′NELL, LEOPOLD (1809-67). Duke of Tetuan. A Marshal of Spain. He was born at Santa Cruz, Teneriffe, of an Irish family long in the service of Spain. He entered the army when young and embraced the cause of Isabella (q.v.) against Don Carlos, whose armies he fought bravely under Espartero, gaining the title of Count of Lucena. In 1840 he sided with Maria Christina, the Queen mother, went with her to France, and stirred up a number of unsuccessful revolts against Espartero, his old chief. In 1843 his intrigues were more fortunate, Espartero fell, and O'Donnell went to Cuba as Governor-General. Returning rich in 1848, he plotted against the Ministers, Bravo-Murillo and Narvaez. In 1854 he headed a military insurrection; defeated and driven into Andalusia, he suddenly turned Liberal, issued a radical manifesto, and gave his rising the aspect of a revolution. He won. The nation and Espartero joined him, the two men assumed the powers of government, and O'Donnell was made Marshal. Then by a *coup* O'Donnell ousted Espartero, July, 1856, but in three months was himself ousted by Narvaez. He resumed office in 1858, and in the following year led as Prime Minister and commander-in-chief a successful expedition against the Moors and was made the next year Duke of Tetuan. He resigned in 1863, but was recalled in 1865, and remained Prime Minister till 1866. He died the next year at Bayonne.

O'DONOGHUE, ō-dŏn′ō-hụ, DAVID J. (1866—). A British biographer and editor, born in Chelsea, London. He was educated in a Roman Catholic school, and began his journalistic work by writing for the Dublin papers upon subjects relating to Irish music, art, and literature. A founder of the Irish Literary Society in London, he was also vice-president of the National Literary Society, Dublin, and the compiler of a biographical dictionary called *The Poets of Ireland* (1891-93); also, *Humor of Ireland* (1894); *List of 1300 Irish Artists* (1894); *Traits and Stories of the Irish Peasantry* (4 vols., 1896-97); *Bibliographical Catalogue of Collections of Irish Music* (1899); and a *Treasury of Irish Poetry in the English Tongue* (1900). He edited the works of Samuel Lover (1898-99), and among his biographies are those of *William Carleton* (1896); *Richard Pockrich, an Irish Musical Genius* (1899); and *Robert Emmet* (1902).

O'DONOJÚ, ō-dō′nō-hōō′, JUAN (c.1755-1821). A Spanish soldier and viceroy, born in Spain. Already well known in his own country, he was made acting Viceroy of Mexico in 1821. When he arrived there he found that Iturbide was practically conqueror of the entire province and that there was little left for him to do but make terms with the victorious revolutionist. He signed the Treaty of Córdoba, which made Mexico an empire, and surrendered the city itself (1821). Meanwhile he was elected one of the provisional agents, and died soon after.

O'DON'OVAN, John (1809-61). A distinguished Irish historian, archæologist, and Gaelic scholar. He was born in Attateemore, County Kilkenny. In 1826 he obtained work in the Irish Record Office, and in 1829 was appointed to a post in the historical department of the Ordnance Survey. In the discharge of his office he examined many Irish manuscripts and visited every part of the country, thus becoming an authority on Irish topography. In 1840 the Irish Archæological Society was formed, and in the following year O'Donovan contributed a map of ancient Ireland to its first volume of publications. From this time till the year of his death he was a prolific writer on Irish history and antiquities. He was called to the Irish bar in 1847, having entered at Gray's Inn three years before. O'Donovan's chief work was an edition of the so-called *Annals of the Four Masters*, a compilation made in the seventeenth century by Michael O'Clery and a company of Irish Franciscans. This was finished in 1851, and the next year O'Donovan was employed by the commission for the publication of the ancient laws of Ireland. He made extensive manuscript collections for an edition of the *Seanchus Mor*, but did not live to prepare them for publication. In 1845 he published a *Grammar of the Irish Language* which was long regarded as the chief authority on the subject. Of O'Donovan's remaining works the most important were issued by the Irish Archæological Society or the Celtic Society.

ODONTOLCÆ. See Bird, Fossil.

ODONTOLOGY. See Dentistry; Teeth.

O'DONTOR'NITHES. A group-name for all those primitive birds which had teeth in the jaws (bill). See Bird, Fossil.

O'DWY'ER, Joseph (1841—). An American physician, specialist in the diseases of children. He was born in Summit County, Ohio; graduated at the New York College of Physicians and Surgeons; and became a practicing pediatrist in New York City. O'Dwyer invented, in 1885, intubation of the larynx to take the place of tracheotomy. The method was very successful, especially in croup and diphtheria.

ODYNIEC, ŏ'dų'nê-ĕts, Antoni Edward (1804-85). A Polish poet and critic, best known for his close relations with Mickiewicz. He was born in Lithuania; studied at Vilna; and, settling at Warsaw, became editor of *Melitele*, a periodical which reflected the aims of the young Romanticists of the time. He had already written translations from the German, especially Bürger, and the two volumes of romantic verse entitled *Poezye* (1825). After several years in Dresden and Leipzig, he returned to Vilna in 1837 and for twenty years was editor of *Kurjer Wileński*, an official journal. His dramas include: *Felicyta* (1849), dealing with the early Christian martyrs; and *Barbara Radziwilówna* (1858), an historic piece of the time of Sigismund Augustus. *Listy z podróży* (1875-78) tells of his travels with Mickiewicz.

ODYS'SEUS. See Ulysses.

Œ'COLAMPA'DIUS, Johannes (1482-1531). One of the most eminent of the coadjutors of Zwingli in the Swiss Reformation. The name Œcolampadius is a Græcized form, after the fashion of the time. His real name is variously given as Heussgen, Hüssgen, Hausch, and Huschke; at any rate it was not Hausschein, as has been inferred from the meaning of Œcolampadius. He was born in 1482 at Weinsberg, Württemberg. He first studied at Heilbronn, then at Heidelberg, where he took his B.A. and M.A. (1501), and altered his name as many scholars of the age did. His father desiring him to study law, he repaired to Bologna to hear a certain famous professor, but, the climate not agreeing with him, he returned in six months to Heidelberg and studied theology, which was his personal preference. After a while he returned home, but, again in pursuit of knowledge, he went to Tübingen (1512) and studied Greek at Stuttgart under Reuchlin, and Hebrew under the Spanish physician Matthew Adrian, at Heidelberg. In 1516 he began preaching at Basel, where he formed the acquaintance of Erasmus, who highly appreciated his classical attainments and secured his assistance in his edition of the New Testament. In 1518 he was preaching at Augsburg, and in 1520 entered the Brigittine convent at Altmünster, near Basel. But Luther's publications exercised so great an influence on him that he left the convent in 1522 and became chaplain to Franz von Sickingen, after whose death he returned to Basel in November, 1522, and, in the capacity of preacher and professor of theology, commenced his career as a reformer. In the controversy concerning the Lord's Supper, he gradually adopted more and more the views of Zwingli, and at last maintained them in 1525, in a treatise, to which the Swabian ministers replied in the *Syngramma Suevicum*. In 1529 he disputed with Luther at Marburg. He died at Basel, November 24, 1531. There is no collected edition of his writings. Consult his *Life* by Herzog (Basel, 1843), and by Hagenbach (Elberfeld, 1859).

ŒCOLOGY. See Ecology.

ŒCUMENIUS, ĕk'ū-mē'nĭ-ŭs. A theological author of the tenth century. He was for some time Bishop of Tricca, in Thessalia, and is supposed to have written the following Greek commentaries to the New Testament: *'Εξηγήσεις εἰς τὰς Παύλου ἐπιστολὰς πάσας* (a commentary on all the Epistles of Saint Paul); *'Εξηγήσεις εἰς τὰς πράξεις τῶν 'Αποστόλων* (a commentary on the Acts of the Apostles); *'Εξηγήσεις εἰς τὰς ἑπτὰ καθολικὰς λεγομένας ἐπιστολάς* (a commentary on the seven Epistles termed Catholic); and *Commentaria in Sacrosancta Quatuor Christi Evangelia*, published by Hentenius in 1641, but now generally ascribed to Euthymius Zygadenus. The Greek text of this last commentary was published by C. F. Matthaei (Leipzig, 1792), and a complete edition of all Œcumenius's writing was published, in both Latin and Greek, in Paris in 1631.

ŒDE'MA (Neo-Lat., from Gk. *οἴδημα*, *oidēma*, swelling, from *οἰδεῖν*, *oidein*, to swell, from *οἶδος*, *oidos*, swelling). The term applied in medicine to the swelling occasioned by the effusion or infiltration of serum into cellular or areolar structures. The subcutaneous cellular tissue is the most common, but is not the only seat of this affection. It is occasionally observed in the submucous and subserous cellular tissue, and in the cellular tissue of the parenchymatous viscera; and in some of these cases it gives rise to symptoms which admit of easy recognition during life. Thus œdema of the glottis (see LARYNX, Diseases of) and œdema of the lungs constitute well-marked and serious forms of disease; while œdema of the brain, though not easily recognized during life, is not uncommonly met with in the post-mortem examination of insane patients. A general œdema is called *anasarca.*

Œdema may be either passive or active, the former being by far the most common. *Passive œdema* arises from impeded venous circulation (as from obstruction or obliteration of one or more veins; from varicose veins; from standing continuously for long periods, till the force of the circulation is partly overcome by the physical action of gravitation; from deficiency in the action of the adjacent muscles, which in health materially aids the venous circulation, etc.); from too weak action of the heart (as in dilatation or certain forms of valvular diseases of that organ); or from an impoverished or toxic state of the blood (as in chlorosis, scurvy, Bright's disease, etc.). By means of the knowledge derived from pathological anatomy, we can often infer the cause from the seat of the swelling; for example, œdema of the face, usually commencing with the eyelids, is commonly caused by obstruction to the circulation through the left side of the heart, or by the diseased state of the blood in Bright's disease; and œdema of the lower extremities most commonly arises from obstruction in the right side of the heart, unless it can be traced to the pressure of the gravid uterus, or of accumulated fæces in the colon, or to some other local cause.

Active œdema is associated with an inflammatory action of the cellular tissue, and is most marked in certain forms of erysipelas. It is firmer to the touch, and pressure with the finger produces less pitting than in the passive form.

Angio-neurotic œdema is an affection of neurotic origin characterized by transient, circumscribed swellings in different parts of the body, which come and go suddenly. They may appear on the face and involve a single eyelid or the nose. The larynx may become swollen and cause death.

Malignant œdema is due to a specific infection, the bacillus of which is found in earth. It is rapidly fatal. See ANTHRAX.

From the preceding remarks, it will be seen that œdema is not a disease, but a symptom, and often a symptom indicating great danger to life. The means of removing it must be directed to the morbid condition or cause of which it is the symptom. See DROPSY.

OEDENBURG, ẽ′den-bōōrk. A royal free city of Hungary. See ÖDENBURG.

ŒD′IPUS (Lat., from Gk. Οἰδίπους, *Oidipous*, Οἰδιπόδης, *Oidipodēs;* according to the popular etymology from *οἰδεῖν*, *oidein*, to swell + πούς, *pous*, foot). The hero of one of the most famous Theban legends. The story was certainly told in the early epics, one of which bore the title *Œdipodea*, and it is briefly indicated in the *Odyssey*, but for us it is known chiefly through the plays of the Athenian tragedians, especially Sophocles. The earlier versions, which seem to have varied in many and not unimportant details, are all lost, and though many hints can be obtained by careful analysis of later chroniclers and commentators, any complete reconstruction of the lost poems is in the highest degree conjectural. After passing through the hands of the dramatists, it assumed the following form: Laius, son of Labdacus, King of Thebes, was warned by Apollo's oracle at Delphi that he was to die at the hands of his son. In spite of this warning, Laius became by his wife Jocasta the father of a boy. No sooner was the child born than he fastened its ankles with a pin (whence the name 'swell-foot') and gave it to a faithful herdsman to expose on Mount Cithæron. Ignorant of the oracle, the man in pity gave the child to the shepherd of Polybus, King of Corinth, and that ruler, who was childless, reared him as his own son. The young man, Œdipus, never doubted his Corinthian origin till the taunt of a drunken companion roused his suspicions, and, unable to obtain satisfaction from his supposed parents, he sought the oracle at Delphi, which did not answer his question, but warned him that he was doomed to slay his father and wed his mother. Horrified, Œdipus fled away from Corinth, and shortly after met Laius with his servants. They endeavored to force him from the road, and in the quarrel he slew them all, as he supposed. Pursuing his journey, he found Thebes harassed by the Sphinx, who propounded a riddle to every passer-by and devoured all who failed to solve it. Creon, the brother of Jocasta, who had become King on the death of Laius, had offered the hand of his sister and the kingdom to him who, by solving the riddle, should free the city from the monster. Œdipus answered the riddle and thus slew the Sphinx. He then married Jocasta, his mother, and became King of Thebes. At first he prospered greatly, and four children were born to him, two sons, Eteocles and Polynices (q.v.), and two daughters, Antigone (q.v.) and Ismene. At length a terrible pestilence visited Thebes, and the oracle declared that the murderer of Laius must be exeplled from the country. Œdipus began the search, and by degrees the truth became known. Jocasta hanged herself and Œdipus put out his eyes. The later fate of the King was told in varied form. His sons by their deeds brought upon themselves his curse, and ultimately fell by each other's hand. Œdipus himself was driven from Thebes, and, attended by his faithful daughter, Antigone, wandered over the earth, till he reached the grove of the Eumenides (q.v.), at Colonus, near Athens. Chastened by his sufferings, he was received by these dread goddesses, and conducted, some said, without death to the other world.

For the legend in its varied forms, consult the Introductions in Jebb's editions of the *Œdipus Tyrannus* and *Œdipus Coloneus* of Sophocles (Cambridge, 1893-99); also U. von Wilamowitz-Möllendorf, *Griechische Tragödien*, vol. i. (Berlin, 1899). For the epic forms, see Bethe, *Thebanische Heldenlieder* (Leipzig, 1891). The other extant Greek plays which touch upon the general subject are Æschylus, *Seven Against Thebes;* Sophocles, *Antigone;* Euripides, *Phœnissæ.*

ŒDIPUS COLO′NEUS (Lat., from Gk. Οἰδίπους Κολώνειος, *Oidipous Kolōneios*, Œdipus of

Colonus). A tragedy by Sophocles, produced in B.C. 401 after the author's death. The action takes place in the grove of the Eumenides at Colonus, whither the blind Œdipus is led by his daughter Antigone, and where he is to die. Creon attempts to induce Œdipus to go with him, and, failing, carries off Antigone and Ismene, who are rescued by Theseus, King of Athens. Polynices appears and is cursed by his father. Finally Œdipus withdraws into the grove and his death is announced. The tragedy is simple in plot and filled with an atmosphere of peace and dignity, except in the scenes with Creon and Polynices.

ŒDIPUS TYRAN'NUS (Lat., from Gk. Οἰδίπους τύραννος, *Oidipous tyrannos*, Œdipus the King). The greatest drama of Sophocles and the most representative of Greek tragedies. The scene is Thebes, which has been visited by a pestilence, and can be cleansed only by the punishment of the murderer of Laius, on whom Œdipus invokes curses. The plot consists in the gradual bringing home to Œdipus that he is the unwilling murderer of his father and the husband of his own mother. In the horror of the enlightenment, Jocasta kills herself and Œdipus in frenzy blinds himself and begs of Creon to banish him. The dialogue is full of life, the interest of the action is sustained throughout, and the choral portions are of notable beauty.

OEHLENSCHLÄGER, ẽ'len-shlā'gẽr, ADAM GOTTLOB (1779-1850). A great Danish poet and dramatist, born of German ancestry at Vesterbro, near Copenhagen. He was irregularly educated; was destined first for trade, then for the university, and then went on the stage. After failure as an actor he studied law, but in 1802 he quitted law to devote himself to literature. In the symbolic poem *Guldhornene* he declared his new faith, destroyed older verses then in the printer's hands, and composed in haste new ones in their place that made him undisputed head of the new Romanticists. From 1805 to 1809 he traveled on a Government stipend, visiting Goethe, Madame de Staël, and other noted writers. In 1810 he was made professor of æsthetics at Copenhagen, but did not long retain this position. In 1829 he was crowned by Tegnér as King of the Singers of the North. He was similarly honored at the royal palace in Copenhagen in 1849, and his funeral, two months later, was made a national solemnity. Oehlenschläger's importance lies in drama, beginning with *Sanct Hans Aaften-Spil* (1803), followed by a series of national tragedies, *Hakon Jarl* (1807; English trans. 1875), *Baldur hin Gode, Karl den Store, Palnatoke, Axel og Valborg, Vaeringerne i Miklagaard*, and thirteen others, together with five of a more general character, of which the first, *Correggio* (German, 1807; Danish, 1811; English trans., 1854), is typical. Oehlenschläger's dramas, like those of other Romanticists, show epic and lyric rather than dramatic qualities. They are genuinely national, most of them rooted in the popular sagas, and they show unrivaled command of language. Through them he gave the *Eddas* new life. By his youthful *Poems* (1805) he revealed unexpected lyric possibilities in the Danish language. Of these poems perhaps the dramatic fairy tale *Aladdin* is most significant. His later lyric and epic work is not of great value, except *Nordens Guder* (*Gods of the North*, 1819), an effort to utilize Norse mythology for modern poetry. Oehlenschläger's *Works* are in 26 volumes, comprising dramas, memoirs, miscellaneous prose and verse (Copenhagen, 1851-54). For his life consult Arentzen (Copenhagen, 1879) and Nielson (ib., 1879).

OEHLER, ẽ'lẽr, GUSTAV FRIEDRICH (1812-72). A German theologian. He was born at Ebingen, Württemberg. In 1834 he became teacher in the Missionary Institution of Basel, which he left in 1837 to study Oriental languages at Berlin. The same year he went to Tübingen as *repetent*. In 1840 he became professor in the seminary at Schönthal and remained until 1845, when he accepted a call to Breslau. He opposed the union of the Lutheran and Reformed churches, and while declaring in favor of confessional Lutheranism, he held aloof from the old Lutheran party. In 1852 he returned to Tübingen as director of the seminary and professor of Old Testament theology in the university. Here he produced his principal work, *Theologie des Alten Testaments* (2 vols., 1873-74; English trans., Edinburgh, 1874-75; New York, 1883). Oehler was one of the foremost Old Testament scholars of his time of the conservative school. He contributed many articles to Herzog's *Encyclopädie*, and wrote a *Lehrbuch der Symbolik* (1876, edited by Johann Delitzsch). Consult Josef Knapp, *Ein Lebensbild von Oehler* (Tübingen, 1876).

OEHME, ẽ'me, ERWIN (1831—). A German landscape and genre painter, born in Dresden. He was a son and pupil of the landscape painter Ernst F. Oehme (1797-1855), and also pupil of Ludwig Richter and of the Dresden Academy, but formed his style mainly by studying nature on his travels through Germany, Switzerland, France, and England. A fine specimen of his landscapes is the "Stone Quarry in Saxon Switzerland" (1860, Dresden Gallery). In 1877 he executed in the banquet hall of the Albrechtsburg at Meissen three mural paintings representing the "Rape of the Saxon Princes in 1415," and in 1887-89 a picture in heroic size of the "Declaration of Venezuela's Independence by Bolivar," for the House of Parliament at Caracas. He also did excellent decorative work, especially in imitation of old Gobelins for several royal palaces.

ŒIL DE BŒUF, ẽy' de bẽf (Fr., ox-eye). A term applied in architecture to those small round or oval openings in the frieze or roof of large buildings which serve to give light to spaces otherwise dark. The most famous is in the anteroom of the royal chamber at Versailles, which gave name to the apartment.

OELAND, ẽ'länt. An island in the Baltic Sea. See ÖLAND.

OELS, ēls. A city of Prussia. See ÖLS.

OELWEIN, ōl'wīn. A city in Fayette County, Iowa, 53 miles north of Cedar Rapids; on the Rock Island system, and at the junction of four branches of the Chicago Great Western Railroad (Map: Iowa, F 2). The latter maintains large repair shops here, and there is also a foundry. The government, under a charter of 1888, revised in 1897, is vested in a mayor, elected every two years, and a unicameral council. The waterworks are owned and operated by the municipality. Settled in 1875, Oelwein was incorporated first in 1888. Its growth during the decade 1890-1900 was extraordinarily rapid, a population in 1890 of 830 having increased to 5142 in 1900.

Œ′NANTHYL′IC ACID from *œnanthyl*, from Lat. *œnanthe*, from Gk. *οἰνάνθη*, *oinanthē*, first shoot of the vine, vine, from *οἶνος*, *oinos*, wine + *ἄνθος*, *anthos*, flower), NORMAL, $CH_3(CH_2)_5COOH$. One of the volatile fatty acids. It was formerly believed to be the acid component of an ester to which the characteristic odor of wine is due; it has, however, been shown that that odor is really due to a mixture of esters of the acids called capric and caprylic. Œnanthylic acid may be prepared best by the oxidation of œnanthol, $C_6H_{13}CHO$, a product of the distillation of castor-oil.

ŒNEUS, ē′nūs (Lat., from Gk. *Οἰνεύς*, *Oineus*). King of Calydon, the father, by Althæa, of Meleager and Deianira, and, by Melanippe, of Tydeus. The famous Calydonian boar, afterwards slain by Meleager, was sent to devastate his territory as a punishment for his omission of Artemis in sacrificing to all the gods upon reaping the produce of his fields. Œneus was dethroned by the sons of his brother Agrius, and rescued by Diomedes, who took him to Argolis, where he was afterwards slain by the two surviving sons of Agrius. The city of Œnoe was built upon the site of his burial place. He was the first to receive the vine from Bacchus, who taught him its cultivation, and the juice of the grape was from his name called *οἶνος*, wine.

Œ′NOMA′US (Lat., from Gk. *Οἰνόμαος*, *Oinomaos*). The son of Ares and King of Pisa in Elis. Having been warned that he would perish if his daughter married, he made it a condition that all suitors of Hippodamia should strive with him in a chariot race from Pisa to the altar of Poseidon on the Isthmus of Corinth, and if conquered should be slain. Pelops, son of Tantalus, on entering the contest, bribed Myrtilus, the charioteer of Œnomaus, to disable the latter's chariot, and with a chariot and horses given him by Poseidon was victorious in the race. Œnomaus was killed, and when dying cursed Myrtilus, to whom Pelops refused the promised reward and cast him down from Cape Geræstus. The curse uttered by the dying Myrtilus on Pelops brought in its train the misfortunes which pursued the latter's family.

ŒNONE, ē-nō′nē (Lat., from Gk. *Οἰνώνη*, *Oinōnē*). A nymph, who became the wife of Paris while he was still a shepherd on Mount Ida. She warned him of the results of his journey to Greece, and told him that she only could cure him if he should be wounded. When Paris was wounded by the arrow of Philoctetes, he sought the aid of Œnone, who, angered by his desertion, declined to assist him, but repented and in grief at coming too late cast herself on his funeral pile. The story is told in Tennyson's poem *Œnone* (1832).

ŒNOPIDES, ē-nŏp′ĭ-dēz (Lat., from Gk. *Οἰνοπίδης*, *Oinopidēs*). A Greek astronomer, born in Chios, possibly a contemporary of Anaxagoras. He learned astronomy in Egypt and there, no doubt, got his knowledge of the obliquity of the ecliptic, the discovery of which is often ascribed to him. Ælian attributes to Œnopides the fifty-nine-year cycle intended to harmonize the lunar and solar years, and the determination of the length of the solar year as $365\frac{22}{59}$ days. He had a strange theory of the rise and fall of the Nile that subterranean waters are warmer in winter and colder in summer than surface waters, so the winter heat carries the moisture into the earth. Several geometrical propositions are said to have been discovered by him, and he held the theory that the Milky Way was the original path of the sun, which it had left in fright.

ŒNOTH′ERA (Neo-Lat., from Gk. *οἰνοθήρας*, *oinothēras*, plant whose root smells like wine, from *οἶνος*, *oinos*, wine, + *θηρᾶν*, *thēran*, to seek). A genus of plants of the natural order Œnotheraceæ having four petals and eight stamens, the calyx-limb 4-cleft, the segments reflexed; the capsule 4-valved, with many naked seeds. The evening primrose (*Œnothera biennis*), a beautiful plant native of the United States, has been known in Europe since 1614, and is now naturalized in many parts of Europe, on the banks of rivers, in thickets, on sandy grounds, etc. The plant is often cultivated for its fragrant flowers, which expand in the evening and at the summit of a leafy spike in the second year. The root somewhat resembles a carrot in shape, but is short; it is usually red, fleshy and tender; it is sometimes eaten in salads or in soups, and as a boiled vegetable. Several other species of Œnothera, natives of North America, are cultivated in gardens.

OERSTED, ĕr′stĕd, ANDERS SANDÖE (1778-1860). An eminent Danish jurist, brother of Hans Christian Oersted (q.v.), born in Rudkjöbing. He was educated at the University of Copenhagen, embraced the profession of law, and rose to eminence as a practitioner and as editor of legal periodicals; he also wrote several treatises on the philosophy of Kant and Hegel. He became a judge of the highest court of Denmark in 1810. In 1825 he was intrusted with the drawing up of the ordinances of the Danish law, and in 1831 had an important share in forming the provincial constitutions granted by Frederick VI. to the Estates. For several years he was high commissioner, or King's representative at the Assembly of the Estates, and from 1842 to 1848 was a member of the Danish Cabinet. In 1853 he became Premier, and acted successively as Minister of Public Worship, of the Interior, and of Public Instruction and Justice. He now showed himself a decided Conservative. At the close of 1854 the King dismissed the Oersted Cabinet. In 1855 Oersted and his colleagues in the Cabinet were impeached by the Diet; the trial lasted for a year and resulted in acquittal. An autobiography of Oersted, *Af mit Livs og min Tids Historie* (1851-57), contains valuable material for Danish historians. Among his other works is a manual of Danish and Norwegian law, *Haandbog over den danske og norske Lovkyndighed* (6 vols., 1822-23).

OERSTED, HANS CHRISTIAN (1777-1851). A distinguished Danish physicist, brother of the preceding. He was born at Rudkjöbing, on the Danish island of Langeland, and studied at the University of Copenhagen, where he took the degree of doctor of philosophy in 1799. Soon after becoming assistant to a professor of medicine, he gave lectures on chemistry and natural philosophy. In 1806, after having enjoyed a traveling scholarship for several years, in the course of which he visited Holland, Germany, and Paris, he was appointed professor of natural philosophy in the

University of Copenhagen. In 1812 he again visited Germany and France, after having published a manual under the title of *Videnskaken our Naturen's Almindelige Love,* and *Forste Indledning til den Almindelige Naturlære* (1811). During his residence in Berlin he wrote his famous essay on the identity of chemical and electrical forces, in which he first developed the ideas on which were based his great discovery of the intimate connection existing between magnetism and electricity and galvanism—a treatise which, during his residence in Paris, he translated into French, in conjunction with Marcel de Serres. Oersted's great discovery, made in 1819, was that a magnetic needle was deflected by a current in a wire passing over or below it. This is the earliest experiment in electric magnetism, and at once paved the way for the work of Ampère and made possible the galvanometer, the electromagnet, and other apparatus soon to be devised. This discovery was announced shortly afterwards in a Latin essay, entitled *Experimenta circa Effectum Conflictus Electrici in Acum Magneticam.* This memorable experiment obtained for Oersted the Copley medal from the Royal Society of England, and the principal mathematical prize of the Institute of Paris. Oersted endeavored to make science popular among all classes; with this object he wrote numerous works, contributed scientific papers to the newspapers and magazines of his own country and Germany, and, in addition to his regular lectures in the university, gave courses of popular scientific lectures. Among the works specially written to promote the diffusion of scientific knowledge, those best known are *Aanden i Naturen* (Copenhagen, 1850) and *Naturlärens mechanischecke Deel* (Copenhagen, 1844). The majority of his more important physical and chemical papers are contained in Poggendorff's *Annalen.*

OERTEL, ẽr'tel, Max Joseph (1835-97). A German physician, specialist in diseases of the lungs and heart. He was born at Dillingen, studied at Munich, and in 1867 became docent of laryngology there, from which post he was promoted to a professorship in 1876. Oertel discovered the bacillus of diphtheritis in 1868, but is better known for his system of hill-climbing as a cure for faulty respiration or circulation. A device for examining the larynx, the laryngostroboscope, is one of his inventions. He contributed to Ziemssen's *Handbuch der speziellen Pathologie und Therapie,* Liebreich's *Encyclopädie der Therapie,* and other encyclopædic works. His most famous work is *Allgemeine Therapie der Kreislaufstörungen* (1884). Besides he wrote: *Ueber den laryngologischen Unterricht* (1878); *Ueber Terrainkurorte zur Behandlung der Kreislaufstörungen* (1887); *Pathogenese der epidemischen Diphtherie* (1887); *Massage des Herzens* (1889); and *Das Laryngostroboskop und seine Verwendung in der Physik, Physiologie und Medizin* (1895).

OESEL, ẽ'zel. A Russian island. See Ösel.

OESER, ẽ'zẽr, Adam Friedrich (1717-99). A German painter, etcher, and sculptor, born at Pressburg, Hungary. He was a pupil, in Vienna, of Van Schuppen and Daniel Grau at the Academy, where he was awarded the first prize in 1735, and of Raphael Donner in sculpture. In 1739 he went to Dresden, won reputation with portraits, executed mural paintings in Castle Hubertsburg in 1749, and removed to Leipzig in 1759. Appointed director of the newly founded Academy there in 1764, he zealously opposed mannerism in art and was a stout champion of Winckelmann's advocacy of reform on antique lines. Among the numerous pupils he educated was Goethe, with whom he kept up friendly relations afterwards at Weimar. As specimens of Oeser's paintings may be mentioned "The Artist's Children" (1766, Dresden Gallery); "Marriage at Cana" (1777), and four others (Leipzig Museum); and "The Painter's Studio" (Weimar Museum). His best effort in sculpture is the monument of Elector Frederick Augustus (1780) on the Königsplatz in Leipzig. For his biography consult Dürr (Leipzig, 1879).

ŒSOPH'AGUS (Neo-Lat., from Gk. *οἰσοφάγος, oisophagos,* gullet, from *οἴσειν, oisein,* to be about to carry + *φαγεῖν, phagein,* to eat), or Gullet. A membranous canal, about 9 inches in length, extending from the pharynx to the stomach, and thus forming a part of the alimentary canal. It commences at the lower border of the cricoid cartilage of the larynx, descends in a nearly vertical direction along the front of the spine, passes through an opening in the diaphragm, and thus enters the abdomen, and terminates in the cardiac orifice of the stomach opposite the ninth dorsal vertebra. It has three coats—viz. an external or muscular coat (consisting of two strata of fibres of considerable thickness—an external, longitudinal, and an internal, circular); an internal or mucous coat, which is covered with a thick layer of squamous epithelium; and an intermediate cellular coat, uniting the muscular and mucous coats. In this tissue are a large number of œsophageal glands, which open upon the surface by a long excretory duct, and are most numerous round the cardiac orifice, where they form a complete ring.

The œsophagus is liable to a considerable number of morbid changes, none of which are, however, of very common occurrence.

The most prominent symptom of *œsophagitis,* or *inflammation of the œsophagus,* is pain between the shoulders, or behind the trachea or sternum, augmented in deglutition, which is usually more or less difficult, and sometimes impossible. The affection is regarded as a very rare one, unless when it originates from the direct application of irritating or very hot substances, or from mechanical violence.

Spasm of the œsophagus—a morbid muscular contraction of the tube, producing more or less difficulty of swallowing—is a much more common affection than inflammation. The spasm generally comes on suddenly during a meal. Upon an attempt to swallow, the food is arrested, and is either immediately rejected with considerable force, or is retained for a time, and then brought up by regurgitation; the former happening when the contraction takes place in the upper part of the canal, and the latter when it is near the lower part. In some cases solids can be swallowed, while liquids excite spasm; while in other cases the opposite is observed; but in general either solids or liquids suffice to excite the contraction, when a predisposition to it exists. The predisposition usually consists in an excitable state of the nervous system, such as exists in hysteria, hypochondriasis, and especially in hydrophobia. An attack may consist of a single paroxysm, lasting only a few hours, or it may be more or less persistent for months or even years. The treatment must be directed to the establishment of the general health. A temporary cure often follows the passage of a bougie.

Paralysis of the œsophagus is present in certain forms of organic disease of the brain or spinal cord which are seldom amenable to treatment. In this affection there is inability to swallow, but no pain or other symptom of spasm; and a bougie may be passed without obstruction. The patient must be fed by the stomach-pump.

Permanent or organic stricture of the œsophagus may arise from inflammatory thickening and induration of its coats. The most common seat of this affection is at its upper part. The symptoms are persistent and gradually increasing difficulty of swallowing, occasionally aggravated by spasm; and a bougie, when passed, always meets with resistance at the same spot. When the contraction is due to inflammatory thickening, it may arise from the abuse of alcoholic drinks or from swallowing boiling or corrosive fluids. If unrelieved, the disease must prove fatal, either by ulceration of the tube around the seat of the stricture, or by sheer starvation. When the affection is due to chronic inflammatory thickening, some advantage may be derived from dilatation by means of the œsophageal bougie. If it is dependent upon malignant disease, and the tissues have become softened by the infiltration of the morbid deposit, the bougie must be directed with the greatest care through the stricture, as a false passage may be easily made into important adjacent cavities.

Foreign bodies not very infrequently pass into the œsophagus, and become impacted there, giving rise to a sense of choking and fits of suffocative cough, especially when they are seated in its upper part. If the body is small and sharp (a fish-bone, for example), it may often be got rid of by making the patient swallow a large mouthful of bread; if it is large and soft (such as too large a mouthful of meat), it may generally be pushed down into the stomach with the probang; while large hard bodies (such as pieces of bone) should be brought up either by the action of an emetic or by long curved forceps. If the offending body can neither be brought up nor pushed down, it must be extracted by the operation of *œsophagotomy*—an operation which can only be performed when the impacted body is not very low down, and which it is unnecessary to describe in these pages.

Rupture of the œsophagus has occurred from violent vomiting during a state of intoxication and following a heavy meal. It is a fatal, but exceedingly rare accident.

ŒSOPHAGUS, Comparative Anatomy of the. In length, structure, and appearance in cross-section, there is the greatest variety in different groups of animals, and, indeed, an œsophagus may be entirely wanting, as, for example, in Hydra, where the mouth opens directly into the digestive cavity. The cœlenterates are divided into two great classes according to the origin of the œsophagus; in one, the Hydrozoa, the œsophagus, when present, has arisen from the endoderm, while in the other, the Scyphozoa, it has been formed by an invagination of the ectoderm. In all animals above cœlenterates, where a mouth is present, there is more or less of an œsophagus, but its appearance varies widely, with the form of the body. Long-necked animals have long œsophaguses as a rule, while in animals with little or no neck the œsophagus may be very short. In mammals its upper part is closely associated with the pharynx, and its muscles are striated (voluntary), but lower down the muscles are unstriated (involuntary). In birds the œsophagus is very extensible and capable of holding a considerable amount of food in storage, and this ability is greatly increased by the development of a special pouch or pair of pouches on the ventral side of its lower part, known as the 'crop.' This crop may be simply a sac for receiving the food or it may be an accessory digestive organ, the juices which it secretes serving to soften and macerate food stored in it. In pigeons during the breeding season this secretion becomes very abundant and milky in character, and is regurgitated into the mouths of the young along with macerated grain. Such food is popularly called 'pigeon's milk.' Regurgitation is very easy for all birds and is habitual with many as a means of defense, or (by lightening their weight) of escape. In both birds and mammals the œsophagus is a musculomembranous tube, made up of an outer layer of longitudinal (contractor) muscle-fibres, then a layer of circular (constrictor) muscle-fibres, then loose connective tissue containing a thin layer of longitudinal fibres, and finally the glandular mucous membrane, which forms a lining, and is generally folded and plaited, often papillose, unless fully distended.

OESTERLEY, ẽ'stĕr-lĭ, Karl Wilhelm (1805-91). A German historical painter, born at Göttingen, where he studied art-history at the university, before taking up painting in Dresden under Matthäi. After a sojourn in Rome (1825-29), he established himself as a lecturer at Göttingen, and in 1831 was appointed professor of art-history. He supplemented his studies in painting under Schadow at Düsseldorf (1835-38), then in Munich, where he gave his attention to the frescoes of Cornelius, and 1842 in Paris. In 1845, he became Court painter at Hanover. His best works include: "Jephtha's Daughter" (1835); "Leonore with Her Mother" (1847), after Bürger's ballad; "Memling Nursed by the Nuns at Bruges" (1866), all in the Hanover Museum. He also painted altarpieces and several portraits, and in fresco an "Ascension" (1838), in the Royal Chapel, Hanover. With Otfried Müller he edited at Göttingen *Denkmäler der alten Kunst* (1834-39). His son Karl (1839—), born at Göttingen, became a successful landscape painter. First instructed by his father, he studied afterwards under Bendemann and Deger at the Düsseldorf Academy, but turned from religious subjects, which he essayed originally, to landscape. His frequent study trips to Norway after 1870 resulted in the depiction of such scenes from those regions as "Raft Sound" (1879, Breslau Museum); "View on Salten Fjord" (188[illegible], Hamburg Gallery); "Oldenvand on North Fjord" (1885, National Gallery, Berlin); and "Romsdal Fjord" (1891, Leipzig, Museum); all distinguished by lofty conception, brilliant coloring, and exquisite light effects.

OETINGER, ẽ'tĭng-ẽr, Friedrich Christoph (1702-82). A German theologian. He was born at Göppingen, in Württemberg, and studied at the University of Tübingen, where he devoted himself to the philosophy of Leibnitz and Wolf. He also became intimate with Bengel, Francke, Spangenberg, and Zinzendorf. After traveling extensively he was appointed reader of theology in the University of Halle. In 1738 he was appointed pastor at Hirschau and became the leader of the Pietists in that part of Germany. About this time he became an earnest student of the writings of the mystic Böhme, and also an ardent disciple of Emanuel Swedenborg, some of whose writings he translated into German. In 1765 he published a treatise entitled *Earthly and Heavenly Philosophy*, which, with his translation of the works of Swedenborg, brought upon him the reprehension of his ecclesiastical superiors. Yet he was protected by the Duke of Württemberg, and was nominated to the superintendence of the churches in the district of Weinsberg, afterwards in that of Herrenberg, and subsequently appointed prelate at Murrhardt. His works, about seventy in number, were edited by Ehmann (11 vols., Stuttgart, 1858-63), and his autobiography by Hamberger (ib., 1845). Consult his *Life* by Ehmann (Stuttgart, 1859), and Auberlen, *Die Theosophie F. C. Oetingers nach ihren Grundzügen* (Tübingen, 1847).

OETTINGEN, ĕt'tĭng-*en*, ALEXANDER VON (1827—). A German theologian. He was born at Vissust, near Dorpat, and studied at Erlangen, Bonn, and Berlin. From 1854 to 1891 he was professor of theology at Dorpat. He published, among many other theological treatises, *Die Moralistik und die christliche Sittenlehre* (1868-74), which is his chief work; *Wahre und falsche Autorität* (1878); and *Theorie und Praxis des Heiratens* (1892).

O'FAR'RELL, MICHAEL JOSEPH (1832-94). A bishop of the Roman Catholic Church. He was born at Limerick, Ireland, educated at the Missionary College of All Hallows, and proceeded to the Seminary of Saint Sulpice, Paris, for his theological course. In 1855 he was ordained priest in Ireland. Intending to enter the Canadian mission, he returned to Saint Sulpice, but was retained at the institution for a year as professor of dogmatic theology, after which he went to Montreal, serving first as a member of the faculty of the Grand Seminary, afterwards as priest at Saint Patrick's and Saint Bridget's. In 1869 he went to New York as assistant at Saint Peter's, Barclay Street. He became pastor of the church in Rondout, N. Y., in 1872, but the following year returned to Saint Peter's as priest in charge. During his eight years' pastorate he established a school whose attendance numbered 700. On November 1, 1881, he was consecrated bishop of the newly created diocese of Trenton, N. J.

OF'FA (?-796). A King of the Mercians in Anglo-Saxon England who succeeded the usurper Beornræd in 757. The kingdom was much weakened, and he probably spent the early years of his reign in restoring order at home. In 771 he began to conquer outlying territory; he defeated the Kentish forces in 775; and fought against the West Saxons (779) and the Welsh. (See OFFA'S DYKE.) Offa had cordial relations with the Roman See; won from the Pope the grant of a Mercian archbishopric; and sent yearly to Rome for charities 365 mancuses (apparently the origin of 'Peter's Pence'), besides doing much for the benefit of the Church at home. He carried on a correspondence with Charlemagne, and promoted trade between England and the Continent.

OFFA'S DYKE. An ancient earthwork extending along the whole border between England and Wales and attributed to Offa, King of Mercia. Portions of this rampart still stand to a considerable height, though much of it has been almost obliterated by time and the elements. This structure, which represents a vast amount of labor, seems to have been intended as a line of demarcation between the Anglo-Saxon and Celtic populations of England and Wales respectively. On the eastern or English side of Offa's Dyke at varying distances from it is an inferior earth rampart called Watt's Dyke, and it is conjectured that the space between them may have been a neutral zone for trading purposes.

OFFENBACH, ŏf'fen-bäG. The capital of a circle in the Grand Duchy of Hesse, Germany, on the Main, four miles east of Frankfort (Map: Germany, C 3). Its palace is the winter residence of the Isenburg-Birstein family, to whom the old castle, now in ruins, also belongs. Several churches and a Jewish synagogue are the only other edifices worthy of note. Offenbach is the principal manufacturing town in the grand duchy, its chief manufactures being leather goods, engines, tobacco, textiles and knit wares, chemicals, soap, jewelry, and carpets. Population, in 1890, 35,085; in 1900, 50,508. Offenbach was founded in the tenth century. In 1685 the Isenburg-Birstein family made it their residence. Its importance dates from the end of the seventeenth century, when many French Protestants took refuge within its walls. In 1815 it was united with the Grand Duchy of Hesse.

OFFENBACH, JACQUES (1819-80). A French operetta composer, born at Cologne, of Jewish parentage. He went to France in 1833, and studied the 'cello at the Paris Conservatory under Vaslin. Afterwards he played that instrument in the orchestra of the Opéra Comique and then became music director at the Théâtre Français. While at the latter theatre he wrote the *Chanson de Fortunio* for the *Chandelier* of Musset. He became director of the Bouffes-Parisiens in 1855 and produced his operas there until 1866, after which date they were brought out at different houses. In 1876 he made an unprofitable tour in America, which he described in *Notes d'un musicien en voyage* (1877). The libretto is an indispensable part of Offenbach's operettas. In the witty words and doubtful, if amusing, situations of Meilhac and Halévy lay the opportunities for his own best humor and most ironical caricature. For the rest his merry music, natural verve and extravagance, and the affluence of his ideas, made his operettas the highest form of the genre he created, and of which he remains the undisputed master. He died in Paris. His works include: *Les deux aveugles* (1855); *Le violoneux* (1855); *Le financier et le savetier* (1856); *Croquefer ou le dernier des paladins* (1857); *Le mariage aux lanternes* (1857); *La chatte métamorphosée en femme* (1858); *Orphée aux enfers* (1858); *Daphnis et Chloé* (1860); *Barkouf* (1860); *Monsieur et Madame Denis* (1862); *La belle Hélène* (1864); *Barbe-Bleue* (1866); *La* *grande duchesse de Gérolstein* (1867); *La vie parisienne* (1866); *Robinson Crusoé* (1867); *Vert-Vert* (1869); *Les brigands* (1869); *La jolie parfumeuse* (1873); *Madame Favart* (1879); *La fille du tambour-major* (1879); *Belle Lurette* (1880); *Les contes d'Hoffmann* (1881); and many others. Consult Martinet, *Offenbach, sa vie et son œuvre* (Paris, 1892).

OFFENBURG, ŏf′fen-bo͞ork. A town of Baden, Southern Germany, capital of the circle of the same name (Map: Germany, B 4). It is situated on a tributary of the Rhine, ten miles southeast of Strassburg. It contains ruins of old fortifications, numerous monuments, a town hall in the baroque style, and a gymnasium occupying an old Capuchin monastery. There are cotton and linen weaving and dyeing establishments, tanneries, breweries, and machine shops for the manufacture of agricultural machinery. The town has considerable trade in wine, timber, and cattle. Population, in 1890, 8576; in 1900, 13,664.

OFFERING (AS. *offrung, ofrung,* from *offrian,* from Lat. *offerre,* to offer, from *ob,* toward, before + *ferre,* to bear; connected with Gk. *φέρειν, pherein,* Skt. *bhar,* Goth. *bairan,* OHG., AS. *beran,* Eng. *bear*). A term primarily applied to the different forms of sacrifices in the Hebrew ritual. Offerings are of various kinds, as the burnt offering (*'ōlāh*), peace offering (*shelem*), thank offering (*tōdāh*), free-will offering (*nĕdābāh*), meal offering (*minchāh*), sin offering (*chaṭṭāth*), guilt offering (*'āshām*), drink offering (*nesek*). The common Hebrew word for an offering in the sense of a ritualistic sacrifice is *ḳorbān,* which designates the sacrifice as something 'brought near' to the deity, or to the altar, and as such *ḳorbān* is occasionally used to designate a sacred gift in general. (See CORBAN.) Another term for offering in a more secular sense is *minchāh,* which is primarily a 'tribute' offered either by way of a compliment or for the purpose of retaining the good-will of an individual or a deity. In the Old Testament ritual *minchāh* has acquired the technical sense of a meal (or bloodless) sacrifice, in contrast to *zebach* (slaughter), which is invariably a 'bloody' sacrifice. Another specific form of religious offerings, though distinct from sacrifices, is the heave offering (*tĕrūmāh*), denoting (a) that which is 'lifted off' or separated and used of the gifts taken from the soil (first-fruits, tithes, firstlings); (b) contributions of money and spoils of war offered for sacred purposes; (c) portions of the sacrifices and other dues belonging to the priests. See SACRIFICE; FIRST FRUITS; OFFERTORY.

OFFERTORY (OF., Fr. *offertoire,* from Lat. *offertorium,* place where offerings are brought, from *offertor,* one who offers, from *offerre,* to offer). In the liturgical sense, an antiphon in the mass which introduces the more sacred part or *missa fidelium,* as the analogous introit (q.v.) does the *missa catechumenorum.* It is taken from the Psalms (since the thirteenth century limited to a single verse, except in requiem masses), and varies with the season or festival. It is immediately followed by the oblation of the bread and wine: hence the name, which is incorrectly applied by many people to the collection sometimes taken up at this stage of the service. The name is also used for the musical composition which is rendered at that time, and which may be an anthem, motet, or even a purely instrumental selection.

OFFICE (OF., Fr. *officier,* from ML. *officiarius,* officer, from Lat. *officium,* office, from *opificium,* performance of work, from *opifex,* workman, from *opus,* work + *facere,* to do). In general, a delegated service or authority of a public or semi-public character. In practice the term is usually limited to positions of trust or authority under the Government or in a corporation or voluntary association. At the common law public office was not regarded as a public trust, but as a private emolument, and Blackstone in his book on property enumerates offices among incorporeal hereditaments. Thus conceived, a public office may, like other real property, be held in fee simple, in fee tail, for life, or for years, and it may even be made the subject of sale and be alienable by deed or will. Offices of this character have generally become obsolete or have been abolished, but in England certain honorary offices are still held by a species of tenure and descend to the heirs of the holder thereof. See CIVIL SERVICE.

An appointment to office carries with it, as an incident thereof, the right to its emoluments. Civil or public offices are usually classified as ministerial and judicial. An office is ministerial when its exercise depends on the command or direction of others; judicial, when the officer is called upon to employ his own discretion. An example of the first is a sheriff, of the second a judge of a court of law. The two are sometimes united in one. The office is held for the benefit of the public, and may be abolished by legislation, unless such action be expressly forbidden by the Constitution. When the office is in its nature judicial, the duties cannot be performed by deputy, as the personal skill and judgment of the officer are the reasons for his holding the office. With ministerial offices the reverse is the case. Thus a sheriff or other court officer may appoint deputies, and their acts are good in law; and the appointing officer remains responsible for such acts.

Statutes in most of the States provide that offices shall not be sold, and such a sale would be void anywhere as contrary to the policy of the common law. So any agreement between the officer and one who by influence procures his appointment, to divide the compensation received, would be altogether void. It was a principle of the common law that no term of office should be created so as to end at a certain time in the future, nor for a fixed term of years, but should be held for life or during good behavior. This was to prevent the holding of office after competency to perform the duties had ceased, and to render it impossible that the office should survive the officer. It is common in this country to limit the term to the life of the incumbent and to the attaining of a certain age, as seventy years. Two offices cannot be held by the same person where one is in the nature of its duties inconsistent with the other. This inconsistency may be patent from the nature of the offices or it may be declared to exist by act of legislation. Where an office is filled in common by several persons, it has been held that if the office is of a public character all the officers must meet for consultation, but that a majority may act, while if the office is private, all must concur; but this is often governed by statute, and a decision by a majority, or even a majority of those present at any meeting, is made binding. Members of State or national legislatures are not usually termed officers, the word being confined in usage to those having executive or judicial authority. A *de facto* officer is one who is in possession of the authority and emoluments of an office without a good title thereto, while a *de jure* officer is one who has the legal right, but not necessarily actual possession. It is evident that it would make much confusion and cause great injustice if all official acts of a *de facto* officer were to be considered as of no effect. Thus, in the case of a judge who was wrongfully on the bench, it would be a great hardship if all judgments given by him, and all criminal convictions of his court, should be set aside. But if suit be brought by a *de facto* officer in his public capacity, he may be debarred from recovery on the ground of defect in title, and the *de jure* officer may test the question of title by bringing a writ of *quo warranto*. See De Facto.

Public officers are appointed in the United States, under the provisions of the Constitution, by the President with the advice and consent of the Senate, with the exception that to Congress is given the power to vest in the President alone, or in the heads of departments or courts of law, the appointment of 'inferior officers.' Ambassadors, public ministers and consuls, and Supreme Court judges are specified as not belonging to this 'inferior' class, but beyond that the distinction is not clearly defined. In the various States the appointment of public officers is regulated by statutes, and even in the case of Supreme Court judges election is common. The appointee in most cases is required to take an oath to perform faithfully the duties of the office. A bond is often required where the officer has charge of financial interests or his duties affect property rights. Where he performs official acts before giving bond or taking oath, such acts will be valid unless he has been specially prohibited by statute or Constitution from holding the office before the bond was filed or the oath administered.

Compensation of officers may be fixed by law or may be obtained from fees. It is provided in the United States statutes that no officer of the Government who holds an office with a salary of $2500 or more shall receive extra compensation for performing the duties of any other office unless expressly authorized by law. Where an officer has been removed, his salary will continue until proper notice of the appointment of his successor has been given him. Compensation does not begin until an officer is liable to duty.

The law will presume that a public officer is acting within the scope of his duty until the reverse has been shown. Where discretionary power is given, the officer is made the exclusive judge of the facts. The officer is liable for wrongful acts both to the injured party and to the State. In the first case remedy is by action, in the second by indictment or impeachment. The order of a superior is no bar to an action arising from an unlawful act of the inferior, nor is negligence on the part of a subordinate ground for holding the head officer responsible. Contracts made by public officers are governed by the general law of agency and they cannot bind the Government beyond the extent of their legal authority. If an appropriation is exceeded, the officer is liable. A court officer cannot be held if acting under the proper order of a court having jurisdiction, but may be where there is no jurisdiction. If a sheriff seize property which is by law exempt, he is personally responsible.

The method of removing a public officer of the United States is not provided for in the Constitution, and the question arises whether the power belongs to the President alone or whether he must receive the consent of the Senate. The question has several times come before Congress, and the power of the President to act alone sustained by a very close vote. By statutes of 1867 and 1869 it was provided that a civil officer appointed by the advice and consent of the Senate shall hold his place until removed by the same authority, but that during a recess of the Senate the President may suspend such officer and appoint another to fill the duties of the position. The President is to make a nomination within thirty days after the beginning of the next session of the Senate; and in case the Senate directly refuse to confirm, he may nominate another person. These statutes are known as the tenure-of-office acts (q.v.). State officers may in many cases be removed by the Governor; the subject is governed by statutory enactments, which vary greatly in the different States. Elective offices cannot be vacated by an executive officer without showing cause, such as malfeasance or embezzlement. A term of office may be extended or reduced by action of the Legislature unless such action be prohibited by constitutional provision or the office be elective in its nature. Officers of the United States courts hold during good behavior, but those of the Territorial courts do not fall within the clause of the Constitution already referred to, and depend upon the action of Congress for the limitation of their terms. If neither State nor National Constitution prescribe the length of a term, the subject is under legislative control, and may be extended or shortened, or the office abolished altogether. See such titles as Director; Secretary; Governor; President, etc.; and consult authorities under such titles as Contract; Tort; Agent; Administrative Law; Municipality, etc.

OFFICE, Holy, Congregation of the. See Inquisition.

OFFICE FOUND. In case of an inquest of office, a finding by the jury that the property which is the subject of the inquest is forfeited to the Crown or State. Such a finding, by which lands were formerly declared forfeited under the feudal laws, is now in the United States generally a necessary part of the proceedings that must be taken to enforce the forfeiture to the State of lands held by aliens who at common law are or become under a legal disability to hold lands vested in them, and also of the proceedings taken to vest in the State title to lands left by a person without any heir. The procedure, however, is rarely resorted to against an alien while living; and sometimes upon the death of an alien who leaves no lawful heirs, and whose natural heirs are disqualified to take his lands, special statutes are passed waiving the forfeiture to the State and restoring the lands to the natural heirs. See Alien; Inquest (of office); Forfeiture.

OFFICER. In a general sense, a person who holds an office, or who is vested with authority to perform certain functions or do certain acts in the interest of, or in and about the management or direction of, a business or a government. As respects a private business the term is generally applied to certain members of a corporation who are specially intrusted with the management of its affairs, and upon whom service of papers is generally required to be made to be binding upon the company. Under this class are commonly included the president, directors, treasurer, secretary, and other persons similarly intrusted with an active participation in the affairs of the company by the constitution or by-laws. For further information as to the rights, duties, and liabilities of such officers, see such titles as Corporation; Director; Ultra Vires; Contract, etc.; and also consult the authorities referred to under Corporation; Agent, etc.

With relation to governmental officers it has been said that the term 'office' "embraces the idea of tenure, duration, emolument, and duties." But it seems certain that emolument is not necessary to constitute one an officer, since there are numerous positions which are strictly termed 'offices,' but which carry no salary or emolument of any kind. It does appear necessary, however, that a Government position must have more than one of the characteristics mentioned to constitute the person holding it an officer. Thus, if a person simply performs such duties as are required of him by those employing him, and his responsibility is limited to these, and he receives no certificate of appointment, takes no oath, has no term of office, and exercises no powers and discharges no duties conferred upon him directly by law, he is not an officer, and he does not hold an office, although he is employed by public officers and is wholly engaged about public work.

An officer is to be distinguished from a mere employee. The most important basis of distinction is that an employee is such by virtue of a contract, while a person cannot be made an officer by virtue of a contract merely, but his position finds its source and limitations in some act of governmental power. The conception of an officer, however, does not depend in any way upon the character of the duties to be performed, nor is it essential that the officer should be invested with any power of compulsion, or that he should be permanently occupied in the discharge of official duties, or that his duties should or should not be discretionary. The only requirement that appears to be necessary is that the duties shall be discharged in the interest of the Government, and that the right to discharge them shall be based upon some provision of law, and not upon a contract. Governmental officers are commonly classified as *executive*, or those whose duties are mainly to enforce the execution of the laws; *legislative*, or those whose duties relate chiefly to the enactment of laws; *judicial*, or those whose duties relate chiefly to the interpretation and application of the laws; *ministerial*, or those whose duties are chiefly to carry out the lawful instructions of their superiors; *military*, or those having military commissions, and *naval*, or those having command in the navy. See such titles as Executive Department; Judge, etc.

Another important classification is that of honorary officers and professional officers, *professional officers* being those who devote their entire time to the discharge of public functions and are restricted by law from exercising any other occupation, and who receive a compensation sufficiently large to enable them to live without resorting to other means. *Honorary officers*, on the other hand, are those who do not devote their entire time to their public duties, but may at the same time carry on some regular business as a means of support, and receive a compensation which is insufficient for support, or merely nominal, or may receive no compensation at all. In the United States the legal distinction which most nearly corresponds to this is that between *lucrative* and *honorary* officers, the conception of professional officers being not yet fully worked out. The professional officer is characteristic of the bureaucratic administrative system, such as that which existed in Prussia from 1720 to 1808, and in France in 1800; the honorary officer is characteristic of the system of administration (called self-government) which existed in England in the eighteenth century. All existing systems of administration are formed by a combination of professional and honorary officers, the honorary-officer system predominating in the United States and the professional-officer system in Europe, especially upon the Continent.

Most officers become such by either appointment or election, the method of election being much more common in the United States and in England than in most other modern countries. The official relation is sometimes formed by drawing of lots, as in the case of the jury, or as a result of seniority, or sometimes by inheritance. In general it can be formed only in one of the ways recognized by law, and the acts of persons who assume to be officers without right are void both as against the public and third parties; but persons who, though not legally officers, are yet acting under cover of right are regarded as lawful officers for many purposes, and are called officers *de facto*. In England and in the United States, since the reign of Queen Anne, the rule has been that the title to an office is to be tried by the writ of quo warranto or an information in the nature of a quo warranto. One who is clearly entitled to an office may obtain possession of the insignia of office, the public buildings, records, etc., by mandamus.

The general obligations imposed upon officers are of two kinds: First, those which the law positively states that the officers must or must not do, and the violation of which is punished by penalties of criminal character. Second, those which arise from the very existence of the official relation, and which are maintained chiefly by the *esprit de corps* of the official body. When the *esprit de corps* is high, the system of positive requirements is usually correspondingly weak.

For the rights and duties of various particular officers, and for further information, see the titles treating of various public officers, as Bailiff, Deputy, Notary Public, etc.; also De Facto; Ultra Vires; Constitutional Law, etc. Consult the authorities referred to under Administrative Law; Government.

OFFICER, PETTY. See Petty Officer.

OFFICERS, Military and Naval, Commissioned. See Rank and Command.

OFFICIAL PLANTS. See Officinal Plants.

OFFICINAL PLANTS (ML. *officinalis*, relating to a shop, from Lat. *officina*, *opificina*, shop, from *opifex*, workman). Those medicinal plants which have a place in the pharmacopœias of different countries, and which are therefore sold—or some of their products or preparations of them—by apothecaries and druggists. The medicinal plants cultivated to any considerable extent are all official, but many are also officinal which are not cultivated.

A distinction should be made between officinal and official drugs. *Official drugs* include all those substances, whether vegetable, mineral, or animal, used as medicines, and recognized by the various pharmacopœias.

Official preparations are tinctures, syrups, fluids, extracts, emulsions, etc., made from official drugs, recognized by the pharmacopœia, and therein directed how to be prepared.

OFFSET, or Set-Off. The splay or sloping part of a wall, etc., joining parallel surfaces when the upper face recedes from the lower. This frequently occurs on buttresses. The offset is usually protected with dressed stones, having a projection or drip on the lower edge to prevent the rain from running down the wall. In surveying an *offset* is a line perpendicular to a given straight line on which may be located at some measured distance a point. Such points on various offsets may determine the position of an irregular or inaccessible line and make it possible to map accurately a plot of land whose boundaries are unsymmetrical or difficult of access. See Surveying.

OFFSET. A lateral shoot, either a stolon or sucker, which strikes root and forms a new plant. Strawberries, multiplier onions, and black raspberries are familiar examples of plants generally propagated by offsets.

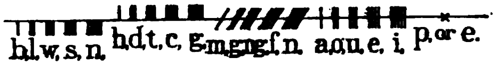
O'FLAHERTY, ō-flä′ẽr-tĭ, Roderic (1629-1718). An Irish historiographer, born in Moycullen Castle, Galway. He was educated in his native county, made a special study of Irish history and literature, and published the results in *Ogygia, seu Rerum Hibernicarum Chronologia* (1685), the first scholarly work on the subject to reach England. His *Chorographical Description of West or H-Iar Connaught* was published by the Irish Archæological Society in 1846, and his letters were edited by J. T. Gilbert (1895). O'Flaherty lost his property through revolutionary changes of government, and died in poverty at Parke, near Galway.

OG, ŏg (Heb. *'Og*, probably connected with *'Agag*). An Amoritish King of Bashan, who is said to have lived at the time of the entrance of the Israelites into Canaan. The chief cities of his territory were Ashtaroth and Edrei, and he and his people were defeated at the latter place by the half-tribe of Manasseh which remained east of the Jordan (Deut. iii. 1-13; Josh. xiii. 12). Og is represented as the last of the Rephaim or giants. The story of his bedstead (Deut. iii. 11) may be based on the huge sarcophagi which Phœnician kings had made in imitation of Egyptian customs. Many other fables arose about Og, some of which found their way into the Jewish midrashic collections. See Amorites.

OGAM, ŏg′am (OIr. *ogam*, *ogum*, Ir. *ogham*, Gael. *oidheam;* perhaps connected with Gk. *ὄγμος*, *ogmos*, row, Skt. *ajman*, course, from *aj*, Gk. *ἄγειν*, *agein*, Lat. *agere*, to drive). The name of a script used in various ancient inscriptions in the British Isles. They are found chiefly in the southern parts of Ireland and Wales, and the earliest of them date from the fifth century. They number nearly three hundred in all. The language in almost every case is a primitive form of Gaelic, but some fourteen of them found in Scotland appear to be Pictish. The interpretation of these last is entirely doubtful, and scholars are not even agreed as to whether the Pictish language is Indo-European.

The invention of the ogams is assigned in Irish tradition to a god Ogma (one of the Tuatha de Danann), and this name corresponds very well to Ogmios, described by Lucian as a Gaulish Hercules. But the legend looks like an etymological afterthought; especially since the motive assigned to Ogma was the desire to invent a secret script which only the learned could use, whereas there appears to have been nothing cryptic about the old Ogam alphabet. There existed, to be sure, a kind of pedantic puzzle-speech, also called Ogam, some examples of which have been preserved in Middle Irish manuscripts. But this is to be carefully distinguished from the ancient Ogam alphabet used in inscriptions. The old alphabet was apparently known down to the Middle Irish period, and inscriptions or messages written in Ogam figure more or less frequently in the popular sagas.

The characters have been nearly all made out by recent investigation. They are usually cut along the edge of the stone and read from the bottom upward. In the alphabet which follows the horizontal line represents the edge upon which the notches and lines are graven:



A few of the monuments are bi-lingual.

The inscriptions contain almost nothing besides proper names, but these are of great value for the light they throw upon primitive Celtic phonology and inflection. Compare the article on Irish Literature.

Bibliography. R. R. Brash, *The Ogam Inscribed Monuments of the Gaedhil in the British Islands* (London, 1879); John Rhys, *Lectures on Welsh Philology* (2d ed., London, 1879); Sir Samuel Ferguson, articles in the *Transactions of the Royal Irish Academy*, vol. xxvii., and *Ogam Inscriptions in Ireland, Wales, and Scotland* (Edinburgh, 1887; being the Rhind Lectures for 1884); R. A. Stewart Macalister, *Studies in Irish Epigraphy*, part i. (London, 1897, part ii., 1902). The Pictish problem is discussed by Rhys, *The Inscriptions and Language of the Northern Picts*, Proceedings of the Society of Antiquarians of Scotland, 1892, pp. 263 ff. On the Ogmic puzzle-writing see Thurneysen in the *Revue celtique*, vii., pp. 369 ff.

OGASAWARA-SHIMA, ō-gä′sȧ-wä′rȧ-shē′-mȧ (Jap., islands (owned by) Ogasawara). The Japanese name of the Bonin Islands (q.v.).

OG′DEN. A city and the county-seat of Weber County, Utah, 37 miles north of Salt Lake City; at the confluence of the Ogden and Weber rivers, and on the Union Pacific, Southern Pacific, Oregon Short Line, Ogden and Northwestern, and Rio Grande Western railroads (Map: Utah, B 1). It is the seat of the State Industrial School (reformatory) and of State institutions for the deaf, dumb, and blind, of Sacred Heart Academy (Roman Catholic), and of Weber Stake Academy (Mormon). The principal buildings are the city hall, county courthouse, and several of the public school buildings. Union, Lester, and Liberty parks, respectively 5, 10, and 10 acres in area, are notable attractions. The Ogden Cañon, opening at the city limits, is noted for its wildly picturesque scenery and for its waterfall. A pipe line serves to convey an immense electrical energy supplying light, heat, and power for Ogden and Salt Lake City. The city has valuable natural advantages from its location in a productive agricultural, fruit-growing, and mineral region. An important railroad junction, it controls large commercial interests in an export trade in beet sugar, canned goods, grain, and fruit, and as a distributing centre for the surrounding country. Its industrial enterprises, also important, are represented by woolen mills, canning works, brick and tile works, a broom factory, pickle works, etc. Ogden was founded in 1848, was laid out as a city under the direction of Brigham Young in 1850, and was chartered in 1851. The original charter previously governing the city, dated 1861, was repealed by the Legislature of 1898, which enacted a general law for the government of cities and towns of the State. Under this statute, Ogden is governed by a mayor, elected every two years, a unicameral council, and administrative officials, of whom the clerk, auditor, treasurer, attorney, and police justice are chosen by popular vote, and all others appointed by the executive, subject to the consent of the council. Population, in 1890, 14,889; in 1900, 16,313.

OGDEN, Aaron (1756-1839). An American soldier and lawyer, born at Elizabethtown, N. J. He graduated at Princeton in 1773, entered the Revolutionary army in 1777, and served until the close of the war, when he was discharged with the rank of major. In 1801 the Federalist Legislature of New Jersey chose him United States Senator, and in 1812 the same party elected him Governor of the State. He afterwards went into partnership with one Daniel Dod for the purpose of running a steamboat between Elizabethtown and New York, and this brought him into conflict with Livingston and Fulton, to whom the New York Legislature had granted the exclusive right to navigate the waters of that State with steamboats. This led to years of litigation and resulted in Ogden's financial ruin. From 1829 until his death he was president of the Society of the Cincinnati. Consult: Dayton, *Address Before the Whig and Cliosophic Societies of the College of New Jersey* (Princeton, 1839); and *Collections of the New Jersey Historical Society*, vol. vii. (1872).

OGDEN, William Butler (1805-77). An American railroad official. He was born at Walton, N. Y., and became a member of the New York Legislature in 1834. In 1835 he removed to Chicago, and upon its incorporation as a city in 1837 became the first mayor. He was instrumental in building the Galena and Chicago Railroad, of which he was made president in 1847. He advocated canal improvement, was president of the Chicago, Saint Paul, and Fond du Lac Railroad in 1855, and when, by the consolidation of smaller railroads, the Chicago and Northwestern was formed, he became its president. He was a strong advocate of the Pacific railroads, and was the first president of the Union Pacific Company. In addition to his railroad interests, he was largely engaged in lumbering in Wisconsin. He was also the promoter of many philanthropic and educational movements in Chicago.

OG'DENSBURG. A city and port of entry in Saint Lawrence County, N. Y., 142 miles north by east of Syracuse. It is on the Saint Lawrence River, at its confluence with the Oswegatchie, and opposite Prescott, Ont., with which it is connected by steam ferry, and on the New York Central and Hudson River and the Rutland railroads (Map: New York, E 1). Among the prominent educational and charitable institutions are the Ogdensburg Free Academy, Saint Lawrence Hospital (State), city hospital, Saint John's Hospital, and United Helpers' Home. The city has also a fine United States custom-house and post-office, State armory, city hall, public library, Roman Catholic cathedral, and Riverside, Hamilton, Mansion, Crescent, and Grove parks. Ogdensburg, as the terminal of deep-water navigation on the Great Lakes, has regular steamship communication with the principal lake ports, and carries on an important trade in grain, lumber, and general produce, as well as manufactured products, principally lumber, brass curtain rods, silk, and skirts. Many of its industrial establishments utilize water power derived from the river. First settled in 1749, Ogdensburg was incorporated as a village in 1817 and received a city charter in 1868. The government, under the original charter as subsequently amended, the last revision in 1899, is vested in a mayor elected every two years; a unicameral council; and administrative officials, the majority of whom are either elected by the council or confirmed by that body upon nomination by the executive. The civil service commission is appointed by the mayor; and the board of education, one of whose members acts as president, is chosen by popular vote. The waterworks are owned and operated by the municipality. Population, in 1890, 11,662; in 1900, 12,633.

OGÉ, ō'zhā', Jacques Vincent (c.1755-91). A Haitian revolutionist. He was born at Dondon, a free man, but a mulatto; served for several years in one of the German armies; and in 1789 was sent to the Constitutional Assembly as a representative of Haiti. When he returned to the island he petitioned the Assembly to free the slaves there. But he was unsuccessful and took up arms in the autumn of 1790, having organized a company in the United States. He won a few battles, then was defeated, and surrendered after receiving a promise that his life should be spared; but he was tried and sentenced to be broken on the wheel.

OGEE' (probably a corruption of *ogive*, on account of the form of the curve when viewed in perspective from below). A molding consisting of two curves, one concave and the other convex. It is called (in classic architecture) *cymatium* or *cyma reversa*. The ogee is also much used in Gothic architecture.

OGEE'CHEE LIME. An American tree. See Tupelo.

OGGIONE, ŏd-jō'nâ, Marco da (c.1470-c.1540). An Italian painter, born at Oggiono, on Lake Como. A pupil and able imitator of Leonardo da Vinci, under whom he studied as early as 1490, he is best remembered for the excellent copies of his master's "Last Supper," one of which (in oil) is in the Royal Academy, London, another (in fresco) in the Brera Gallery, Milan, and a third, on a smaller scale, in the Hermitage, Saint Petersburg. In view of the almost total destruction of the original, the value of these faithful reproductions can hardly be overestimated. Of five fresco paintings executed for the Church of Santa Maria della Pace, Milan, the "Assumption" and "Marriage at Cana" are now in the Brera Gallery, which also contains a masterly canvas of "The Archangels Suppressing Lucifer." In the Louvre may be seen a "Holy Family," in the Berlin Museum a "Madonna," and in the Pinacoteca at Turin a "Christ Bearing the Cross."

OGIER (ō'zhyâ') **THE DANE.** One of the most popular of Charlemagne's paladins, the hero of several of the chansons de geste of the Charlemagne cycle, the oldest form of which, "La Chevalerie Ogier de Danemarche," was edited by Barrois, and another version by Raimbert. Ogier, son of Godfrey, Duke of Denmark, was brought up as a hostage at Charlemagne's Court. His son being killed by the King's son, a long strife ensued, during which Ogier was long besieged in Castle-Fort, defending it with great valor. He inherited the Kingdom of Denmark, but gave it up to return to the French Court, and became one of Charlemagne's foremost champions. In extreme old age he was shipwrecked near the island of Avalon, and carried off by Morgan le Fay to her magic palace. A ring restored his youth, and a magic crown made him forget the past. Two hundred years later he returned to free France from invaders, probably Normans, after which he was carried away again by Morgan to Avalon. As the Danish national hero, Holger Danske, he still sleeps till danger wakes him. He figures in the literature of several countries. In English legends he is known as the father of Sir Bevis of Hampton, and appears in Morris's *Earthly Paradise.*

OGILBY, ō'g'l-bĭ, John (1600-76). A British author and publisher; born in or near Edinburgh. He accompanied Strafford, Lord Deputy of Ireland, to Dublin in 1633, and built a little theatre in Saint Werburg Street. The outbreak of the Civil War in 1641 ruined him, however, and he returned to London destitute. He then learned Latin and Greek, and translated Vergil, Æsop, and Homer. After the Restoration Ogilby enjoyed the favor of Charles II., and after a brief sojourn in Ireland he settled in London and became a publisher. The great fire of 1666 destroyed his printing house and stock, but he soon recovered, and during the next ten years published many fine works, several of which were illustrated with engravings by Hollar, Lombart, Faithorne, and others. During his latter years he devoted himself to the publication of works on geography and topography, freely illustrated with maps and engravings, among which were *An Embassy from the East India Company of the United Provinces to the Grand Tartar Cham, Emperor of China* (1669); and the first volume of *Britannia,* a work which was to have comprised three volumes, but which was never completed, owing to its projector's death. Consult: Nicolson, *Historical Libraries* (new ed., London, 1796), and Conington's "English Translators of Vergil," in the *Quarterly Review* (London, 1861).

OGILVIE, ō'g'l-vĭ, Clinton (1838-1900). An American landscape painter, born in New York. He studied in his native city under James Hart, and afterwards went abroad, where he spent much time, especially in France. In 1864 he was elected an associate of the Royal Academy. His landscapes are usually of Swiss or French scenes.

OGILVIE, John (1797-1867). A Scottish lexicographer, born in Marnoch parish, Banff. The loss of a leg forced him to abandon physical labor at twenty-one, and he became schoolmaster while preparing himself for the university. In 1828 he graduated from Marischal College, Aberdeen. He taught privately in that city for three years, and was then mathematical master in Gordon's Hospital until 1859. He wrote *Imitations of Horace* (1831-32), in the Scottish dialect, for the *Aberdeen Magazine;* collaborated in Stackhouse's *History of the Bible* (1836); and from 1838 to the end of his life was engaged in revising and enlarging *Webster's Dictionary* under a new title, the *Imperial,* of which he published an abridgment in 1863, and a student's edition two years afterwards, which he abridged in 1867.

O'GIVE (Fr. *ogive, augive,* from ML. *augiva,* ogive, from Sp., Port., It. *auge,* highest point, from Ar. *awj,* highest point, zenith). The arch in Pointed Gothic vaulting which crosses the vault diagonally from one angle to another. By extension the term *ogive* is used to mean a Pointed arch, and French critics use it quite generally as synonymous with Gothic.

OGLESBY, ō'g'lz-bĭ, Richard James (1824-99). An American soldier and politician. He was born in Oldham County, Ky., was orphaned at eight, studied law while living on a farm and working as a carpenter at Decatur, Ill., and began to practice at Sullivan, Ill., in 1845. He served as a lieutenant in the Mexican War, participating in the battles of Vera Cruz and Cerro Gordo. In 1847 he resumed his law practice at Decatur, and after a short course of study graduated at the Louisville Law School in 1848. During the gold excitement of 1849 he crossed the continent to the mining districts of California, but returned to Decatur in 1851. He was an unsuccessful candidate for Congress in 1858, but in 1860 represented his district in the State Senate. When the Civil War broke out he resigned his seat to accept the position of colonel of the Eighth Illinois Volunteers, and subsequently commanded a brigade at Forts Henry and Donelson, was promoted to the rank of brigadier-general of volunteers in March, 1862, and to that of major-general in November; served under Grant at Shiloh and under Halleck and Rosecrans at Corinth, where he was severely wounded, and commanded the Sixteenth Army Corps from April, 1863, to May, 1864, when he resigned from the service. He was afterwards Governor of Illinois from 1864 to 1869, for several months in 1873, and from 1884 to 1889; and from 1873 to 1879 was a member of the United States Senate.

OGLETHORPE, ŏ′g′l-thôrp, James Edward (1696-1785). An English general and philanthropist, the founder of Georgia. He was born in London, December 22, 1696, and in 1710 entered the army. In 1722 he entered Parliament as member for Haslemere. The unhappy death of a friend in the debtors' prison drew Oglethorpe's attention to the horrible abuses of that institution. He brought the matter before Parliament, and was appointed chairman of a committee to investigate the subject. This experience led to the formation of a plan of colonization as a means of affording relief to insolvent debtors. In 1732 Oglethorpe and others obtained a charter granting them a tract of land in America, between the Altamaha and Savannah rivers. The plantation was called Georgia, in honor of George II., who was much interested in the project. Liberal subscriptions were made, and a Parliamentary grant of £10,000 was obtained. Oglethorpe was appointed Governor, and in November, 1732, sailed with 120 colonists, who founded the town of Savannah (q.v.). Oglethorpe was for nine years the guiding spirit of the settlement. Aside from his administrative activity, his claim to distinction in colonial history lies in his determined efforts to turn back the Spanish tide of colonization and conquest in the South. In expectation of an attack from the Spaniards at Saint Augustine, Oglethorpe organized the defenses of the little colony, and in 1738 he brought over a volunteer regiment of 600 men recruited in England. Upon the outbreak of the War of Jenkin's Ear in 1739, Oglethorpe successfully repelled an attack on Amelia Island, by the Spaniards, and in May, 1740, marched against Saint Augustine at the head of a force of 2000 militia and Indians, but in spite of the coöperation of a small fleet he was forced to abandon the attempt. In the spring of 1742 a threatened invasion of Georgia by a large Spanish force was repelled by Oglethorpe, who inflicted a severe defeat on the enemy at Frederica and thus assured the colony immunity from attack. In 1743 Oglethorpe was made brigadier-general, and in the same year he returned to England, a step rendered necessary by his financial obligations, most of which were incurred in advancing the necessary supplies for the defense of Georgia. During the Stuart invasion of 1745 Oglethorpe was accused by the Duke of Cumberland of failure to overtake the Jacobite fugitives when sent in pursuit of them. He was court-martialed, but acquitted. In 1752 he and the other trustees of Georgia resigned their charter, and the colony became a royal province. There is an admirable biography by Wright, *Memoirs of James Oglethorpe* (London, 1867). Consult also Lecky, *England in the Eighteenth Century,* vol. i. (New York, 1879). See Georgia.

OGMORE (ŏg′môr) **AND GARW** (gär′oo͝). A coal-mining town in Glamorganshire, Wales, 2½ miles southwest of Bridgend (Map: Wales, C 5). During the last decade much activity has been shown in the promotion of public industrial improvements. Of archæological interest in the neighborhood are Ogmore Castle, a Norman ruin; the remains of the twelfth-century fortified priory of Ewenny; and Coity Castle and Church. Population, in 1891, 13,800; in 1901, 19,912.

O'GOR′MAN, Thomas (1843—). An American bishop of the Roman Catholic Church, born in Boston, Mass. He lived in Chicago and in Saint Paul, Minn., until 1853, and for twelve years thereafter studied in France. In 1867 he took a pastoral charge in Rochester, Minn., but left it in 1878 to become a member of the Paulist community in New York City for four years, and was then pastor at Faribault, Minn., until 1885. The following year he went to Saint Thomas College, Saint Paul, as professor of dogmatic theology, and was the first president of that institution. In 1890-95 he was professor of modern Church history in the Catholic University, Washington, D. C. He received his D.D. degree from the Pope in 1893, and in 1896 was consecrated Bishop of Sioux Falls, S. D. His publications include *A History of the Roman Catholic Church in the United States* (1895).

OGOWAI, ō′gō′wä′, or **OGOVÉ,** ō′gō′vā′. The principal river of French Congo, equatorial West Africa. It rises about 150 miles northwest of Stanley Pool, and flows first northwestward through extensive savannas, and then westward through a dense forest region, where it leaves the inland plateau in a series of falls and rapids. Finally turning southwestward, it enters the Atlantic Ocean through a large delta in latitude 1° S. The Ogowai flows through a densely populated country, but, owing to its numerous rapids, its commercial importance is not as great as it was thought to be before its upper course was explored. Its length is over 700 miles, and it is navigable for small steamers a distance of 200 miles from its mouth. Along its banks are a number of European trading stations.

O'GRA′DY, Standish (1846—). An Irish author, and promoter of the Celtic renaissance. He studied at Trinity College, Dublin, where he graduated with high honors. Then he read and practiced law, but gave it up for journalism, and that in turn for Irish history and legend, a field in which his studies and publications are very important. They include *The Bog of Stars,* legends of Elizabethan Ireland (1893), and other collections of tales; and historical essays: *History of Ireland* (1881); *The Story of Ireland* (1894); and, with Sir G. Carew, *Pacata Hibernia, or the Wars in Ireland* (1896).

O'GROW′NEY, Eugene (1863-99). An eminent Irish Gaelic scholar, born at Ballyfallon, Athboy, Ireland. He entered the Diocesan Seminary of Saint Finans at Navan, and while there developed an interest in the Gaelic language and literature. Later, while a student in Maynooth College (1882-88), he devoted his leisure to the study of Irish history and antiquities. In 1889 he was ordained to the priesthood, and appointed a curate in the parish of Ballinacarrigy, County Westmeath. In 1890 he was appointed associate editor of the *Gaelic Journal.* Previously to this, during his vacations from Maynooth, he had paid several visits to the Aran Islands to learn the folk-tongue Irish, and in common with Professors Zimmer and Kuno Meyer, did much to establish the reputation of Inis Meadhoin as an Irish summer school. He afterwards held the reëstablished chair of Irish at Maynooth and later was elected a member of the Royal Irish Academy. He wrote many text-books, as well as numerous contributions to the current publications. In 1894 his health gave way, and he came to America, and settled in Arizona. He died at Los Angeles, Cal.

OGY'GES, or **OGYGUS** (Lat., from Gk. 'Ωγύγης, *Ōgygês*, Ὤγυγος, *Ōgygos*). In Theban legend, one of the early kings of Bœotia, the son or grandson of Poseidon. In his reign a great flood took place in Bœotia, which destroyed cities on Lake Copais. His name was borne by one of the seven gates of Thebes, near which his grave was said to be. Later systematizing chronicles introduced Ogyges to Athenian legend, as King of Eleusis or even first King of Athens, while others transferred him to Egyptian Thebes. Whatever the origin of the name, there is much to show that Ogyges was originally the name in Bœotia of a sea-god like Poseidon.

OGYG'IA (Lat., from Gk. 'Ωγυγίη *Ōgygiē*). In Homer, the mythical island of Calypso, where she detained Odysseus. The word is originally an adjective, and describes the island as belonging to the sea-god Ogyges, whether identified with Oceanus or Poseidon. Later commentators tried to localize the island near Crete or Italy; in Homer its location is wholly indeterminate in the far West.

O'HA'GAN, THOMAS, first Baron (1812-85). An Irish jurist and statesman, born at Belfast. He was called to the Dublin bar in 1836, for the following four years he edited the *Newry Examiner*, and was afterwards associated with his friend Daniel O'Connell in lawsuits bearing upon national rights. He fell out of favor with the Patriot Party by his defense of the union with England, by his appointment to the Board of National Education in 1858, and to the Attorney-Generalship in 1862, but, despite opposition, he was sent to Parliament from Tralee in 1863. Five years afterwards, under Gladstone, O'Hagan was made Lord Chancellor of Ireland and served until 1874. He was the first Roman Catholic raised to that office during two centuries, and he took his seat in the House of Lords in 1870. In 1880 he was made vice-chancellor of the Royal University of Ireland, founded in that year, and the same year Gladstone, on his return to power, called him to resume the Lord Chancellorship of Ireland, but O'Hagan's health forbade his keeping it for more than a year, though he had time to make an eloquent appeal for the Irish Land Bill. His *Occasional Papers and Addresses* were published in 1884, and his *Speeches and Arguments* in 1885.

O'HARA, ô-hăr'ȧ, THEODORE (1820-67). An American poet and soldier, born in Danville, Ky., February 11, 1820. After being educated at Bardstown, he studied law, was admitted to the bar, got an appointment at Washington, entered the army at the beginning of the Mexican War, and was brevetted major for gallantry. Afterwards he practiced law, filibustered in Cuba, performed diplomatic commissions and filled editorial posts, and in the Civil War served as colonel of an Alabama regiment and on staffs. After the war he engaged in the cotton business, but he suffered reverses. His body was removed to Kentucky and buried by the side of the victims of Buena Vista whom he had commemorated in his famous "Bivouac of the Dead," the only one of his occasional poems that keeps his memory fresh.

O'HIGGINS, ô-ĕ'gêns. An inland province of Chile, bounded by the Province of Colchagua on the south, Santiago on the north and west, and Argentina on the east (Map: Chile, C 10). Area, 2524 square miles. The eastern part lies on the slope of the Andes and is very mountainous. In the west the surface is flat and well adapted for grazing, which, together with agriculture, is the chief occupation. Gold and other metals are found in the mountains. Population, in 1895, 85,277. The capital is Rancagua (q.v.).

O'HIG'GINS, *Span. pron.* ô-ĕ'gêns, AMBROSIO (c.1730-1801). A South American governor. He was born in County Meath, Ireland, and his original name was Ambrose Higgins; was sent by his uncle, a priest in Spain, to Buenos Ayres; there he set up as a peddler and finally crossed the country and settled in Chile. He entered the Spanish army, rose rapidly, and in 1788 received the appointment of Captain-General of Chile. The last five years of his life were spent as Viceroy of Peru, with the title of Marquis of Osorno.

O'HIGGINS, BERNARDO (1776-1842). A South American soldier, dictator of Chile. He was born at Chillan, was educated at Lima until he was fifteen and then in England, where he became intimate with Miranda; and after many strange adventures returned to Chile in 1802. He joined the patriots in 1810, and three years afterwards was appointed Carrera's successor. A breach between the two generals, which threatened civil war, seemed healed by the necessity of meeting the attack of the Spanish Army. O'Higgins, treacherously deserted by Carrera, was defeated at Rancagua (1814), and was forced to leave the country. In 1817 he returned as lieutenant of San Martin, and after the victory of the patriot army accepted the dictatorship, which his commander had refused. He was completely successful in driving out the Spaniards from Chile; but the aristocratic party distrusted his republican leanings and his attempts to introduce a liberal constitution. Under the followers of Carrera, they rebelled and deposed him in 1823. O'Higgins went to Lima, where he spent his remaining years.

OHI'O (corruption of Iroquois *Ohionhiio*, beautiful river), popularly called the 'BUCKEYE STATE.' A north central State of the United States, lying between 38° 27′ and 41° 57′ north latitude, and between 80° 34′ and 84° 49′ west longitude. It is bounded on the north by Michigan and Lake Erie, on the east by Pennsylvania, on the southeast by West Virginia, on the southwest by Kentucky, and on the west by Indiana. Its southeastern and southwestern boundaries are formed by the Ohio River, while the others, with the exception of Lake Erie, are straight lines. The State measures 215 miles from east to west, and 210 miles from north to south. Its area is 41,060 square miles, of which 40,760 square miles or 26,086,400 acres are land-surface. It ranks thirty-second in size among the States.

TOPOGRAPHY. The surface is a rolling plain sloping gradually northward toward Lake Erie and southward toward the Ohio River from a low and flat ridge which forms the divide between the two water systems. This ridge crosses the State in an irregular line from near the northeastern corner to about the middle of the western boundary, keeping much nearer to the lake than to the Ohio River. The elevation of the State above sea-level varies from slightly less than 500 feet to somewhat more than 1000 feet. The greatest altitude, 1540 feet, is reached near

Bellefontaine in the west-central part. There are no marked irregularities in the surface except the trenches cut by the rivers, the Ohio River valley being lined with bluffs which in some places are 600 feet high. As noted above, the State is divided into two drainage basins. The northern portion is drained into Lake Erie by a number of streams which are all short except the Maumee, which flows through the northwestern part of the State from Indiana. The southern and much larger slope is drained into the Ohio River, some of whose tributaries in this State are of considerable size. These are the Muskingum, Hocking, Scioto, and Little and Great Miami. The Muskingum is the longest river flowing wholly within the State, and is navigable for nearly 100 miles. The Ohio itself is navigable throughout its length on the boundary, a distance of 436 miles. The other rivers of the State are chiefly important for water-power, some of them being very swift.

CLIMATE. The climate is in general pleasant and healthful, though variable, and subject to great and sudden changes of temperature. The mean temperature of the State for January is 26°, and for July 73°. The maximum may reach as high as 108° and the minimum 34° below zero, but extreme heat or cold is never very prolonged, on account of the variable winds. The southern half is the warmer, the heat of the northern portion being tempered by the presence of Lake Erie. In the north the winters are more severe, though seldom very rigorous in any part of the State. The average annual rainfall is 39.35 inches, very evenly distributed through the year, though there is a maximum in May and June.

SOIL AND VEGETATION. In the southeastern part the soil is formed directly from the decomposition of the underlying rocks, while in the remaining area, covering nearly two-thirds of the State, it consists of glacial drift of great fertility. This soil contains a great percentage of limestone material in the west, while in the northeast it consists chiefly of clay, and is well adapted for wheat-growing. The alluvial soil deposited along the river courses is excellent for the raising of Indian corn. The extreme northwestern part of the State exhibits certain features of prairie country, The remainder was originally covered with forests, in which oak, chestnut, and maple predominated on the higher ground, and elm, beech, ash, and similar trees on the lowlands. The flora of the State partakes of the general character of the Northeastern United States and has few peculiar species.

For Fauna, see paragraph under UNITED STATES.

GEOLOGY. The principal feature in the geology of Ohio is the broad fold or anticlinal whose axis extends from central Kentucky and crosses southwestern Ohio near Cincinnati, thence running northwest into Indiana, while a branch axis runs northeast toward the western end of Lake Erie. From this axis the strata dip gently in either direction, so that a broad area of Silurian rocks is exposed, covering southwestern Ohio, southeastern Indiana, and north central Kentucky, with a narrower band along the branch axis toward Lake Erie. A small portion of this area near Cincinnati is composed of Lower Silurian rocks known as the Cincinnati group. On either side of the Silurian are narrower outcrops of Devonian strata running on the one hand through central Indiana, and on the other through the whole length of Ohio a little west of the central line. The lateral outcrops of these strata along the branch axis occupy the northwestern corner of the State and a narrow belt along the entire southern shore of Lake Erie. The remainder of Ohio, including nearly the whole eastern half, consists of Carboniferous strata. The entire State seems to have been above sea level throughout the Mesozoic and Cenozoic eras, there being no formations later than the Carboniferous until we come to the glacial drift. This covers about two-thirds of the State, leaving the southeastern portion untouched by the ice invasion. The drift deposit is in some places several hundred feet thick, and consists of alternating layers of boulder clay, stratified sand, finely laminated clay, sandy clay, and gravel. Raised beaches showing the former extent of the Great Lakes have been traced through the State, and another interesting feature of the surface are the deeply carved river-valleys which are completely filled with débris, so that the rivers sometimes flow far above their former beds.

MINERAL RESOURCES AND MINING. Both the upper and lower coal measures contain several workable seams interbedded between strata of shale, limestone, sandstone, and clay, and ranging in thickness from two to over a dozen feet. It has been estimated that Ohio contains enough coal to supply the demand of the State for soft coal for 1000 years at the present rate of consumption. The interbedding strata of the coal measures yield fire-clay and building stone, and here also are found the iron ores of the carbonate variety. The Salina group of the Silurian strata near Sandusky contains valuable gypsum deposits, and salt deposits also occur at various places. One of the most remarkable events in the mineralogical development of Ohio was the discovery in 1884 of petroleum in the Trenton limestone formation of Lower Silurian age. This formation as well as the Upper Silurian inclosed also considerable reservoirs of natural gas.

Ohio's output of coal increased from about 6,000,000 tons in 1880 to 13,562,000 tons in 1892. It did not exceed this figure again until 1898. In that year and in the two following years the increase was very rapid. The output in 1900 aggregated 18,988,150 short tons, amounting to 7 per cent. of the total output for the country. It was valued at $19,292,246. Only a small amount of the coal output is used in the production of coke. The average number of employees engaged in the coal industry in that year was 27,628.

The petroleum development has been of recent date. Little had been produced prior to 1885, which year marks the beginning of the swift progress of the industry. The yield increased from 90,081 barrels in 1884 to 661,580 in 1885, 10,010,868 in 1888, and 23,941,169 in 1896. The last is the record year. The output for 1900 was 22,362,730 barrels, valued at $24,091,601. This was much in excess of that of any other State, and was over one-fourth of the total output for the United States. The petroleum is obtained in two sections of the State, the southeast and northwest. The former is known as the Eastern district, and the latter—the more important—as the Lima district. In a third region, known as the Mecca-Belden district, small quantities of lubricating oil are obtained. The utilization of the State's natural gas resources is also of recent development. There are two gas fields corresponding in a general way with those of petroleum. The extensive use of gas for fuel began in the Eastern district in the early seventies. The value of the gas burned in 1880 was estimated at over $5,000,000. The product was extravagantly consumed, and the supply soon became exhausted, so that in 1885 the value of the product was only about $100,000. The development of the gas fields in the northwest part of the State began at Findlay about this time, and the value of the output rapidly increased until 1889, when it exceeded that of any previous year. After 1889 the output declined steadily until 1898, since when its value increased again, amounting in 1900 to $2,178,234. From 1890 to 1900 the State was exceeded in rank with respect to the output of natural gas by Pennsylvania and Indiana, and since 1899 by West Virginia.

Ohio ranks first in the annual value of clay products, contributing 17.3 per cent. (1900) of the total output for the country. Their value increased from $10,860,934 in 1890 to $18,504,628 in 1900. Of the latter amount, $8,573,323 represented the value of the pottery (see *Manufactures*), and $9,731,305, the brick and tile. The State regularly ranks first in the figures for the sandstone product. From an annual value of over $3,000,000 in the earlier years of the decade 1890-1900, Ohio's product fell to about half that amount, but rose in 1900 to $2,233,596, including grindstones and whetstones. Of these it produces over four times as much as all the rest of the country, the value for 1900 being $549,636. The output of limestone for the same decade fluctuated in value around $1,500,000, approximately half the product being burned into lime. Considerable quantities of cement are annually manufactured. Iron ore was mined at an early period, and was of great importance to the industrial development of the State. Recently, however, iron-mining has become of less importance, both relatively and absolutely. From 344,484 tons in 1886 the output fell gradually to 61,016 tons in 1900, the entire product being of the carbonate variety of ore, and giving Ohio first rank in the production of carbonate ore. In 1900 sales of mineral water were reported from fifteen springs. In the same year the production of salt amounted to $696,326, giving the State fourth rank.

Forests and Forest Products. The greater part of Ohio was originally covered with forests of hard wood, largely white oak. Scarcely any of the primeval forests remain. The wooded area in 1900 was estimated at 9300 square miles, or 23 per cent. of the total area. The value of the lumber and timber products (see table below) was greater for 1900 than for any previous census year. The abundance of forests early gave rise to a number of industries, such as the manufacture of planing-mill products, furniture, etc., which have continued important, although much of their timber supply is now imported from other States.

Agriculture. There is little waste land in the State. In 1900, 93.9 per cent. of the total land area was in farms. The proximity of large city markets and the excellence of the transportation facilities help to stimulate agriculture. Every decade from 1850 to 1900 shows an increase in the area of improved land, which amounted in both 1890 and 1900 to 78.5 per cent. of the total farm area. The average size of farms decreased from 125.2 acres in 1890 to 88.5 acres in 1900. The farms operated by tenants in 1900 were 27.5 per cent. of the total number. Farm renting is becoming more common. The farms leased on share are more than twice as numerous as those leased for cash.

From the table appended it will be noticed that no particular agricultural products receive a monopoly of attention. In the variety of its farm yield the State has ranked high since the first settlement of the West. The staple products are grown throughout the State, there being only a slight difference in the adaptability of the different sections. The area of corn, wheat, and hay each exceeds three million acres, though the two last attained that record for the first time in 1900. From 1890 to 1900 the acreage of wheat increased 41.4 per cent. and the acreage of corn 20 per cent. Oats are also extensively grown, but this crop decreased in area during that decade. Rye, barley, and buckwheat are not extensively raised. Ohio is one of the largest producers of Irish potatoes, and the large city markets have given rise to the extensive raising of other varieties of vegetables—sweet corn, tomatoes, and cabbage being particularly important. The area devoted to tobacco increased 61.2 per cent. from 1890 to 1900, the rank of the State in 1900 being fourth. Over 43 per cent. of the area devoted to tobacco in 1900 lay in the counties of Montgomery and Darke. Ohio is probably the largest producer of temperate zone orchard fruits. Fifty-nine per cent. of the trees, or 12,952,625, are apple. The yield of this crop in 1900 was 20,600,000 bushels. The number of peach and pear trees was three times, and of plum and prune trees six times, as great in 1900 as in 1890. The region around Lake Erie is especially favored for fruit-raising. This region has become noted for its numerous and extensive vineyards. Large quantities of small fruits are grown. The use of fertilizers, estimated on the basis of cost, increased 68.2 per cent. from 1890 to 1900, amounting in the latter year to an average of $10 per farm.

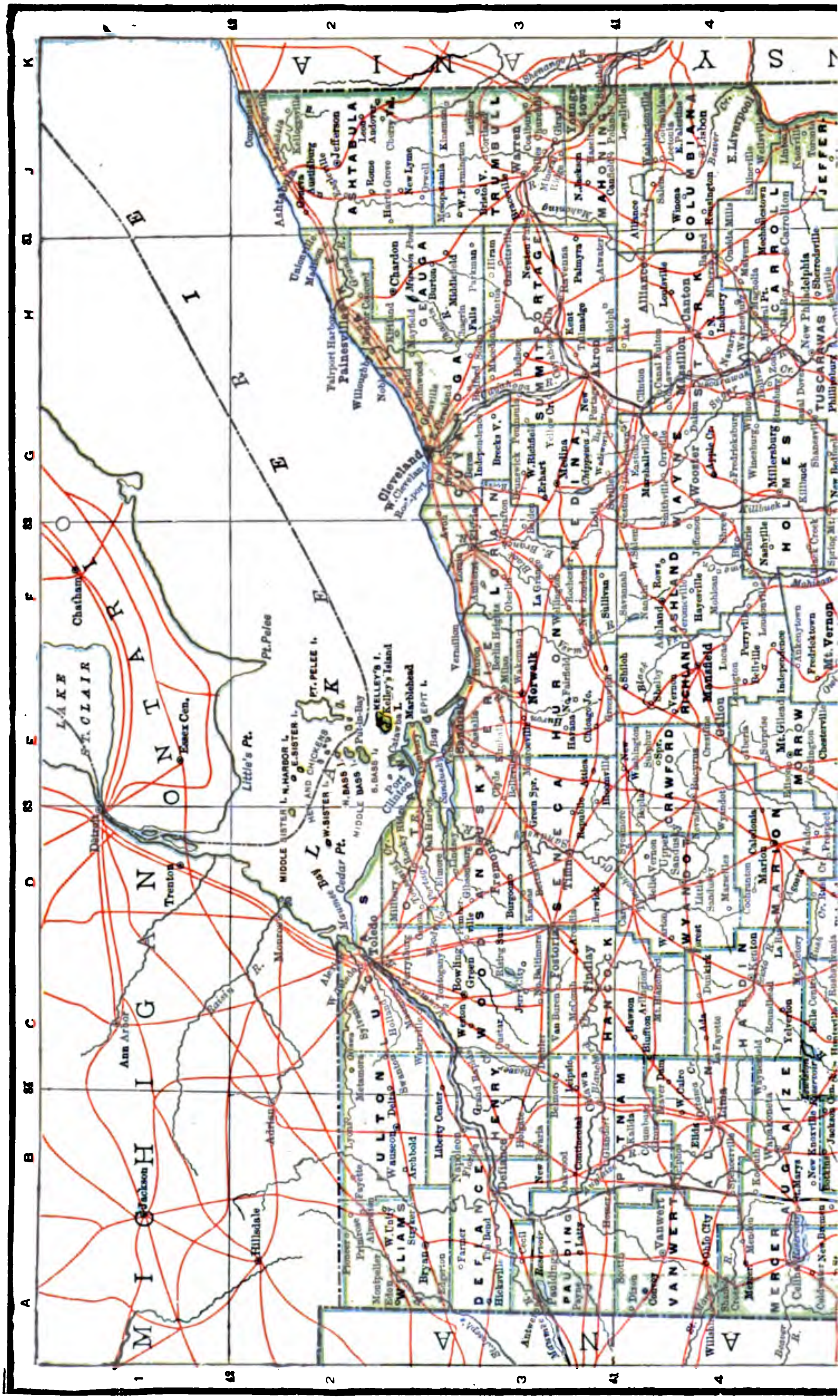
The following table of crop acreages is self-explaining:

CROP	1900	1890
Corn	3,826,013	3,189,553
Wheat	3,209,074	2,269,585
Oats	1,115,149	1,215,355
Rye	17,585	59,643
Buckwheat	13,071	14,052
Barley	34,058	37,092
Hay	3,015,261	2,992,026
Tobacco	71,422	44,303
Potatoes	167,590	185,393

Stock-Raising. Stock-raising is characterized by the same diversity as is the cultivation of crops. Ohio holds a prominent place in dairying. The number of dairy cows has increased each decade since 1870. The production of milk gained 30.3 per cent. from 1890 to 1900. The receipts from sales of dairy produce in 1900 were $15,484,849, or 61 per cent. of the value of the total product. Of this amount, $8,303,626 was derived from the sale of milk, and most of

AREA AND POPULATION OF OHIO BY COUNTIES.

County.	Map Index.	County Seat.	Area in square miles.	Population.	
				1890.	1900.
Adams	D 8	West Union	524	26.093	26,328
Allen	B 4	Lima	405	40,644	47,976
Ashland	F 4	Ashland	424	22,223	21,184
Ashtabula	J 2	Jefferson	691	43,655	51,448
Athens	F 7	Athens	528	35,194	38,730
Anglaize	B 4	Wapakoneta	394	28,100	31.192
Belmont	H 6	Saint Clairsville	611	57,413	60,875
Brown	C 7	Georgetown	430	29,899	28,237
Butler	A 7	Hamilton	498	48.597	56,870
Carroll	H 4	Carrollton	379	17,566	16,811
Champaign	C 5	Urbana	419	26.980	26,642
Clark	C 6	Springfield	403	52.277	58,939
Clermont	B 7	Batavia	431	33,553	31,610
Clinton	C 7	Wilmington	424	24,240	24,202
Columbiana	J 4	Lisbon	504	59,029	68,590
Coshocton	F 5	Coshocton	552	26,703	29,337
Crawford	E 4	Bucyrus	397	31,927	33,915
Cuyahoga	G 3	Cleveland	472	309,970	439,120
Darke	A 5	Greenville	604	42,961	42,532
Defiance	A 3	Defiance	412	25,769	26,387
Delaware	D 5	Delaware	431	27,189	26,401
Erie	E 3	Sandusky	312	35,462	37,650
Fairfield	E 6	Lancaster	493	33,939	34,259
Fayette	C 6	Washington C. H.	444	22,809	21,725
Franklin	D 5	Columbus	479	124,087	164,460
Fulton	B 2	Wauseon	419	22,023	22,801
Gallia	F 8	Gallipolis	408	27,005	27,918
Geauga	H 2	Chardon	412	13,489	14,744
Greene	C 6	Xenia	453	29,820	31,613
Guernsey	G 5	Cambridge	484	28,645	34,425
Hamilton	A 7	Cincinnati	405	374,573	409,479
Hancock	C 3	Findlay	526	42,563	41,993
Hardin	C 4	Kenton	461	28,939	31,187
Harrison	H 5	Cadiz	370	20.830	20,486
Henry	B 3	Napoleon	415	25,080	27,282
Highland	C 7	Hillsboro	558	29,048	30,982
Hocking	E 6	Logan	425	22,658	24,398
Holmes	F 4	Millersburg	439	21,139	19,511
Huron	E 3	Norwalk	516	31,949	32,330
Jackson	E 7	Jackson	411	28,408	34,248
Jefferson	J 5	Steubenville	390	39,415	44,357
Knox	F 5	Mount Vernon	514	27,600	27,768
Lake	H 2	Painesville	242	18,235	21,680
Lawrence	E 8	Ironton	469	39,556	39.534
Licking	F 5	Newark	665	43,279	47,070
Logan	C 5	Bellefontaine	470	27,386	30,420
Lorain	F 3	Elyria	494	40,295	54.857
Lucas	C 2	Toledo	356	102,296	153.559
Madison	D 6	London	451	20,057	20,590
Mahoning	J 3	Youngstown	413	55.979	70,134
Marion	D 4	Marion	502	24,727	28,678
Medina	F 3	Medina	423	21,742	21,958
Meigs	F 7	Pomeroy	435	29,813	28,620
Mercer	A 4	Celina	466	27,220	28,021
Miami	B 5	Troy	417	39,754	43,105
Monroe	H 6	Woodsfield	431	25,175	27,031
Montgomery	B 6	Dayton	489	100,852	130,146
Morgan	G 6	McConnellsville	396	19,143	17,905
Morrow	E 4	Mount Gilead	395	18,120	17,879
Muskingum	F 6	Zanesville	655	51 210	53,185
Noble	G 6	Caldwell	369	20,753	19 466
Ottawa	D 3	Port Clinton	292	21,974	22,213
Paulding	A 3	Paulding	415	25,932	27,528
Perry	F 6	New Lexington	418	31,151	31,841
Pickaway	D 6	Circleville	474	26,959	27,016
Pike	D 7	Waverly	411	17,482	18,172
Portage	H 3	Ravenna	509	27 868	29,246
Preble	A 6	Eaton	432	23,421	23.713
Putnam	B 4	Ottawa	475	30,188	32,525
Richland	E 4	Mansfield	514	38,072	44,289
Ross	D 7	Chillicothe	646	39,454	40,940
Sandusky	D 3	Fremont	429	30,617	34,311
Scioto	D 8	Portsmouth	565	35,377	40,981
Seneca	D 3	Tiffin	556	40.869	41,163
Shelby	B 5	Sidney	401	24,707	24,625
Stark	H 4	Canton	546	84,170	94,747
Summit	G 3	Akron	394	54,089	71,715
Trumbull	J 3	Warren	624	42,373	46.591
Tuscarawas	H 5	New Philadelphia,	533	46,618	53,751
Union	D 5	Marysville	430	22,860	22,342
Van Wert	A 4	Vanwert	411	29,671	30,394
Vinton	E 7	McArthur	414	16,045	15,330
Warren	B 7	Lebanon	439	25 468	25,584
Washington	H 7	Marietta	627	42,380	48,245
Wayne	G 4	Wooster	544	39,005	37,870
Williams	A 2	Bryan	432	24,897	24,953
Wood	C 3	Bowling Green	626	44.392	51,555
Wyandot	D 4	Upper Sandusky	403	21,722	21,125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Lima
Findlay
Norwalk
Painesville
Youngstown
Canton
Jackson
Hillsdale
Adrian
Ann Arbor
Monroe
Chatham
Pt. Pelee
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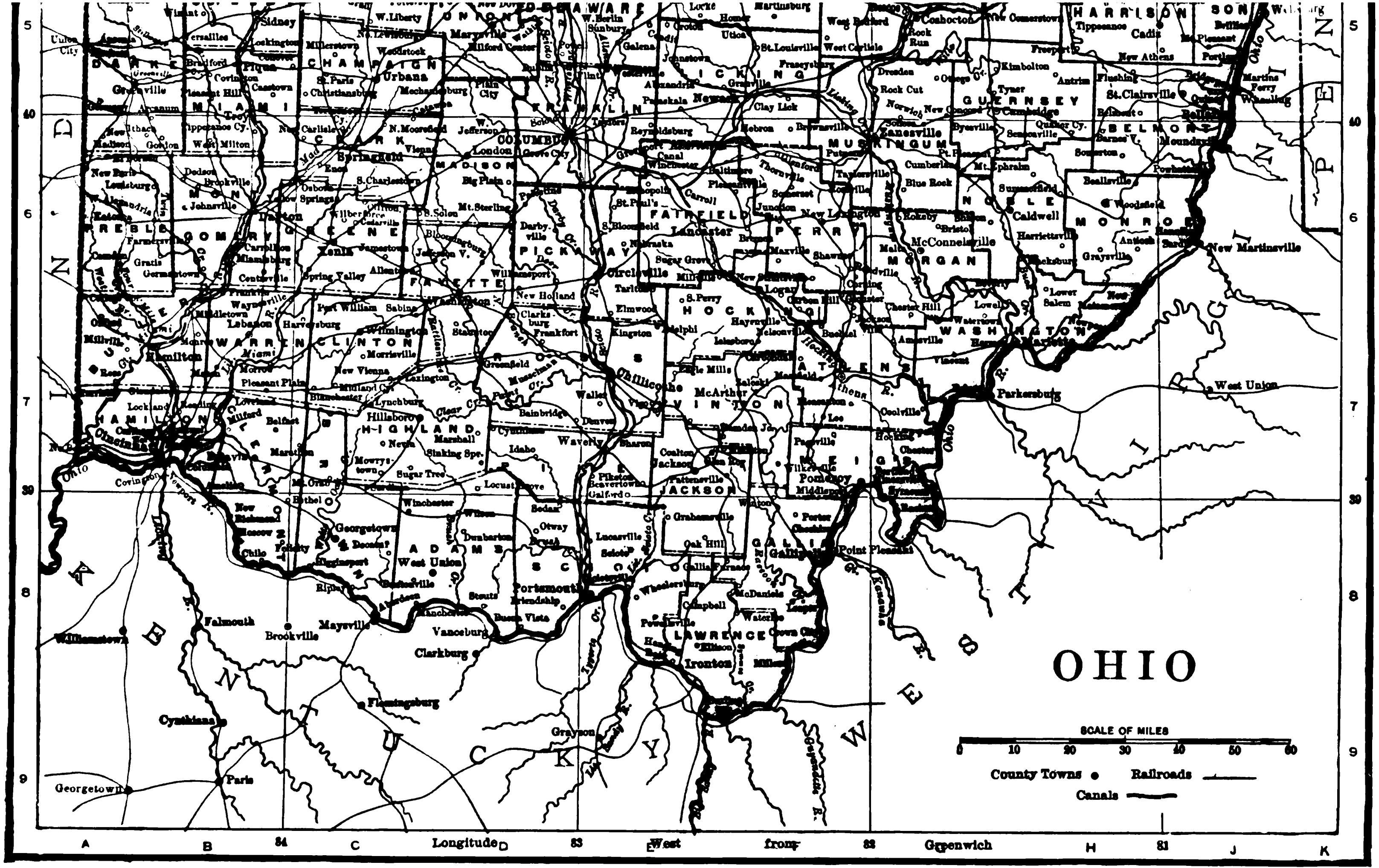

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the remainder from butter. The State is noted for sheep-raising, having for a long time led in the number of sheep, but there was a large decrease from 1890 to 1900. The average weight of fleeces, however, increased in this last decade, and in 1899 $4,299,025 was received from sales of wool. There was a significant gain from 1890 to 1900 in the number of cattle. The number of swine has remained about the same since 1880. Poultry is an important source of income.

The following table of holdings of stock explains itself:

	1900	1890
Dairy cows	818,239	794,833
Other cattle	1,235,074	968,554
Horses	878,205	880,677
Mules and asses	17,021	18,858
Sheep	2,648,250	4,060,729
Swine	3,188,563	3,275,922

Manufactures. Until 1880 Ohio ranked fourth in the United States in the value of manufactured products, being exceeded in that year for the first time by Illinois. It has since held fifth place. The greatest absolute increase both in the value of products and the number of wage-earners employed was made between 1880 and 1890. In 1900 the value of products was estimated at $832,438,000, and the wage-earners numbered 345,869, or 8.3 per cent. of the population.

The early settlers were mainly from the Atlantic coast States, and brought with them a knowledge of industrial methods which enabled them to begin at once a diversity of industries for the supplying of local needs. The local requirements were soon outgrown, however, in consequence largely of the superior advantages of transportation, which gave the industries easy access to the resources of raw materials outside the State, and to the markets of an extensive and rapidly developing region. The Ohio River on the south afforded communication with the States of the Mississippi Valley. Lake Erie on the north gave the State the advantages of the lake system of transportation, and, after the building of the Erie Canal, afforded communication with the Atlantic coast. The two systems of transportation were early connected by two canals, and these waterways determined the location of the early industrial centres, three of which, Cincinnati, Cleveland, and Toledo, were especially favored by their positions at the junction of the artificial with the natural waterways. They still hold their industrial precedence.

From 1800 to 1850 Cincinnati not only far surpassed all other cities in the State, but was the metropolis of the West. From 1890 to 1900, however, there was a decrease in both the value of its products and the number of its wage-earners. Cleveland by contrast has rapidly grown, and now surpasses all Ohio towns in importance as to manufactures. What has brought Cleveland and other cities in the northeastern part of the State into recent prominence is the advantage they enjoy in the manufacture of iron and steel. This has become the State's leading industry. The first iron and steel establishment was in this section of Ohio, but as the forests, which supplied the charcoal used as fuel, became exhausted, the industry shifted to the southern part. The revival of iron and steel manufacture in the northeastern part was due to the development of the Lake Superior iron mines and the easy transportation afforded by the Great Lakes to this section of Ohio, together with the fact that the coke-producing regions of Pennsylvania were near. Youngstown, near which place the industry originated, has become the largest producer of iron and steel in Ohio. Since 1870 the State has ranked next to Pennsylvania, and between 1890 and 1900 its product more than doubled in value. The closely allied tin and terne-plate industries are also rapidly developing. The prominence of the iron and steel industry and the convenient resources of coal have exercised a beneficial influence on the manufacture of foundry and machine-shop products—the second largest industry in the State. This branch early attained large proportions at Cincinnati, which city was favored by its location on the Ohio River and its nearness to the coal and iron regions farther east. The industry has since developed generally throughout the State, Cleveland having become the largest centre. From 1890 to 1900 there was a gain of 66 per cent. in the value of the product. In the construction of merchant vessels Cleveland now ranks first among the cities of the United States.

In 1900 Ohio led all States in the manufacture of metal-working machinery. The large steam railway interests have led to an extensive car and general shop construction industry, and the increased use of electricity has occasioned a rapid development in the manufacture of electrical apparatus and supplies. From the first the preëminence of Ohio in agriculture has been a potent factor in manufacturing, having created a market for certain products, and supplying raw materials for others. A number of towns are best known by their manufacture of agricultural implements and wagons and carriages. The local iron and steel supply and the native forests within or near the State boundaries have afforded the chief raw materials required. The products of the farms in turn have occasioned a large slaughtering and meat-packing output, extensive manufactures of liquors, and a large production of flour, grist and tobacco products, and food preparations. In 1900 Ohio ranked third in the value of flour and grist-mill output, and also in the value of liquor products. Toledo ranks first in the production of the former, and Cincinnati in that of the latter. Cincinnati is also the largest centre of the slaughtering and tobacco interests. Being located close to the junction of the three largest swine-raising States, Cincinnati was, from 1800 to 1850, the largest meat-packing centre in the United States. The importance of the tobacco manufacture of that city is due to the fact that it is surrounded by one of the largest tobacco-growing regions in the United States. Akron is the chief producer of food preparations, an industry which enjoyed a sixfold increase from 1890 to 1900. Other industries which depend upon the resources of the State include the manufacture of glass, pottery and other clay products, and the refining of petroleum. When the natural gas supply partially failed, some of the glass factories removed to the Indiana gas fields. The value of the output for Ohio has therefore decreased. The value of the pottery products, on the contrary, more than doubled during the decade ending with 1900. East Liverpool, on the Ohio River, produces nearly one-half of the white ware manufactured in the United States. Yellow ware is manufactured at Zanesville and other points.

The manufactures of clothing, boots and shoes, leather, and rubber and elastic goods are all important. The value of the boots and shoes manufactured in 1900 was twice that for 1890, and the value of the rubber and elastic goods increased fivefold during the same period. Ohio has always been the largest boot and shoe manufacturing State west of the Alleghany Mountains, and only three cities, all located in Massachusetts, rank in this line ahead of Cincinnati.

The following table with respect to the leading industries explains itself. It will be seen that the percentage of the value of products has increased much more than that of the number of establishments:

INDUSTRIES	Year	Number of establishments	Average number wage-earners	Value of products, including custom work and repairing
Total for selected industries given below for State	1900	9,557	218,545	$547,619,814
	1890	7,997	169,057	402,134,891
Increase, 1890 to 1900	......	1,560	44,488	145,484,923
Per cent. of increase	......	19.5	26.3	36.2
Per cent. of total of all industries in State	1900	29.5	61.7	65.8
	1890	27.9	57.7	62.7
Iron and steel	1900	107	33,677	138,935,256
	1890	101	23,546	65,206,828
Foundry and machine shop products	1900	861	41,799	72,399,632
	1890	600	24,795	43,617,072
Cars and general shop construction and repairs by steam railroad companies	1900	91	11,534	12,975,182
	1890	64	7,397	8,096,905
Electrical apparatus and supplies	1900	64	3,773	6,504,847
	1890	11	348	604,780
Agricultural implements	1900	78	6,852	13,975,268
	1890	106	7,701	14,333,258
Carriage and wagon materials	1900	109	4,529	7,186,271
	1890	99	2,697	4,310,607
Carriages and wagons	1900	543	7,274	15,919,173
	1890	709	9,493	18,777,866
Flouring and grist-mill products	1900	1,150	2,438	37,390,367
	1890	910	3,311	39,468,409
Slaughtering	1900	71	1,765	20,660,780
	1890	138	1,346	17,012,198
Soap and candles	1900	55	1,427	8,150,069
	1890	49	1,013	5,746,660
Liquors: total	1900	190	3,978	31,771,591
	1890	179	3,666	28,484,290
Tobacco	1900	1,196	12,189	20,832,629
	1890	995	8,259	16,387,719
Food preparations	1900	31	1,100	7,166,532
	1890	35	270	1,029,842
Coffee and spice, roasting and grinding	1900	26	678	5,849,644
	1890	32	488	7,806,763
Glass	1900	28	4,546	4,547,063
	1890	59	6,435	5,649,182
Pottery, terra cotta, and fire-clay products	1900	248	11,870	11,851,225
	1890	125	4,606	5,047,501
Petroleum, refining	1900	9	1,006	8,396,977
	1890	15	1,976	16,343,493
Clothing, men's, factory product	1900	539	6,521	16,593,824
	1890	508	15,210	20,604,134
Clothing, women's, factory product	1900	126	4,817	7,772,771
	1890	31	2,546	4,352,098
Boots and shoes, factory product	1900	81	12,718	17,920,854
	1890	63	5,743	8,489,728
Leather—tanned, curried and finished	1900	58	1,384	5,182,065
	1890	113	1,447	6,701,670
Rubber and elastic goods	1900	19	3,505	7,330,104
	1890	7	658	1,486,777
Printing and publishing: total	1900	1,253	11,021	20,391,868
	1890	987	9,026	17,188,851
Lumber and timber products	1900	2,054	8,539	20,790,854
	1890	1,461	11,727	15,279,843
Lumber, planing mill products, including sash, doors and blinds	1900	354	4,696	11,066,671
	1890	335	5,356	12,910,538
Furniture, factory product	1900	165	6,723	9,514,764
	1890	215	7,076	9,988,129
Paper and wood pulp	1900	51	3,184	6,543,513
	1890	50	2,921	7,209,750

Transportation and Commerce. Ohio ranks fifth in its total railroad mileage; and in its mileage per 100 square miles of area—21.61 miles—it is exceeded by only one other of the large States. The first railroad built in Ohio, the Mad River and Lake Erie, now a part of the Big Four System, was chartered in 1832. By 1850 the mileage had increased to 572 miles; in 1870, 3538 miles; in 1890, 7980 miles; and in 1900, 8885 miles. In 1901 there were 100 railroad companies represented in the State. Among the longer lines were the Baltimore and Ohio Southwestern, the Cincinnati, Hamilton and Dayton, the Cleveland, Cincinnati, Chicago and Saint Louis, the Hocking Valley, the Lake Shore and Michigan Southern, the New York, Chicago and Saint Louis, the Pittsburg, Cincinnati, Chicago and Saint Louis, the Toledo and Ohio Central, and the Wheeling and Lake Erie. In recent years there has been a decided tendency toward centralization of the railroads. In 1901 there were 858,815,080 passengers carried one mile; the average distance which passengers were carried was 25.73 miles; and the average receipt per passenger per mile was $.025. In the same year there were 12,450,261,839 tons of freight transported one mile, the average distance haul per ton being 72.18 miles, and the average amount received per ton mile $.013. Ohio leads every State in the extent of its interurban electrical railways. It is now possible to cross the northern part of the Commonwealth on electrical lines, or to go from Newark to Cincinnati. Cleveland, Toledo, Columbus, and Dayton are important centres for electrical lines.

Ohio has three United States customs districts, of which the ports of entry are Toledo, Sandusky, and Cleveland. Cincinnati also is a port of entry in the district of Louisiana for the State of Ohio. These customs ports represent only the foreign imports and exports which the position of Ohio on the lakes, adjoining Canada, and in communication with ocean commerce through the Canadian canals and the Saint Lawrence, enables the local merchants to make direct to and from foreign countries. The same may be said of Cincinnati, though its foreign trade has to be carried much more indirectly through the Ohio and Mississippi rivers. The foreign commerce of Ohio is, however, insignificant compared with the vast domestic commerce east, west, north, and south, along the State's lakes, railways, canals, and great river. Lake Erie is still the greatest single highway of commerce for the State, and the Government has improved several of its harbors. Those at Cleveland and Sandusky are the finest in the State. Sandusky Bay extends inland about eighteen miles, and admits the largest lake vessels to wharf. Cleveland figures most prominently in the lake commerce. Formerly the canals were expected to be second only to the lake and the Ohio River in volume of commerce, but the railways have far surpassed them in carrying facilities. The great value of the canals is now to force low rates upon the railway system by their cheaper, though slower, transportation. The canals now operated comprise the Ohio Canal, completed in 1835, extending from Cleveland to Portsmouth, 309 miles long; the Miami and Erie Canal, completed in 1835, extending from Cincinnati to Toledo, 250 miles long; the Hocking Canal, a branch of the Ohio, completed in 1843, extending from Carroll to Nelsonville, 42 miles long; and the Walhonding Canal, completed in 1843, extending from Rochester to Roscoe, 25 miles long. There is also a large mileage of artificial feeders and slack-water navigation.

Banking. In 1803 a trading company was chartered with the privilege of doing a banking business. From 1808 to 1813 five more banks were incorporated, each by a special act of the Legislature. The banks did a prosperous business, and when in 1817 a branch of the first United States Bank was established in Cincinnati it called forth strong opposition. The State made an effort to drive out this branch by special taxation, but was defeated in the United States Supreme Court. Some 25 banks were established in the following twenty years, and when in 1836 the second United States Bank made an effort to establish a branch, a special act was passed prohibiting it. A large number of unauthorized banking institutions sprang up between 1840 and 1850, and their currency flooded the State. Several of them failed and caused losses to the holders of currency. To correct the evil, the State in 1845 strictly prohibited any one from engaging in the banking business without special authority of the State; but the law did not prove sufficient, and in 1851 the State was forced to pass a free banking law. In 1863 almost all the State banks became national. Since then the national banks have remained the more popular. In the panics of 1873, 1884, and 1893 the numerous bank failures were practically limited to the private and State banks. A reaction in favor of State banks came toward 1900, when the high prices of the United States bonds made the advantages of national banking unattractive. Savings banks have existed in Ohio since 1850, but the institutions do also a commercial business.

The condition of the various banks in 1902 is shown in the following table:

	National banks	State banks	Private banks	Savings banks
Number........	211	225	91	4
Capital........	$50,545,000	$24,829,000	$4,330,000	....
Surplus.........	16,858,000	5,906,000	844,000	$2,437,000
Cash, etc	22,455,000	7,156,000	1,891,000	743,000
Deposits.......	185,468,000	142,913,000	20,246,000	48,180,060
Loans..........	202,388,000	114,161,000	18,123,000	15,798,000

Finances. The first debt of the State was created in 1825, when the construction of several important canals was begun. In 1835 the debt amounted to $4,500,000. The State continued to subscribe to railroad, turnpike, and canal companies, until in 1843 it had a public debt of $16,880,000, in 6 and 7 per cent. bonds, and interest charges of $1,022,000. Simultaneously with the loans, the State established a system of taxation to meet the charges. All the income from the canals and a special tax were pledged for that purpose. These measures kept the credit of Ohio high and enabled it to borrow further sums. In the financial stringency of 1838-40, however, borrowing became more difficult, and as the abandonment of work would have meant too great a loss, 7 per cent. bonds had to be issued in 1843. But the law authorizing this loan also closed up all means of further increase of the debt. The sinking fund, the proceeds from sale of lands, and the school fund were absorbed by the canals. The debt was then gradually reduced and in 1856 it was $13,897,242. During that year, however, $2,423,349 more was borrowed, after which the debt was rapidly reduced by redemption of several hundreds of thousands of dollars each year. In 1880 the debt was only $6,476,805; a greater part of these bonds were acquired by the school fund and so became irredeemable. Of the redeemable debt only $2,541,655 was left in 1890, and in 1902 only $200,000—maturing in 1903. The income of the State was always derived mainly from direct taxation and was divided between the general revenue fund, sinking fund, and school fund. In 1892 a special university fund was created. In 1902 the total income was $9,855,524, of which almost 60 per cent. came from a general property tax and 17½ per cent. from an excise tax. The expenses were $7,967,003. The balances in all the funds on November 15, 1902, amounted to $3,572,244.

GOVERNMENT. Ohio has its second Constitution, the one now in operation having been adopted by a popular vote in 1851. An amendment proposed in either House must be approved by three-fifths of the members elected to each House, and in turn by a majority of the electors voting at a popular election, each amendment being voted upon separately. A constitutional convention may be called if demanded by two-thirds of the members elected to each branch of the General Assembly, and by a majority of all the electors voting at a popular election. The question 'Shall there be a constitutional convention?' is voted upon at a popular election each twentieth year and determined by a majority of all the electors voting. The exercise of the franchise has the usual limitations of age, sex, and sanity, and the requirement of a residence of one year in the State and such time in the county, township, or ward as may be provided by law. The Legislature may deny the right of suffrage to persons convicted of bribery, perjury, or other infamous crime. The registration of voters is required in cities of not less than 9000 inhabitants. The State sends 21 members to the National House of Representatives.

LEGISLATIVE. The General Assembly consists of a Senate and a House of Representatives. Representation is upon the basis of population. Most of the counties have one or more members in the Lower House, the smaller counties being united with other counties for representation. The members of both Houses are elected for two years, the day of election being the same as that for executive officers—the first Tuesday after the first Monday in November. The Legislature meets in regular session biennially the first Monday of January, in even-numbered years. The number of Senators and Representatives is determined biennially. Counties are united for Senatorial representation, but any county may be made a separate Senatorial district when it has acquired a population equal to a full Senatorial ratio, providing, however, that a full Senatorial ratio is left in the district from which it is removed. The compensation of the members of the General Assembly is fixed by law. The Lower House impeaches and the Senate tries all cases of impeachment, the concurrence of two-thirds of the Senators being necessary to a conviction. Bills may originate in either House, and no bill may contain more than one subject.

EXECUTIVE. The term of the Governor, Lieutenant-Governor, Secretary of State, State Treasurer, and Attorney-General is two years; that of the Auditor four years; and that of the school commissioner, and of the board of public works, three years. The commissioner of railroads and telegraphs, superintendent of insurance, supervisor of public printing, gas commissioner, and State and law librarians are appointed by the Governor.

The Governor may call extra sessions of the General Assembly. He exercises the usual pardoning power, subject to regulations as to the manner of applying for pardons.

The Lieutenant-Governor, president of the Senate, and Speaker of the House are in the line of succession to the Governorship in case of a vacancy.

JUDICIAL. The judicial power of the State is vested in a Supreme Court, circuit courts, courts of common pleas, courts of probate, justices of the peace, and such other courts inferior to the Supreme Court, as the General Assembly may from time to time establish. The officials here mentioned are all elected by popular vote. The term of service for the Supreme Court judges cannot be less than five years, that for the judges of the common pleas is five years, and that of the probate court judges and the justices of the peace is three years. The term of the circuit judges is determined by law. The General Assembly may establish courts of conciliation, and prescribe their powers and duties, but their judgment is not final except upon agreement of the parties to abide by such judgment.

LOCAL GOVERNMENT. The General Assembly may provide for the organization of cities and incorporated villages by general laws, and variously restrict their powers. Similarly, provision is made for the election of such county and township officers as may be necessary, the day of election for county officers being the same as that for State officers. Their terms of office do not exceed three years. No person is eligible to the office of sheriff or county treasurer for more than four years in any period of six.

LAWS. The legal rate of interest is 6 per cent., but 8 per cent. is allowed by contract. Willful absence or habitual drunkenness for three years, extreme cruelty, imprisonment in penitentiary, divorce procured by either party in another State, are some of the chief causes for divorce. Residence required, one year.

MILITIA. The men of militia age in 1900 totaled 893,327. The militia in 1901 numbered 6001.

POPULATION. The following figures show the growth of the population: 1800, 45,365; 1820, 581,295; 1840, 1,519,467; 1860, 2,339,511; 1870, 2,665,260; 1880, 3,198,062; 1890, 3,672,316; 1900, 4,157,545. From eighteenth in rank in 1800 Ohio rapidly advanced to third in 1840, which position it held until surpassed by Illinois in 1890, since when it has been fourth. The greatest absolute increase was made in the decade 1830-40. From 1890 to 1900 the increase amounted to 13.2 per cent., as compared with 20.7 for the United States. The earliest development of the State was along the Ohio River, many of the early settlers coming from the Southern States. But the great bulk of the population in the later developing central and northern portions came from Pennsylvania and the Northeastern States. Ohio, particularly the southern part, attracted large numbers of the early German and Swiss immigrants, and Cincinnati became well known for its large German population. In 1900 the Germans constituted over half of the 458,734 foreign-born population. In the same year the negroes numbered 96,901. The increase between 1890 to 1900 was almost wholly on the part of the urban population. Only two States have a larger number of places containing over 4000 inhabitants. The 83 towns of this size in 1900 together had 44.8 per cent. of the State's population. There is an average of 102 persons to the square mile, which figure exceeds that for any other State west of the Alleghany Mountains.

In 1900 the population of the nine largest cities was: Cleveland, 381,768; Cincinnati, 325,902; Toledo, 131,822; Columbus, the capital, 125,560; Dayton, 85,333; Youngstown, 44,885; Akron, 42,728; Springfield, 38,253; Canton, 30,667.

Religion. The principal denominations are the Methodists, with about one-fourth of all the church members of the State, the Presbyterian, with about one-tenth, and the Roman Catholics, with about one-tenth. Other denominations, in order of their importance, are the Lutheran, the Baptist, the Disciples of Christ, the Congregational, and the Protestant Episcopal.

Education. The first grant of land for public education in the territory of Ohio was made in 1785, when the Continental Congress reserved for that purpose the sixteenth section of every township. These grants were supplemented later by similar grants in the Virginia and United States military reservations and the Connecticut Reserve. In 1825 a school tax law was passed, and in 1827 provision was made for the sale of the school lands. A general school law was passed in 1873 providing for the classification of school districts, and making the use of the English language obligatory in teaching all branches, instead of German, which had hitherto been used in many schools.

During the second half of the nineteenth century Ohio was in many respects the leading State in the West with regard to education, and some of the most important educational reforms in the United States were first introduced here. School attendance is compulsory between the age of eight and that of fourteen. Considerable progress has been made of late in Ohio in the centralization of rural schools, with the result that there has been an increase in the number of high and graded schools, as well as in the regularity of attendance. The cost of maintaining the schools under the new system, including transportation, is in some cases less than under the old system. The census of 1900 gives the illiterate population of Ohio as 4 per cent. of the total population of ten years and over, being 2.4 per cent. for native white, 11.1 per cent. for foreign white, and 17.8 per cent. for colored. The total school age population (six to twenty-one) in 1901 was 1,219,919, of whom 829,857 were enrolled in the public schools. The average attendance in the same year was 610,622, or nearly 74 per cent. of the total enrollment. The length of the school term averages 163 days. The male teachers constituted 39.2 per cent. of all instructors in 1901. The average salaries of teachers were $40 for males and $35 for females.

The school revenue is derived from State and local taxes, fines and penalties, and various other sources. The State contributions consist of the general State tax of one mill and the interest (6 per cent.) on the money obtained from the sale of the school lands and held by the State as an irreducible State debt, amounting in 1901 to $3,978,705. In 1901 the total school revenue was $14,237,752, of which $11,351,987 was obtained from local taxes, $1,783,258 from State taxes, and $242,257 from the income of the permanent fund. The average expenditure per pupil of average attendance in the same year was $23.33. Public kindergartens are found in all the larger cities. For the preparation of teachers there are a number of State and private normal schools. Some of the colleges and the universities also give courses in pedagogy. Ohio has more public high schools than any other State, though New York has a greater high school attendance. In 1901 there were in Ohio 899 public high schools, with a total attendance of 41,909. The Case School of Applied Science (q.v.) ranks among the leading technological schools in the United States.

The best known of the academic institutions are the State University, at Columbus; Oberlin College (nonsect.), at Oberlin; Western Reserve University (nonsect.), at Cleveland; and the University of Cincinnati (city), at Cincinnati. Among the other higher institutions are Miami University (State), at Oxford; Ohio University (State), at Athens; Ohio Wesleyan University (M. E.), at Delaware; University of Wooster (Presb.), at Wooster; Hiram College (Christian), at Hiram; Marietta College (nonsect.), at Marietta; Kenyon College (P. E.), at Gambier; Saint Xavier (R. C.), at Cincinnati; Mount Union College (State), at Alliance; German Wallace College (M. E.), at Berea; Denison University (Bapt.), at Granville; Muskingum College (U. Presb.), at New Concord; Wittenberg College (Luth.), at Springfield; Heidelberg University (Reformed), at Tiffin; and Otterbein University (U. B.), at Westerville. Most of these institutions are coeducational.

Charitable and Penal Institutions. The State Board of Charities, consisting of six unsalaried members, is appointed by the Governor. This board investigates the whole system of public charitable and correctional institutions, including 17 State institutions, 8 workhouses, 89 infirmaries, 88 county jails, over 50 children's homes, and all municipal institutions and lockups. The plans for all new buildings, additions, or alterations must be submitted to the board for its criticism and approval. The following table includes the 17 State institutions for the year ending November 15, 1901:

INSTITUTION	Location	Daily Average number in institution	Current expenses, including salaries
State Hospital	Athens	997	$127,435
" "	Cleveland	1,121	184,710
" "	Columbus	1,367	200,287
" "	Dayton	837	133,383
" "	Massillon	733	116,789
" "	Toledo	1,515	226,022
Long View Hospital	Carthage	1,118	168,115
Hospital for Epileptics	Gallipolis	841	163,787
Inst. for Feeble-Minded	Columbus	1,068	168,017
Inst. for Deaf and Dumb	"	510	101,037
Inst. for Blind	"	330	76,520
Soldiers and Sailors' Orphans Home	Xenia	860	176,292
Soldiers and Sailors' Home	Sandusky	1,258	203,905
Boys' Ind. School	Lancaster	827	121,231
Girls' Ind. Home	Delaware	312	39,292
Penitentiary	Columbus	1,831	308,814
State Reformatory	Mansfield	339	89,979
Total State institutions		15,884	$2,605,615

In the same year municipal institutions, comprehending eight workhouses and one house of refuge, had a daily average attendance of 1609, and total expenses of $246,543. The expenses for county institutions for the same period, including infirmaries, children's homes, jails, outdoor relief, as reported by infirmary directors ($232,209), and as reported by township clerks ($261,285), and by the soldiers' relief commission, aggregated $2,182,720. The total State municipal and county expenses for the year were $5,034,886. Petty criminals are committed to workhouses or to jails, the commitments to the former in 1901 numbering 813, to the latter 1627. No employment is afforded to those committed to the county jails. The State has a cumulative sentence law, but it is not enforced. The State Reformatory at Mansfield has the benefit of a parole law, and a 'field officer' is appointed to look after paroled men. Convicts at the penitentiary are employed under the peace-price and the contract systems, but the prisoners remain in the complete control of the State. At Dayton is located a National Soldiers' Home with accommodations for about 6000 inmates.

HISTORY. Ohio was formed from a part of the Northwest Territory (q.v.), and includes a portion of the Virginia cession of 1784 and all of the Connecticut cession of 1800. The first explorers cannot be surely determined. Possibly La Salle, about 1670, visited the region, but he left no record of his wanderings. The enmity of the Iroquois kept the French away from Lake Erie long after they had explored the other great lakes, and though large numbers of *coureurs des bois* roamed the wilderness and trading posts were doubtless established, not one resulted in a permanent settlement. About 1686 Governor Dongan of New York sent trading expeditions into the region with but little success. In 1749 a French officer, Céloron, under the orders of Gallissonnière, Acting Governor of Quebec, crossed Lake Erie, put his boats into the Allegheny, and thus reached the Ohio and the Mississippi. His report is the first authentic relation of this part of the country. At several points he placed tablets declaring all the region of the Ohio to be French territory regardless of the grants of the Stuart kings. English traders were driven out, and this precipitated the French and Indian War. (See OHIO COMPANY.) By the Peace of Paris in 1763 the French possessions east of the Mississippi passed to Great Britain. During the Revolution the only settlement within the present limits of the State, consisting of some Moravian villages near the present site of New Philadelphia, was broken up by Indians and renegade whites. After the Northwest Territory was formed, settlement was rapid. Massachusetts pioneers founded Marietta in April, 1788. John Cleves Symmes, of New Jersey, bought a large tract between the Miami rivers and sent out settlers. In 1788, too, a party from Lexington, Ky., founded Losantiville (now Cincinnati) on a portion of this tract. A French settlement was made at Gallipolis in 1789 or 1790, and about the same time Virginians began to come in large numbers. A provision in the Ordinance of 1787 allowed the creation of a representative assembly when 5000 white males of voting age should be resident in the territory. The first session of such an assembly was held at Cincinnati in 1799, and William Henry Harrison was chosen the first delegate to Congress. In 1800 Connecticut completely abondoned her jurisdiction over the territory along Lake Erie, though she still retained proprietary rights in the soil. This was called the Western Reserve (q.v.) and rapidly filled with settlers chiefly from New England. In May, 1800, the Territory was divided and the western part was named Indiana.

On April 30, 1802, Congress authorized the election of delegates to a convention to determine whether a State government should be established. The convention sat at Chillicothe, November 1-29, and adopted a constitution, which was not submitted to the people. The boundaries were fixed, according to the suggestion of Congress, as the Pennsylvania line on the east, the Ohio River on the south, a north and south line from the mouth of the Big Miami to its intersection with an east and west line passing through the most southerly point of Lake Michigan on the west, and this east and west line through Lake Erie to the Pennsylvania line on the north. A proviso was inserted, however, that if this northern line should touch Lake Erie south and east of the mouth of the Maumee, the northern line should then run from Lake Michigan through the mouth of this stream. Such was found to be the case later and Michigan refused to give up claim to the strip of territory including Toledo until it was made a condition of her admission as a State in 1834. An election for members of the Legislature was ordered for January 11, 1803, and the Legislature met on March 1st. Meanwhile, on February 19th, Congress declared that Ohio, by adopting a constitution, had become a State of the Union, though there was as yet no State Government. The capital was fixed at Chillicothe and so remained until 1810, and was then moved to Zanesville. In 1812 the offer of a land company to build a new city was accepted, and since 1816 Columbus has been the seat of government. Considerable excitement was caused by the alleged Burr-Blennerhasset plot in 1806. During the War of 1812 the occupation of Ohio by the British was prevented by Gen. William Henry Harrison. Many Indians joined the British, but the combined forces were defeated, October 5, 1813, on the river Thames in Canada, and Tecumseh, the Indian leader, was killed. This battle, following close upon Perry's victory on Lake Erie, ended the war, so far as this State was concerned. The population steadily increased, but the lack of a market for the products of the State was the greatest need. Some sea-going vessels had been built upon the Ohio, but such sailing vessels were worth little on rivers. The application of steam to navigation, the construction of the Erie Canal, and the completion of the Miami and Ohio canals in 1835 made a new era. From that time access to the sea was comparatively easy and the country entered upon a period of magnificent prosperity, to which the coming of the railroads gave an additional impetus.

The State supplied more than its quota of troops for the Mexican War, and at the outbreak of the Civil War was exceedingly active. Seventy regiments responded to the first call for troops, though only thirteen were asked. Soldiers were sent into Virginia and helped to save West Virginia to the Union, and the prompt action of Governor Dennison had its influence upon Kentucky also. There were many Southern sympathizers in southern Ohio, however, and resistance was offered to national officers in 1863, when the advantage seemed to be with the Confederate armies. (See VALLANDIGHAM, CLEMENT L.) A large number of the most successful Federal officers were natives of the State, as Grant, Sherman, McDowell, Rosecrans, Garfield, and others.

Ohio was Democratic in national elections from the time of its admission to 1836. In that year it voted with the Whigs, and since then has been Whig and Republican, with the exception of the years 1848 and 1852, when it cast its vote for Cass and Pierce respectively. The following have been the Governors of Ohio:

GOVERNORS OF THE NORTHWEST TERRITORY.

Arthur St. Clair	1788-1802
C. W. Byrd (acting)	1802-03

STATE GOVERNORS.

Edward Tiffin	Democratic-Republican	1803-07
Thomas Kirker (acting)	" "	1807-08
Samuel Huntington	" "	1808-10
Return Jonathan Meigs	" "	1810-14
Othniel Looker (acting)	" "	1814
Thomas Worthington	" "	1814-18
Ethan Allen Brown	" "	1818-22
Allen Trimble (acting)	" "	1822
Jeremiah Morrow	" "	1822-26
Allen Trimble	" "	1826-30
Duncan McArthur	Whig	1830-32
Robert Lucas	"	1832-36
Joseph Vance	"	1836-38
Wilson Shannon	Democrat	1838-40
Thomas Corwin	Whig	1840-42
Wilson Shannon	Democrat	1342-44
T. W. Bartley (acting)	"	1844
Mordecai Bartley	Whig	1844-46
William Bebb	"	1846-49
Seabury Ford (acting)	"	1849-50
Reuben Wood	Democrat	1850-53
William Medill (acting)	"	1853-54
William Medill	"	1854-56
Salmon P. Chase	Republican	1856-60
William Dennison	"	1860-62
David Tod	"	1862-64
John Brough	"	1864-65
C. Anderson	"	1865-66
Jacob D. Cox	"	1866-68
Rutherford B. Hayes	"	1868-72
Edward F. Noyes	"	1872-74
William Allen	Democrat	1874-76
Rutherford B. Hayes	Republican	1876-77
Thomas L. Young (acting)	"	1877-78
Richard M. Bishop	Democrat	1878-80
Charles Foster	Republican	1880-84
George Hoadly	Democrat	1884-86
Joseph B. Foraker	Republican	1886-90
James E. Campbell	Democrat	1890-92
William McKinley	Republican	1892-96
Asa S. Bushnell	"	1896-1900
George K. Nash	"	1900—

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OHIO COMPANY. In American history, the name applied to two companies organized for the purpose of exploiting and making settlements in the Ohio Valley. The first was an association of prominent Virginia planters and some London merchants, and was organized in 1749. It received from George II. a grant of 500,000 acres of land lying chiefly south of the Ohio River, in what is now West Virginia. Thomas Lee, president of the Virginia Council, was the originator of the scheme, and Lawrence Washington, a brother of George Washington, was one of the leading members. In 1772 the Walpole Company secured from the King a grant of the whole territory southeast of the Ohio from the Pennsylvania boundary to a point opposite the mouth of the Scioto. The Ohio Company now became merged in the Walpole Company. A second company, known as the 'Ohio Company of Associates,' was formed at Boston in March, 1786, by officers and soldiers, chiefly of the Massachusetts, Connecticut, and Rhode Island lines, for the purchase and settlement of Western lands. Gen. Rufus Putnam, Samuel H. Parsons, and Manasseh Cutler were chosen as directors, and the lands selected for purchase lay along the Ohio River on both sides of the Muskingum. After considerable delay the company secured a grant upon favorable terms from Congress and the contract was formally signed in October, 1787, by the Treasury Board of Congress and by Dr. Cutler and Winthrop Sargent, acting as agents of the Ohio Company. In December, several companies of surveyors, carpenters, smiths, farmers, and others, under the leadership of General Putnam, emigrated to the new territory, arriving in April, 1788. Opposite Fort Harmer they laid out a town which was named Marietta in honor of the French Queen, Marie Antoinette. Consult: King, *History of Ohio* (Boston, 1888); and McMaster, *History of the People of the United States*, vol. i. (New York, 1883). See OHIO.

OHIO RIVER. The most important affluent of the Mississippi River in point of the amount of commerce, and the longest tributary excepting the Missouri (Map: United States, J 3). It is formed by the junction at Pittsburg of the Allegheny and Monongahela rivers, and is navigable, excepting at the lower stages of water, from Pittsburg to its confluence with the Mississippi, 975 miles. After leaving Pennsylvania it flows between Ohio, Indiana, and Illinois on the right, and West Virginia and Kentucky on the left. Its drainage basin is over 200,000 square miles, and the rainfall over the basin averages 43 inches a year. Its discharge of water averages 158,000 cubic feet a second, surpassing that of the Missouri by nearly 40,000 cubic feet. The elevation of the river above the sea is 1021 feet at Pittsburg and 322 feet at its mouth. Its mean rate of flow is 3 miles an hour, and its mean fall is about .70 of a foot to the mile. The Allegheny and Monongahela are regarded as having equal claims as the source of the river, though the Allegheny is longer, with 123 miles of navigation. The Allegheny rises on the plateau of northern Pennsylvania west of the Alleghany Mountains, drains Lake Chautauqua in New York, and descends through a series of narrow valleys to its junction with the Monongahela. The latter river (navigable for 60 miles) draws its farthest supplies from the rains and melting snows of the upland Allegheny valleys in the centre of West Virginia, and in the lower part of its course passes through a valley composed of Carboniferous rocks, where coal is mined almost at the water's edge. Below Pittsburg the Ohio winds through a wide flood plain between the inclosing hills, receiving waters from the north that rise only ten to twenty miles from the south shore of Lake Erie. The glacial drift in this north part of the Ohio basin changed the line of the water parting so that the crest of the divide between the Saint Lawrence and the Ohio basins is now ten or more miles nearer the lake than in the pre-glacial epoch. The chief northern tributary is the Wabash, a placid stream navigable by small boats to Terre Haute, Ind. Other northern affluents, as the Muskingum, the Scioto, and the Miami, descend, like the Allegheny, from the plain studded with lakes not far from Lake Erie. The southern affluents are larger, and rise, like the Monongahela, among the upland glades of the Appalachians or on the Appalachian plateau. The Kanawha (navigable to Charleston, W. Va.) and the Licking traverse salt-yielding regions. The Kentucky River (navigable to Beattyville, Ky.) joins the Ohio above the Louisville Rapids and marks the natural division between the middle and lower courses of the river. At Louisville a coral reef obstructs the Ohio with a series of rapids which disappear during the floods, but which arrested navigation at low water until the rapids were turned by lateral riverine canals. The greatest tributaries from the south are the Cumberland, navigable to Burnside, Ky., and the Tennessee, navigable to Knoxville.

Many fine towns and cities border the Ohio, the larger places standing chiefly at the mouths of the affluents. Below Louisville the valley broadens and the skirting hills retire to a great distance from the river banks. As the larger part of the drainage comes from the mountain districts, the Ohio is unable in times of very heavy rainfall or rapid thaw of the winter's snow to carry off the vast quantity of water suddenly emptied into it. The volume of its discharge has varied as much as eightfold. The difference between the high and low water marks is sometimes as much as 50 to 60 feet in a single season and in 1887 it exceeded 70 feet. The river at flood covers the lower parts of many towns on its banks, causing great loss of property and much suffering. On the other hand, in periods of drought the current is often reduced to a fordable depth above Cincinnati. These great variations in the level are a serious impediment to navigation. Boats loaded with many thousands of tons of coal and other freight destined for Ohio and Mississippi river points are frequently held up for weeks at Pittsburg waiting for enough water to float them. In spite of this drawback, the Ohio and its tributaries carry over 15,000,000 tons of freight a year, mainly coal, lumber, grain, and the product of iron and steel mills and the potteries on their banks. The total length of navigation on the river and its affluents is about 2300 miles. In the development of the West the Ohio played a prominent part.

Consult: Ellet, "Contributions to the Physical Geography of the United States," in *Smithsonian Institution Contributions to Knowledge* (Washington, 1849); Bliss, "Dr. Saugrain's Relation of His Voyage Down the Ohio River," in *American Antiquarian Society Proceedings* (Worcester, 1897).

OHIO STATE ARCHÆOLOGICAL AND HISTORICAL SOCIETY. A learned society, founded in 1875 as the Ohio Archæological Society, and reorganized and incorporated under its present name in 1885. Its object is to promote a knowledge of archæology and history, especially as relating to the State of Ohio, through the maintenance of a library and a museum, open to the public, as well as by courses of lectures and the publication of books dealing with subjects within its scope. The society is officially recognized by the State Legislature from which it receives an annual appropriation for the prosecution of its work. The membership is divided into four classes known as active members, life members, corresponding members, and honorary members. The regular annual meeting of the society is held during the month of February in the city of Columbus, unless some other meeting place be designated by the executive committee. The society issues an annual volume of *Publications* (11 vols. 1887-1902).

OHIO STATE UNIVERSITY. A coeducational State institution at Columbus, Ohio, founded in 1870 as the Ohio Agricultural and Mechanical College, and opened in 1873. The present name was assumed in 1878. The original endowment provided by the Land Act of 1862 has been supplemented by a permanent annual grant from the United States under an act of 1890, by special appropriations of the General Assembly, and by a permanent annual State grant made in 1891 and doubled in 1896. The university is organized in six colleges: Arts, philosophy, and science; agriculture and domestic science; engineering; law; pharmacy; veterinary science. Admission to the college is by certificate from accredited institutions or after examination in five groups of studies—English, history, mathematics, science, and foreign languages. The entire work of the college is arranged on the group and elective systems. It confers the bachelor's degree in course in the various departments, and the engineer's, master's, and doctor's degrees for advanced work. Military instruction and the wearing of a uniform are required of the students. The attendance in 1903 was 1717, distributed as follows: Arts, 527; engineering, 662; law, 166; agriculture, 243; pharmacy, 40; veterinary medicine, 94. The faculty numbers 133. The library contains 44,523 volumes. The university grounds consist of 345 acres, of which 235 are devoted to agricultural and horticultural purposes. A laboratory is maintained at Sandusky for summer work. The value of the property under the control of the university in 1903 was $2,850,000, the grounds and buildings being valued at $2,500,000. The total endowment was $569,876, and the income $545,909.

OHIO UNIVERSITY. A coeducational State institution at Athens, Ohio, organized in 1804, two townships of land having been set aside for the founding of a university by the terms of the purchase made from the United States Government by the Ohio Company of Associates in 1787. Besides the collegiate department, the university has schools of music and commerce, a preparatory department, and a normal college. The bachelor's degree in arts, philosophy, science, and pedagogy is given in course and the master's degree after one year's graduate work. Tuition is free. The registration in 1903 was 551, and the faculty numbered 39. The library contains 17,500 volumes. The university receives about $7000 a year from its land endowment and about

$70,000 by direct tax. The income for 1902 was $85,000, and the value of the college property was estimated at $400,000.

OHIO WESLEYAN UNIVERSITY. A coeducational institution of higher learning under the control of the Methodist Episcopal Church at Delaware, Ohio, opened in 1844. The Ohio Wesleyan Female College, founded in 1853, was united with the university, and in 1896 an existing medical school at Cleveland was annexed under the name of the Cleveland College of Physicians and Surgeons. The university embraces a college of liberal arts, an academic department, and schools of music, oratory, business, fine arts, and medicine. In 1849 the trustees authorized the sale of scholarships to secure an endowment, and during the next five years 3740 scholarships were sold, calling for more than 25,000 years of tuition. In 1902 the faculty numbered 111 and the student body 1385. The endowment was $954,121, and the value of the grounds, fifteen buildings, and equipment, $742,503. The library contained 42,000 volumes.

OHLAU, ō'lou. A town of Silesia, Prussia, 16 miles southeast of Breslau, on the Ohlau, a tributary of the Oder (Map: Prussia, G 3). The town has a gymnasium. The surrounding country is a tobacco district, so the town has large tobacco and cigar factories, and in addition manufactures of white lead, machinery, lime, wagons, bone-dust, and shoes. There are also saw-mills and brick-kilns, and the town has steamboat communication with Breslau. Ohlau was formerly a residence of the dukes of Brieg and of the Sobieskis, and in 1742 became part of Prussia. Population, in 1900, 9235.

OHLIGS, ō'lĭks (formerly MERSCHEID). A town in the Rhine Province, Prussia, near the Rhine, 10 miles southeast of Düsseldorf (Map: Prussia, B 3). There are manufactures of steel goods, umbrella frames, cloth, silk, and bricks. Population, in 1900, 20,682.

OHM (named after Georg S. *Ohm*). The practical unit of electrical resistance. It is defined as being the electrical resistance offered to the passage of an unvarying electric current by a column of mercury, 106.3 cm. long, of uniform cross-section, having a mass of 14.4521 grams, the mercury being at the temperature of 0° C. (This would require a cross-section of 1.00003 square millimeters.) The ohm is substantially equal to 10^9 C.G.S. electro-magnetic units of resistance. See ELECTRICAL UNITS; RESISTANCE, ELECTRICAL.

OHM, ōm, GEORG SIMON (1787-1854). A German physicist and discoverer of the famous law in electricity bearing his name. He was born and educated at Erlangen, and, after giving instruction in mathematics and physics in a number of schools, he was called in 1817 to a chair in the gymnasium at Cologne. He made a study of the laws of galvanic currents, and while investigating the relative conductivity of metals finally discovered the relation known as 'Ohm's law,' which underlies all electrical theory and measurement. The experimental proof of this law was first published in a paper in *Schweiggers Journal für Chemie und Physik*, vol. xlvi. (1826), under the title of "Bestimmung des Gesetzes nach welchem Metalle die Contaktelectricität leiten," etc. An exposition of the theory is contained in *The Galvanic Chain, Mathematically Worked Out* (1854). He resigned his professorship at Cologne in 1826, was director of the Nuremberg Polytechnic School 1833-49, and was then called to the chair of physics at Munich. The name ohm was given to the unit of electrical resistance by the Paris Congress of Physicists (1881). Previously (1846) the British Association had called the unit of resistance the ohmad. See *Scientific Works of Georg Simon Ohm*, by Eugene Lommel, a biographical sketch in *Smithsonian Report*, 1891, Washington; also, Mann, *Georg Simon Ohm* (Leipzig, 1892).

OHM'S LAW. See ELECTRICITY, section on *Laws of Steady Electric Currents.*

OHNET, ō̇'nā̇', GEORGES (1848—). A popular French novelist and dramatist. Ohnet left law for journalism, attempted the stage with *Regina Sarpi* (1875), and began his novelistic series, "Les batailles de la vie," in 1881. Of these the most successful were: *Le maître de forges* (1882); *La comtesse Sarah* (1883); *Lise Fleuron* (1884); *Le docteur Rameau* (1888). Most of Ohnet's novels have been translated and several of them dramatized. Story and character are conventional; the tone is monotonously optimistic. But Ohnet manages commonplace material with a melodramatic skill that has won a remarkable commercial success.

OIDIUM, ō̇-id'i-ŭm (Neo-Lat., from Gk. ᾠόν, *ōon*, egg). The conidial form of certain Erysipheæ, an important family of minute fungi growing on animal and vegetable substances. The species of Oidium consist of tiny tubular white or bright colored threads, forming flocks, simple or irregularly branched, assuming in their upper part the form of strings of beads, which finally break up into elliptic spores. Oidium albicans is found on the epithelium in the mouth and throat in the disease called aphthæ, or thrush. It is more common in children and aged persons than in those who are in the prime of life. Another species, Oidium Tuckeri, which has attracted great attention in Europe, is regarded by many as producing a destructive grape disease. It is the conidial form of Uncinula necator, or Uncinula spiralis. It makes its appearance at first in the form of a mycelium of creeping, branching filaments, which send out upright or decumbent jointed stems. Each bead-like joint of the stems develops into a sort of spore, numbers of which are finally discharged in little clouds. The grape disease was first observed in Kent, England, in the spring of 1845. The disease rapidly spread over other English vineries; was observed about the same time in the vineries of Paris, and soon in the vineyards of almost all parts of France, Italy, Greece, Tyrol, and Hungary, finally, and in a slighter degree, affecting the vineyards of the Rhine. Its ravages extended to Algeria, Syria, Asia Minor, and many other countries, among which is particularly to be noted the island of Madeira, where it proved almost completely destructive to the grapes and nearly put an end to the production of the celebrated Madeira wine. It is probable that the complete isolation of the Madeira vineyards made the progress of the disease more rapid, and its result more complete than elsewhere, by reason of the prevalence of the conditions favorable for it. This disease is more fully described under GRAPE as powdery mildew, for which remedies are there suggested.

OIL-BEETLE. Any of the blister-beetles of the family Meloidæ, particularly those of the type genus Meloë. See BLISTER-BEETLE.

OIL-BIRD. See GUACHARO.

OIL-CAKE. The residue which remains in the press when seeds are crushed to express the oil which they contain. Oil-cake still retains a portion of the oil of the seed, along with almost all its other constituents, and is valuable either for feeding cattle or for manure. As it is too rich in proteins and fats to be given alone, it is mixed, for feeding, with hay, straw, or cereals. Sometimes the cake is ground, in which case the product is known as oil meal. The amount of oil remaining in the cake depends upon the process employed in expressing; whether by simple pressure, by pressure combined with heat, or by a solvent, as carbon disulphide or petroleum ether. From 8 to 10 per cent. of oil is now left in the cake when extracted by the latter method, but when solvents were first introduced they extracted the oil so completely as to make the cake of little value for cattle food.

The accompanying table gives the composition of a number of the most important oil cakes:

COMPOSITION OF THE MOST IMPORTANT OIL-CAKES
(From Sadtler's *Industrial Organic Chemistry*)

	Water	Fat	Non-nitrogenous materials, woody fibre	Ash	Protein material	Nitrogen
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Earth-nut cake	11.50	8.80	31.10	7.25	41.35	6.80
Cottonseed cake	13.00	7.50	51.00	8.50	20.00	2.90
Rape-oil cake	10.12	9.28	41.93	6.48	31.88	5.00
Colza-oil cake	11.35	9.00	42.82	6.28	30.55	4.50
Beechnut cake	11.40	8.50	49.80	5.30	24.00	3.20
Linseed cake	10.56	9.83	44.61	6.50	28.50	4.25
Camelina cake	9.60	9.20	50.90	7.00	23.30	3.60
Poppy-oil cake	9.50	8.90	37.67	11.43	32.50	5.00
Sunflower-oil cake	10.20	8.50	48.90	11.40	21.00	2.40
Hempseed cake	10.00	8.26	48.00	12.24	21.50	3.30
Palm-nut cake	9.50	8.43	40.95	10.62	30.40	4.50
Cocoanut cake	10.00	9.20	40.50	10.50	30.00	4.50
Sesame-oil cake	10.35	10.10	38.80	9.80	31.93	5.00

See COTTONSEED AND ITS PRODUCTS; FLAX; FEEDING STUFFS.

OIL CITY. A city in Venango County, Pa., 132 miles north by east of Pittsburg; on the Allegheny River, at the mouth of Oil Creek, and on the Erie, the Pennsylvania, and the Lake Shore and Michigan Southern railroads (Map: Pennsylvania, B 2). There are several bridges within the municipal limits, and Smithman's and Hasson's parks. The more prominent structures include the Carnegie Free Library, city hospital, high school, the Oil Exchange, and the office buildings of the Standard Oil Company. Oil City is the centre of the celebrated petroleum fields of western Pennsylvania, and has large refineries and barrel works; also foundries and machine shops, tubing and casing works, boiler and engine shops, and manufactories of oil-well supplies. Under a charter of 1889, the government is vested in a mayor, elected every three years, a bicameral council, and administrative officers, most of whom are elected by the council or confirmed by that body on nomination of the mayor. The treasurer, comptroller, assessors, constables, and school board, however, are chosen by popular vote. The water-works are owned by the municipality. Oil City was settled about 1825, but did not become of any particular importance until after 1859, when the vast oil wells were developed. It was incorporated as a borough in 1863 and in 1874 it received a city charter. On June 5, 1892, a quantity of burning oil swept down Oil Creek from Titusville, 18 miles above Oil City, and caused the loss of over 100 lives and of property valued at more than $1,000,000. Population, in 1890, 10,932; in 1900, 13,264.

OILCLOTH. A coarse canvas, coated on both sides, and partly saturated with thick oil-paint, one side having usually a colored pattern printed upon it in oil-paint. The canvas basis for oilcloth is usually jute or burlap. This is first sized by drawing through troughs filled with liquid glue, rye flour, tapioca, or varnish, different manufacturers employing different materials. As the canvas passes through the trough the surplus sizing is squeezed out by rollers between which it passes. In making the very wide varieties, the canvas is put upon a frame first and the sizing applied with a brush. After the cloth is sized it is rubbed down thoroughly with pumice-stone, either by hand or with steam rollers. The cloth then receives a coat of paint, composed of ochre, benzine, and linseed oil. The surface is afterwards evened down by passing the cloth through a series of metal blades, which scrape off the superfluous paint. The surface is again rubbed down with pumice-stone and the process of painting and rubbing down is repeated many times, the number determining the quality of the cloth. The next step is the applying of the pattern. The pattern is carved on wooden blocks, a separate block for each color. The blocks are of pine, faced with a thin layer of harder wood, which is glued on. The part of the design assigned to each block is carved in relief upon it. The color is applied by rollers, which have taken up the coloring matter from troughs. The printing of the cloth is done by machinery. The cloth passes over a table and under the blocks, which have a rising and falling motion. The cloth is now passed to the drying-room, where the process of drying is hastened by artificial heat. When dry and hard the cloth is varnished, trimmed, and rolled. Manufacturers sometimes use instead of the carved blocks, pin blocks, which consist of three layers of wood firmly cemented together. The surface block is divided up into a series of pegs and interstices by sawing the block in lines very close together and at right angles to each other. All the pegs not needed for outlining the figure are then cut away. See *History and Manufacture of Floor Covering* (New York, 1899).

OIL-FISH, or GOLOMYNKA. A remarkable fish (*Comephorus Baikalensis*) of the blenny family, living only in Lake Baikal (q.v.). It is about a foot long, is destitute of scales, and is very soft, its whole substance abounding in oil, which is obtained from it by pressure. It is never eaten. In winter it retires to great depths, but in summer approaches the shores, and great numbers often are stranded.

OILLET (OF., eyelet), or ŒILLET. A small opening or window, often circular, used in mediæval buildings; also called œil de bœuf.

OIL PALM (*Elæis*). A genus of palms of the same tribe with the cocoanut palm. The best known species, *Elæis guineensis*, sometimes attains a height of 20 to 30 feet, has pinnate leaves with spiny footstalks and flowers with an odor like anise or chervil. The fruit forms an immense head, like a great pineapple, consisting of a large number of bright orange-colored thin-skinned drupes, with hard stones and oily pulps, which by bruising and boiling yield a bland violet-smelling oil which when taken to cold climates becomes butter-like in consistency. This oil, now largely exported from tropical Africa, is much used for making candles, toilet soaps, etc., but when fresh is eaten like butter. The nut was formerly rejected as useless after the oil had been obtained from the fruit; but from its kernel a fixed clear and limpid oil called palm-nut oil is extracted and has become to some extent an article of commerce.

OIL RIVERS. A name applied to the channels forming the delta of the Niger (q.v.) in West Africa and the neighboring small independent rivers, on account of the vast forests of oil palms which line their banks (Map: Africa, E 4). The surrounding district, a British dependency, was formerly known as the Oil Rivers Protectorate, but is now a part of Southern Nigeria.

OILS (OF. *oile*, *ole*, *uile*, Fr. *huilc*, from Lat. *oleum*, oil, from Gk. *ἔλαιον*, *elaion*, oil, olive oil, from *ἐλαία*, *elaia*, olive tree). A term applied to a large number of liquids characterized by being insoluble in water and being highly viscous. Their 'greasy feeling' often mentioned as an additional characteristic is due largely to their viscosity and insolubility in water. Capability of saponification (see further below), formerly considered essential, is confined to a variety of substances, chiefly of animal or vegetable origin, while the unsaponifiable class includes the so-called mineral oils and similar products prepared artificially. Chemically the oils possess no property in common which would justify their being grouped together in any rational classification of substances. And if they are still referred to collectively as a distinct class of chemical substances, it is owing partly to custom, partly to the fact that chemically different oils are sometimes associated industrially.

LIQUID FATS. The vegetable and animal oils of liquid fats do not differ essentially from the class of substances described under FATS. They, too, contain olein, palmitin, and stearin, together with certain other fatty bodies, which give each oil its characteristic properties. Palmitin and stearin are solids at ordinary temperature, but are freely soluble in the liquid olein, and a liquid fat is essentially a solution in one proportion or another of palmitin and stearin in olein. Olive, cottonseed, corn, linseed, and lard oils are types of this class of oils, all of which are soluble in ether, carbon disulphide, chloroform, hydrocarbons, etc.

All of the fatty oils are also capable of being saponified, i.e. of being broken up into glycerin and so-called fatty acids. The term 'saponification' (from Lat. *sapo*, soap) is used on account of the decomposition being oftenest effected by the use of caustic soda or potash, which combines with the freed fatty acids to form the mixtures of salts well known as soaps. There are, however, other methods by which the decomposition may be sometimes brought about. And since, whatever the method, the decomposition is accompanied by the chemical absorption of the elements of water, it is more exactly referred to, not as saponification, but as *hydrolysis*, or *hydrolytic splitting*. The several methods by which the hydrolysis of oils may be brought about include: (1) Boiling with caustic alkali; (2) the action of steam under high pressure; (3) bacterial action, e.g. when fats become rancid; (4) the action of dry heat.

The following classification of these compounds by A. H. Allen will be found useful; it serves to illustrate the origin and approximate composition of the more common oils.

Olive Oil Group, vegetable oleins, non-volatile, high viscosity, non-drying, insoluble in alcohol.

Rape Oil Group, derived from the Cruciferæ, non-volatile, highest viscosity, non-drying, insoluble in alcohol.

Cottonseed Oil Group, non-volatile, medium viscosity, semi-drying, insoluble in alcohol.

Linseed Oil Group, drying oils, non-volatile, absorb oxygen, insoluble in alcohol, low viscosity.

Castor Oil Group, distinctly different from the above in chemical composition by reason of containing a large proportion of hydroxy-fatty acids including ricinoleic acid—highest viscosity, soluble in alcohol and glacial acetic acid, non-volatile, non-drying.

Lard Oil Group, animal oleins, non-volatile, non-drying, high viscosity.

Whale Oil Group, marine animal oils, slightly volatile, low viscosity, partly drying, darken with chlorine, characteristic odor.

Palm and cocoanut oils are omitted because solid at ordinary temperatures. Sperm oil is not a true oil, but a liquid wax.

Plants contain a greater variety and, as a rule, relatively larger quantities of oils than animals. Vegetable oils are obtained by the simple process of grinding or crushing and hydraulic pressing of seeds or kernels, which contain the largest proportion of oil. At times the ground materials are pressed cold and hot, the cold process yielding better products, but smaller quantities. Of late years extraction processes using light hydrocarbon solvents are much used. The solvents are allowed to act on the crushed material at a slightly elevated temperature; on exhaustion, the liquid is drawn off, and the solvent is separated by distillation. Oils produced by this process are very free from foots or gelatinous material, but, on the other hand, are liable to be contaminated with resins and coloring matters or any other material soluble in the solvent used. Animal oils occur in cells of putrescible tissue and require prompt rendering or extraction to retain their quality. Rendering may be of three types, viz.: (1) Open-kettle rendering; (2) acid rendering; (3) steam rendering. In the first process the fatty tissue is chopped, heated over water until the oil or fat is melted, and tried out. The broken tissue shrivels and rises to the top, where it is skimmed off and pressed to remove traces of oil. On cooling, the oil and water stratify, and may be readily separated. In acid rendering, the fatty tissue is, without previous treatment, boiled with water and sulphuric acid, which dissolves away the tissue and liberates the oil. In steam rendering the tissue is destroyed by treatment with steam under pressure in autoclaves, the exhaust of foul-smelling gases being discharged into a chimney.

The drying oils, linseed, poppy-seed, etc., expressed by hot pressure, are subsequently boiled or heated with various oxidizing substances, such as the oxides of lead and manganese, in order to increase their drying or varnish-making properties. On mixing these boiled oils, which always contain some free fatty acid, with pigments whose base is some readily decomposable lead compound, such as white lead (basic carbonate), a lead soap forms and dissolves in the excess of oil. The resulting product, on exposure for some time to the atmosphere, readily dries or forms a tough elastic coating, which acts as a protective covering to the material beneath. Oils of the rape oil group absorb oxygen when heated, especially if air is forced through the liquid. Such are the so-called 'blown oils.' During this process the liquid becomes thicker, its viscosity and hence the lubricating value increasing materially. The thickness is probably caused by exchange of the sulphur contained by these oils for oxygen.

The tests usually applied to fatty oils include determinations of specific gravity, of the amount of alkali necessary for saponification, of the amount of free fatty acids present, of the amount of volatile fatty acids, and of the amount of bromine or iodine that the oil is capable of absorbing, as well as various color tests with acids and special reagents.

Essential or Volatile Oils. These are liquids which give the peculiar odor to plants. Their composition differs very widely. The various types are as follows: Terpenes, or hydrocarbons of the general formula $(C_{10}H_{16})_n$; certain ethers, aldehydes, ketones, and phenols (substances composed of carbon, hydrogen, and oxygen); and finally, certain substances containing sulphur or nitrogen among their elements, e.g. mustard oil. All these substances are soluble in alcohol, ether, petroleum, and certain other organic solvents. Some of them have been prepared synthetically, but the greater number are still obtained from plants, by one of the following processes: (1) By distilling the plant with water; (2) by extraction of the plant with solvents; (3) by pressing the plant; (4) by macerating in fat; (5) by enfleurage, or absorption in fat. In the distillation process, the material is put into a still with a large quantity of water. During ebullition, the steam carries the oil over mechanically and separation of oil and water takes place on cooling, the oil being usually on top. Turpentine is produced by this process from the gum of the pine tree, the residue in the retort being common rosin. The processes of extraction and expression require no explanation. Maceration, employed in those cases in which the product would be injured by high temperatures, consists in gently heating the flowers or leaves in pure sweet tallow or lard, until exhausted, the product being called a pomade. The oil may be extracted from it with alcohol. Enfleurage is used in those cases in which an elevation of temperature would destroy the odor. The flowers or leaves are placed on glass-bottomed trays coated with pure tallow or lard; these trays are then stacked up and allowed to stand until the fatty matter becomes strongly charged with the perfume, and this is subsequently extracted with cold alcohol.

Hydrocarbon Oils. An account of the chemistry of the hydrocarbons may be found in a special article under the name. Mixtures of liquid hydrocarbons, or 'hydrocarbon oils,' of natural or artificial origin, are used largely as fuels, illuminants, and lubricants. The main sources of these oils are petroleum, shale, and bituminous coal. Most of the native American oil comes from the Devonian and Upper Silurian. It occurs in sandstone or conglomerate (oil sand) between impervious layers of shale or slate. The Russian petroleum deposits are usually of Tertiary origin. Considerable discussion has arisen concerning the origin of petroleum. According to Berthelot it is produced by the action of steam and carbonic acid gas on alkali metals. Mendeléeff regards it as the product of the action of water on metallic carbides. According to other theories, petroleum is derived from either plant or animal matter by a slow process of destructive distillation under the enormous pressure of superincumbent strata. Since either natural gas or anthracite coal is usually found at no great distance from oil sources, it would seem that the last mentioned theories are the most plausible. American petroleum is mainly composed of the liquid members of the marsh gas or paraffin series together with small quantities of olefins, and traces of benzenes. Russian oils consist largely of the naphthene series, similar to the olefins. Oil fresh from the well is a thick, syrupy liquid, greenish brown to black in color and of a disagreeable odor. Many samples are fluorescent. The specific gravity varies from 0.782 to 0.85. Marsh gas, ethane, propane, and butane are generally found in the fresh oil, but soon escape. Sand and water are frequently mixed with the oil, but are readily removed by settling in tanks.

The oil is prepared for the market by a process of fractional distillation and refining of the fractions with acid and alkali. The distillation process serves to separate the oil into three portions, viz.: (1) Benzine distillate; (2) burning oils; (3) residuum. The first portion is redistilled and yields very volatile products (naphthas and gasolenes) that are used as solvents and for power in small engines. The second portion is likewise redistilled and yields two fractions, which are treated separately with strong sulphuric acid, followed by a washing with water, then treatment with caustic soda, and a final washing with water. By this process the oils are bleached and partly deodorized. The two oils are commonly known under the name of kerosene. If the distillation of the crude oil has been carried on by the vacuum process, in which the heavy vapors are withdrawn from the stills as soon as formed, 'cracking' does not take place and the residuum may be used entirely for preparing lubricating oils and vaseline. During the 'cracking,' which is facilitated by heating the stills over free fires, the residuum is decomposed and yields a further series of volatile products (chiefly used as burning oils), together with paraffin, lubricating oil, yellow 'wax,' and coke. Russian oils may be successfully treated by a continuous process of distillation, as they are not very susceptible to cracking. To guard against any possibility of change, the stills are heated by superheated steam. Oils containing large quantities of sulphur are very offensive and must be distilled over mixtures of oxides of copper and lead to take up the sulphur, before they can be refined. The crude oil is, however, now largely used for fuel purposes with steam or compressed air in injector burners. The following mineral oils are commercial articles:

Petroleum Ether, distills over between 40° and 70° C (104° and 158° F.), and is used as a solvent and for gas machines.

Gasolene, distills over between 70° and 90° C. (158° and 194° F.), and is used as a solvent and for carbureting coal-gas.

Naphtha, distills over between 80° and 110° C. (176° and 230° F.), and is used for burning in vapor stoves, and as a solvent for resins.

Benzine, distills over between 120° and 150° C. (248° and 302° F.), and is used as a substitute for turpentine for cleaning clothing.

Kerosene. See article PETROLEUM.

Lubricating Oils, including spindle oils and cylinder oils. The analytical tests applied to these oils include determinations of specific gravity, the 'fire test' (i.e. determination of the flash-point and burning-point), the cold test, and determinations of viscosity and neutrality. For burning oils the fire test and the determination of neutrality are the most important. For lubricating oils the determination of viscosity is also essential. A large number of forms of apparatus have been devised for obtaining the flash and burning point, but no other is as simple and reliable as the New York State 'closed tester.' This apparatus consists of a double boiler of copper heated by a gas or lamp flame, the inner chamber being filled with oil and covered with a glass plate perforated with two holes, one for the thermometer, the other for the introduction of the test flame. The oil must not be heated more rapidly or slowly than 2° F. per minute. At minute intervals the test flame is brought to the hole in the glass cover. A flash is said to occur when a blue flame momentarily plays over the surface of the heated oil, and at this point the thermometer is read. The burning-point, usually a few degrees higher, is that temperature at which the oil begins to burn.

Previous to the introduction of petroleum products, bituminous shale had been subjected to destructive distillation, yielding gas, ammonia, oil, and tar. This process is still carried out in Scotland, Germany, and various other European countries. Oil does not occur as such in bituminous shale, but is liberated by the decomposition of the latter, which is a sort of pitch. Shale, in small pieces, is fed into vertical retorts heated to a low red heat, and steam is injected into the retorts to promote distillation. The vapors are condensed in a hydraulic main and scrubbers similar to those employed in the distillation of coal (see GAS, ILLUMINATING), the gases given off being utilized for heating the retorts. The crude oils are refined with acid and alkali, and are redistilled to furnish naphthas, burning and lubricating oils, and paraffin (q.v.).

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OIL SAND. A term applied to beds of sand or porous sand rock which contain petroleum. There may sometimes be several oil sands separated by beds of rock in one formation. See PETROLEUM.

OIL SHARK, or SOUP-FIN SHARK. A tope-like shark of southern California (*Galeorhinus zyopterus*), often six feet long and grayish in color, with the front of both dorsal fins black. It is sought for the oil in its liver—single fishes sometimes yielding a gallon—and for the fins, which are highly prized by the Chinese as material for soup. The fins are dried and a fine white gelatin is extracted. The fish is rarely taken except in July and August, when it enters quiet bays to be delivered of its young.

OIL-STONE. A very smooth fine-grained type of rock used for abrasive purposes, more especially for sharpening various cutting instruments. The material used in the manufacture of oil-stones is obtained from a number of different localities, but the most important stones at the present time are those from Arkansas, Indiana, and Germany. Those from Arkansas go under the name of *Arkansas* and *Washita* stones and are an extremely fine-grained siliceous rock of white color. They are especially adapted to sharpening fine tools requiring smooth edges. Owing to the limited supply of the Arkansas rock of good quality, the difficulty in quarrying, and the very large loss in trimming, the material retails at $2.50 per pound. The Washita is less expensive. The German stone is much used for razor hones. The Indiana oil-stones, which are very fine-grained sandstones, are commonly known in the market as *Hindostan* or *Orange* stones. They are not suited for sharpening such fine steel instruments as those for which Washita rock is used. See ABRASIVES.

OIL WELLS. See PETROLEUM.

OINTMENT (ME. *oinement,* from OF. *oignement,* from *oigner, oindre, ongier,* to anoint, from Lat. *unguere, ungere,* Skt. *añj,* to smear). A fatty preparation, either soft or solid at ordinary temperatures, but liquid when rubbed into the skin. Ointments are composed of a fatty base, either lard or vaseline, alone or mixed with olive or almond oils or with spermaceti or wax, to diminish or increase their consistency as desired. Benzoin is often added to the lard or other base to prevent decomposition. Hydrated sheep's wool fat (lanolin) is more quickly absorbed than most fats and may be mixed with more than twice its weight of water without losing its ointment-like character. It is employed as a base when rapid absorption is wished, as sometimes happens in the case of mercury. Into the base is thoroughly incorporated the substance which, as a rule, gives to the ointment its remedial virtues. The greatest care is necessary to insure a minute subdivision of the medicinal element in order that the ointment may be homogeneous and free from gritty particles. The United States Pharmacopœia recognizes twenty-seven ointments, but many more are made. Among the better known may be mentioned zinc, sulphur, and the various mercurial ointments. Cold Cream (q.v.) is the popular name of rose-water ointment.

OISE, wäz. A northern department of France, formed from parts of the former provinces of Ile-de-France and Picardie, and lying on both sides of the Oise River, north of Paris (Map: France, J 2). Its area is 2272 square miles. The surface is generally level and about two-thirds of it is cultivated, producing cereals, potatoes, sugar-beets, and large quantities of fruit, including grapes. Stock-raising is well developed, as are the industries, covering the manufacture of iron, pottery, paper, chemicals, and textiles. Population, in 1891, 401,835; in 1901, 407,808.

OISE. A river of Northern France. It rises among the Ardennes in Southern Belgium, flows southwest through the French departments of Nord, Aisne, Oise, and Seine-et-Oise, and joins the Seine 15 miles northwest of Paris (Map: France, J 2). Its length is 189 miles, and it is navigable 86 miles to Chauny. A lateral canal follows part of its upper course, and other canals connect it with the Somme, the Sambre, and the Scheldt rivers. The principal towns on its banks are Compiègne, Chauny, and Novon.

OJEDA, ō-hä′dȧ, Alonso de (1465-1515). A Spanish explorer, born of noble parentage, in Cuenca, Spain. He accompanied Columbus on his second voyage, and from that time until his death was closely associated with the exploration and settlement of the newly discovered region. One of his first exploits was the capture by stratagem, in 1495, of the cacique Caonabo, who had formed a scheme for an alliance of all the natives against the Spaniards in Hispaniola. Four years later, accompanied by Columbus's former pilot, Juan de la Cosa, and by Americus Vespucius, he succeeded in exploring the northern coast of South America from some point on the north coast of what we now call Brazil as far westward as the Gulf of Maracaibo. He made a second voyage in 1502, and for trespassing on territory given by the Papal bull to Portugal, was upon his return censured and heavily fined. In 1509, with about 300 men, he sailed from Hispaniola to take possession, as Governor, of Nueva Andalucía, which comprised the territory between the gulfs of Urabá (Darien) and Maracaibo. Near the site of the present town of Cartagena he landed with a party of about seventy men in order to capture Indians for slaves, but the party was overpowered, and only Ojeda and one other man escaped. A colony was then established at San Sebastian, but provisions soon ran so low that Ojeda set out for Hispaniola for supplies and reënforcements. The vessel was wrecked off the coast of Cuba, and Ojeda reached his destination only after great hardships. He was unable to fit out another expedition, and died in great poverty and misery at Santo Domingo.

OJIB′WA, or **CHIPPEWA.** The largest and most important tribe of the Algonquian stock (q.v.), formerly holding an extensive territory about the upper Great Lakes, in Michigan, Minnesota, Ontario, Manitoba, and adjacent regions, and now gathered upon a number of reservations within the same area. The name is from a root signifying 'puckered,' or 'drawn up,' said by some authorities to refer to the peculiar sewing of the tribal moccasin, although this derivation is disputed. They call themselves usually *Anishinabeg*, 'spontaneous men,' were known to the French as *Ojibois*, or *Saulteurs*, from their residence about Sault Saint Marie, and were commonly known to the English as *Ojibwa*, or in its corrupted form, *Chippewa*.

Although the Ojibwa are the largest tribe north of Mexico, yet, owing to their looseness of organization and remoteness from the settlement frontier, they were not proportionately conspicuous during the colonial period. According to their tradition they emigrated from the Saint Lawrence region in the east, in company with the Ottawa and Potawatami, the three tribes separating at Mackinaw, the two others going southward, while the Ojibwa spread westward along both shores of Lake Superior. The Cree, Maskegon, and Missisaga (qq.v.) are claimed by the Ojibwa as later offshoots from their own tribe, and are sometimes so closely affiliated that they are hardly distinguished from the Ojibwa. The Ojibwa, Ottawa, and Potawatami, though differing in language, also formed a sort of loose confederacy, and were sometimes for this reason designated in Indian councils as the 'Three Fires.' When first known, about the year 1650, the Ojibwa were confined to a comparatively narrow area close along the shore of Lake Superior, hemmed in by the hostile Sioux and Foxes on the west and south. On procuring firearms from the traders, however, they became aggressive and soon drove out the Foxes from northern Wisconsin, compelling them to take refuge with the Sauk farther south. They then turned their attention to the Sioux, driving them from the headwaters of the Mississippi and continuing their victorious westward march until they had occupied the upper Red River country and established their frontier band in the Turtle Mountains, on the boundary between Dakota and Manitoba. In the meantime other bands of the tribe had overrun the Ontario peninsula, formerly conquered by the Iroquois from the Huron and others. These bands later became known as Missisaga. The Ojibwa first turned the westward tide of Iroquois invasion by inflicting upon them a disastrous defeat at the place thereafter known to the Indians as 'The Place of Iroquois Bones,' now Point Iroquois, near Sault Sainte Marie. Throughout the colonial wars they adhered to the French side and later to Pontiac, but took sides with the English and Tecumseh against the Americans in the Revolution and War of 1812, joining with other tribes in the general treaty of peace in 1815. Since then they have been at peace with the whites. By a general treaty of 1825 for the adjustment of intertribal boundaries in the Northwest the Government made an end to the hereditary war between the Ojibwa and the Sioux. By other treaties, on both sides of the line, they have sold the greater part of their former territory, retaining only their present reservations.

Scattered over such an immense region, extending hundreds of miles from east to west, the Ojibwa had a large number of bands and divisions, some of which were hardly known to the others more remote, as well as a large number of clans which were not all represented in the same section. According to Warren, they themselves recognized ten principal divisions, including three on the Canadian side of the boundary. Among these the Makandwe, or Pillagers, about Leech Lake, Minn., are perhaps the best known. The number of clans is variously stated from eleven to twenty-three, Warren making it twenty-one, grouped into five phratries representing original clans, one of which claimed the hereditary chieftainship, while another claimed precedence in the war councils. In their general habit they resembled the other northern Algonquian tribes. Living in a cold country, they gave little or no attention to agriculture, but depended for subsistence upon hunting, fishing, and the gathering of wild fruits and seeds, particularly the abundant wild rice of the lake region, with the sugar which they had learned to extract from the maple. Their houses were framed in wigwam or tipi shape, covered usually with birch bark, from which also they made their light canoes, their bowls and boxes, and upon which they scratched their simple pictograph records. They made no pottery, but were skillful mat-weavers. They had an elaborate mythology and ritual, chiefly in the keeping of the secret Mide Society. Despite missionary effort and contact with civilization, the primitive culture of the Ojibwa is little modified. The principal works in the Ojibwa language are Baraga's Dictionary, Belcourt's Grammar, and the shorter treatises of Schoolcraft. Of myths, the best collection is Schoolcraft, *Algic Researches*, upon which Longfellow based his *Hiawatha.* In ritual mythology and general description the best work is Hoffman, "Midewiwin of the Ojibwa," in *Seventh Report of the Bureau of Ethnology.* On traditional and later history the most satisfactory is Warren, "History of the Ojibwa," in fifth volume of Minnesota Historical Society *Collections*, after which come Copway, *History of the Ojibway Indians*, and Jones, *History of the Ojebway Indians*, all three authors being of mixed Ojibwa blood. In special research may be noted Jenk, "Wild Rice Gatherers," in *Nineteenth Report of the Bureau of Ethnology.*

The Ojibwas were estimated in 1764 at about 25,000; in 1783, at 15,000; in 1843, at 30,000; in 1851, at 28,000. They number now about 30,000, divided between the United States and Canada as follows: United States—Minnesota (chiefly at Leech Lake, Red Lake, and White Earth), 8130; Wisconsin (chiefly at Lac Court Oreille, Lac de Flambeau, and La Pointe), 5100; North Dakota (Turtle Mountain), 2460; Michigan, 700 on upper peninsula, with 5600 scattered Chippewa and Ottawa on lower peninsula; Kansas, mixed Munsee and Chippewa, 90. Canada —all in Ontario Province, on numerous small reservations, and variously designated as 'Chippewas,' 'Ojibbewas,' and 'Saulteaux,' 10,760, besides Ojibbewas and Ottawas of Manitoulin and Cockburn islands, 1950. See Colored Plate of INDIANS, AMERICAN.

O. K. The story that General Jackson used these letters to indorse official papers as correct seems to have been started by Seba Smith (Major Downing), the humorist. It was a hit at Jackson's supposed illiteracy, and as a party cry during the Presidential campaign of 1832 acquired great vogue. Parton states that Jackson used to indorse legal documents O. R., order recorded, and the mistaking of the letters was probably the basis of Downing's jest. The term is also said to have originated with Josh Billings and has been ascribed to several other persons. Jacob Astor is said to have used it to indicate the standing of traders about whom he was questioned. In colonial days, the best tobacco and rum were imported from Aux Cayes, and from this fact Aux Cayes (ō kā) became a popular expression for excellence.

OKA, ō-kä′. A river of Central Russia, and the principal west affluent of the Volga (Map: Russia, F 3). It rises on the southern boundary of the Government of Orel and flows in a generally northeast direction with several large bends, joining the Volga at Nizhni-Novgorod after a course of 960 miles through the most fertile parts of Russia. The river is navigable for steamers to the town of Bielev, a distance of 862 miles, and for smaller vessels 32 miles farther to the city of Orel. It is a very important commercial route.

O′KA. A mission settlement of Catholic Iroquois, Nipissing, and Algonquin, on the Lake of Two Mountains, a few miles from Montreal, in Quebec Province, Canada. Oka is the Algonquin name, said to signify a pickerel, while the Iroquois name, Canasadaga, by which it was formerly known, refers to the position of the village on the slope of a hill. It was settled originally in 1720 by the Catholic Iroquois who had previously been at the Sault au Recollet and who numbered about 900 at the time of removal. They were soon afterwards joined by some Nipissing and Algonquin from the abandoned mission of Isle aux Tourtes. The two bodies occupy different parts of the same village, separated by the church, the Iroquois using the Mohawk language while the others speak Algonquin. In 1881 a part removed to Gilson, Ontario, where they are now established. Those at Oka number now about 450.

OKAPI, ō-kä′pē (African name). An animal of the giraffe family (*Ocapia Johnstoni*), discovered in 1899 by Sir Harry Johnston in the Semliki Forest of the Congo State. The animal stands about 4½ feet high at the withers, and is of the peculiar form shown on the Plate of GIRAFFE AND OKAPI. The head is giraffe-like, but there are no external horns. The tail is rather short, and the neck is short and thick. The skull is characteristically giraffine and exhibits rudiments, or rather vestiges, of three horn-cores. The coloration as described by Sir Harry is extraordinary. The cheeks and jaws are yellowish white, contrasting with the dark-colored neck. The forehead and a line down to the muzzle is a deep-red chestnut, and the large broad ears are of the same tint, fringed with black. The neck, shoulders, and body range in tone from sepia and jet-black to vinous red; the belly is blackish, the tail chestnut with a small black tuft. The hind quarters and hind and fore legs are either snowy white or pale cream color, touched here and there with orange, and boldly marked with purple-black horizontal stripes and blotches. Not much is known of the okapis except that they live in pairs in the forests of the northern Congo Basin. Consult *Transactions* and *Proceedings* of the Zoölogical Society of London for 1901 and 1902.

OKAVANGO, ō'kȧ-väṉ'gȯ. A river of Central Africa. See KUBANGO.

OKAYAMA, ō'kȧ-yä'mȧ. The capital of the prefecture of the same name and of the Province of Bizen, Japan, situated on the river Asahi, in the southwestern part of Hondo, 89 miles by rail west of Kobé (Map: Japan, C 6). It has an old castle formerly inhabited by the daimio, and close to it a magnificent Japanese garden. Population, in 1898, 58,025.

OKEECHOBEE, ō'kė-chō'bė. A lake in the southern part of Florida, the largest in the Southern United States (Map: Florida, H 5). It is 40 miles long and 30 miles wide, with an area of 1250 square miles and a maximum depth of 12 feet. It borders on the great Everglade swamps, and its shores are nearly everywhere inaccessible, consisting of marshy jungles, while great parts of the lake itself are overgrown with weeds. Its waters are discharged partly by seeping through the Everglades, partly through the Caloosa River, connection with which has been facilitated by several canals which have reduced the size and depth of the lake, and drained large portions of the surrounding swamps, rendering them fit for agriculture.

O'KEEFE, ȯ-kēf', JOHN (1747-1833). An Irish playwright and actor. He was born in Dublin, and in his youth studied painting, but he began writing comedies at the age of fifteen. A few years later he joined a theatrical company in his native city, and wrote meanwhile a number of small pieces, in which he appeared at his own benefits. His *Tony Lumpkin in Town* was produced at the Haymarket, London, in 1778, and gained for its author an English reputation. He settled in London, and, though threatened with blindness, continued to write for the stage. His dramatic pieces by his own statement number sixty-eight, of which about fifty were performed, and some of them, such as the operatic farces, *The Highland Reel* and *The Agreeable Surprise*, and the farce *Wild Oats*, were unusually successful. In 1798, when he had become almost totally blind, he published *The Dramatic Works of John O'Keefe, Esq.*, in four volumes. For some years afterwards he was in straitened circumstances, till he was relieved by a pension from the Crown. In 1830 he went to live in Southampton, where he died on February 4, 1833. The next year, his daughter Adelaide, who was herself an author, published a collection of his verse under the title of *A Father's Legacy to His Daughter*. O'Keefe's plays, many of which have been separately published, are deficient in characterization and incident, and rough in diction, but full of broad humor and rollicking spirits. Consult the *Recollections of the Life of John O'Keefe* written by himself (London, 1826); also as edited by R. H. Stoddard (New York, 1876); Geneste, *History of the English Stage* (Bath, 1832).

O'KEFINO'KEE SWAMP. One of the largest swamps in the United States, covering parts of Baker County, Fla., and of Ware, Clinch, and Charlton counties, in Georgia (Map: Georgia, D 5). It consists of a series of swamps about 180 miles in circuit, and having an area of 500,000 acres. It is filled with pools and islands, some overgrown with bay trees, others with vines and brush. Moccasins and alligators are numerous. In the eastern portion is an open lake dotted with small floating islands.

OKEGHEM, ŏ'ke-gĕm, **OKEKEM, OCKEGHEM, OCKENHEIM** (c.1420-c.1500). One of the great masters of the Netherlandish school of composition. He was born in East Flanders and was a chorister in the Antwerp Cathedral, and subsequently studied under Dufay. Accuracy with regard to dates considering the life and history of Okeghem is impossible. He was first master of music to the French King Charles VII. (1454), and held similar important appointments under Louis XI. As a teacher he is principally famous through his pupil Deprès (q.v.), who introduced his master's style and music to the world at large, and greatly influenced modern German church music through Luther, who was a contemporary and admirer of Deprès. Okeghem's music is still very much admired by musical scholars. He wrote nearly twenty masses, besides numerous motets, a ninefold canon in 36 parts, chansons, etc. See MUSIC—SCHOOLS OF COMPOSITION (section iii.).

O'KEL'LY, CHARLES (1621-95). An Irish historian, born in Screen Castle, Galway, and educated at the Irish College in Saint Omer, France. He took part in the Civil War in 1642, and when Cromwell won, O'Kelly with 2000 compatriots followed the fortunes of Charles II. in France and Spain. They returned to England at the Restoration, and after the next revolution O'Kelly represented Roscommon in 1689 at the Dublin Parliament of James II., whom he also served as colonel of cavalry. He defended the island of Bofin against the Orange troops in 1691, but was forced to capitulate there, as well as from his later post, and he retired into private life at the Treaty of Limerick. His *Macariæ Excidium* (1692), an invaluable contemporary account of the revolution, was first printed by the Camden Society in 1841, and J. C. O'Callaghan (q.v.) prepared an annotated edition of it for the Irish Archæological Society in 1850, while a third appeared under the title *The Jacobite War in Ireland* (1894).

O'KELLY, JAMES (c.1757-1826). A pioneer preacher of the Methodist Episcopal Church and leader of the first secession from it. He was born in Ireland about 1757, came to America, and in 1778 began work as a traveling preacher. He was among the number who were ordained elders at the organization of the Methodist Episcopal Church in 1784. He became presiding elder of the South Virginia district, and was a member of the first Council meeting in 1789. He took the lead in a movement opposing the authority and life tenure of the bishops. O'Kelly shortly after the General Conference of 1792 withdrew from the connection, taking several other ministers with their congregations or parts of congregations with him, and formed a Church known as the Republican Methodist. His opposition to Methodism became more bitter, and he denounced ordination as spurious. His secession movement reached its height in 1795, causing a loss of nearly 6500 members to the Methodist

Church. The name of his organization was afterwards changed to the Christian Church, but at the end of twenty years it had almost disappeared. Consult Buckley, ***History of Methodism in the United States*** (New York, 1897).

OKEN, ōk'en, Lorenz (1779-1859). A German naturalist and philosopher, born at Bohlsbac. His real name was Ockenfuss. He studied medicine and the natural sciences at Würzburg and Göttingen. In 1807 he became a professor of medicine at Jena, and in 1812 received the chair of natural sciences, but in 1819 he was compelled to resign his position because a scientific journal called *Isis*, which he had conducted since 1816, gave offense to the Government. In 1828 he obtained a professorship in the newly founded University of Munich, and in 1832 accepted a chair at Zurich, where he remained until his death. Oken sought to unify all the natural sciences, and invented an entirely new and very complicated terminology for the purpose. His system was in some respects fantastic, and is now almost obsolete. Some of his speculations were, however, fortunate. As early as 1805 he foreshadowed the theories of the cellular structure of organisms and of the protoplasmic basis of life, and his vertebral theory of the structure of the skull, although false, was an important contribution to comparative morphology. His most important works are: *Die Zeugung* (1805); *Ueber die Bedeutung der Schädelknochen* (1806); *Lehrbuch der Naturphilosophie* (1808-11), translated into English by Tulk and called *Elements of Physio-philosophy* (1847); *Lehrbuch der Naturgesohichte* (1813-27).

OKHOTSK, ō-kôtsk', Sea of. A large inlet of the Pacific Ocean, indenting the east coast of Siberia, and separated from the ocean on the east by the Kamtchatka Peninsula, and on the south by the Kurile Islands (Map: Asia, O 3). In the southwest it communicates with the Japan Sea by La Pérouse Strait between the islands of Yezo and Sakhalin, and by the long passage which separates Sakhalin from the mainland. It is nearly rectangular in shape, its northern shore lying nearly on the 60th parallel N., and it is about 1000 miles long and 600 miles wide. The coasts are steep and forbidding, very sparsely inhabited, and ice-bound from November to April and even to July. The open sea is ice-free, but subject to heavy fogs and storms. The sea is very little frequented, but has been exploited by American whalers for the last half century.

OKINAGAN, ō'kē-nä'gȧn. An important tribe of Salishan stock (q.v.), and formerly the head of a confederacy including also the Colville, Sanpoil, and a number of other cognate tribes. They occupied an extensive territory upon Okinagan and Similkameen rivers in northern Washington and the adjacent part of British Columbia. They were converted by Jesuit missionaries about fifty years ago, and are now civilized and fairly prosperous. They reside upon the Colville reservation in northern Washington, numbering altogether 575, and have been made citizens under the allotment act.

OKINAWA, ō'kȧ-nä'wȧ. A Japanese ken or prefecture formed in 1879 to include those islands of the Loo-Choo (q.v.) Archipelago that were not incorporated into Kagoshima Ken. It takes its name from Okinawa, the largest of the group.

OKLAHOMA, ŏk'lȧ-hō'mȧ. A former Territory of the United States, lying in the south central division between 34° and 37° north latitude, and between 96° and 103° west longitude. It was bounded on the north by Colorado and Kansas, on the east by Indian Territory, on the south by the last and by Texas, and on the west by Texas and New Mexico. Its extreme north and south dimension was 205 miles, and its extreme length from east to west, including the long narrow western projection constituting Beaver County, was 383 miles. Its area was 38,848 square miles. In June, 1906, Congress authorized the admission of Oklahoma, together with Indian Territory (q.v.), as one State. Nevertheless, the character of the statistical material necessitates the treatment of each former territory separately.

Topography. The surface is in general a rolling plain rising gradually from an elevation of about 800 feet in the extreme east to 2500 feet on the western boundary of the main portion, and to 5000 feet on the extreme western boundary of Beaver County. A range of hills known as the Chautauqua Mountains runs through the central portion. In the south the picturesque Wichita Mountains rise in a group of more or less isolated granite peaks to a height of 1000 feet above the surrounding plains. The western part of the Territory belongs to the region of the Great Plains rising toward the Rocky Mountains. The Red River flows on the southern boundary, and the southern part of the Territory is drained by its tributaries, chief of which are the North Fork and the Washita, the latter joining its main stream in Indian Territory. The rest of the Territory is drained by the Arkansas River, whose main stream flows through the northeastern corner. Several of its large tributaries traverse the Territory from west to east, namely, the Salt Fork, the Cimarron, and the Canadian River with its long North Fork.

Climate and Vegetation. The climate of Oklahoma is very favorable for agriculture, since, owing to the southern situation, the winters are not severe, and the rainfall is for the most part sufficient. There is, nevertheless, a considerable range of temperature, and the region is subject to severe and sudden cold waves. The maximum temperature recorded during eight years is 115°, and the minimum 25° below zero. The latter figure is, however, entirely abnormal, and the cold winter periods are of short duration, the mean temperature for the coldest month (January) being well above freezing (36.9°). The mean temperature for July is 81.2°, and for the year 59.5°. The average annual rainfall is 31.8 inches, evenly distributed through the year with a maximum in midsummer, but ranging in localities from 57 inches to a small amount, the smallest amount falling in the extreme northwest. In the western part generally the precipitation is very light for farming. The soil is formed by the decomposition of the underlying rock formations, and consists chiefly of red clay and sandstone material. In the river valleys these are mixed with a rich black alluvium, and the soils are generally of sufficient depth to be of almost inexhaustible fertility.

There are some forests of oak, walnut, and hickory in the east, but the western plains are generally treeless, and covered with grama, drop-seed, and bunch grasses, while in the extreme west are found sage-brush, yucca, and cactus. For Fauna, see paragraph under UNITED STATES.

GEOLOGY AND MINERAL RESOURCES. The surface rock in the greater part of the Territory is Triassic sandstone, on which here and there are small areas of Cretaceous deposits. The great central Carboniferous area of the United States covers the eastern part of the Territory, and the western part of Beaver County consists of Neocene deposits. The Wichita Mountains in the south present an intrusion of Archæan rocks flanked by the upturned Silurian strata. The principal minerals found are building-stone, gypsum, salt, petroleum, iron, gold, and silver. The production of petroleum, begun in 1901, amounted in 1904 to 652,479 barrels.

AGRICULTURE. Oklahoma is preëminently an agricultural and stock-raising region. The development of agriculture since the Territory was opened to settlement has been extraordinary. In 1900, 15,719,258 acres, or 63.3 per cent. of the total area, was included in farms, of which 35.1 per cent. was improved. The average size of farms was 251.5 acres. Cash tenants represented 8.2 per cent. of the farms, and share tenants 12.9 per cent.

The striking feature is the great variety of crops successfully grown. The cotton yield per acre is in excess of that of any other State or Territory.

Corn and wheat lead in importance. In 1905 there were 1,902,948 acres of corn and 1,434,648 acres of wheat. Other cereal crops in 1905 were: oats, 294,442 acres, and barley, 14,920 acres. Hay and forage for the same year had an area of 305,070 acres, and potatoes an acreage of 10,935. Cotton is produced most extensively in the southern section. In 1905, 418,184 acres were devoted to this crop. The cultivation of Kafir corn, sorghum, melons, peanuts, castor beans, and broom corn receives considerable attention. Not a little fruit is grown. The peach trees in 1900 numbered 5,519,072, or over five-eighths of the total number of fruit trees. In 1905 there were 1,983,249 acres of vacant Government land in the Territory subject to homestead entry. A great part of this was in the arid Beaver County, formerly known as 'No Man's Land.' For the recent opening of land to settlement, see section *History*.

STOCK-RAISING. The western third of the Territory is given up to cattle-raising, which flourished before the region was opened to settlement. The number of cattle has increased prodigiously since. Horses, mules, and swine are also important, and some sheep are raised.

The following table gives the number of domestic animals on farms in 1900 and 1905:

	1900	1905
Dairy cows	165,852	192,332
Other cattle	1,543,900	1,387,151
Horses	303,631	411,772
Mules and asses	57,198	87,373
Sheep	48,535	57,240
Swine	584,878	595,612

MANUFACTURING. The census of 1900 showed 870 establishments, with 2054 wage-earners, and products valued at $7,083,938. Of these 316 establishments, with 1294 wage-earners and products valued at $5,504,869, were of the class of establishments included in the 1905 census, when there were reported 657 establishments, with 3199 wage-earners and $16,549,656 in products. The chief industries were flour and grist-mills, cotton-ginning and the manufacture of cottonseed oil and cake.

RAILROADS AND COMMERCE. The development of Oklahoma was not delayed for want of railroad facilities. The mileage increased from 899 miles in 1900 to 2790 miles in 1905. The principal lines were: Atchison, Topeka, and Santa Fe; Chicago, Rock Island and Pacific; Choctaw, Oklahoma and Gulf; Saint Louis and San Francisco. There are no navigable streams. Wheat is much the largest export. Cattle, corn, hogs, and cotton are other important exports. Coal and manufactured articles are imported.

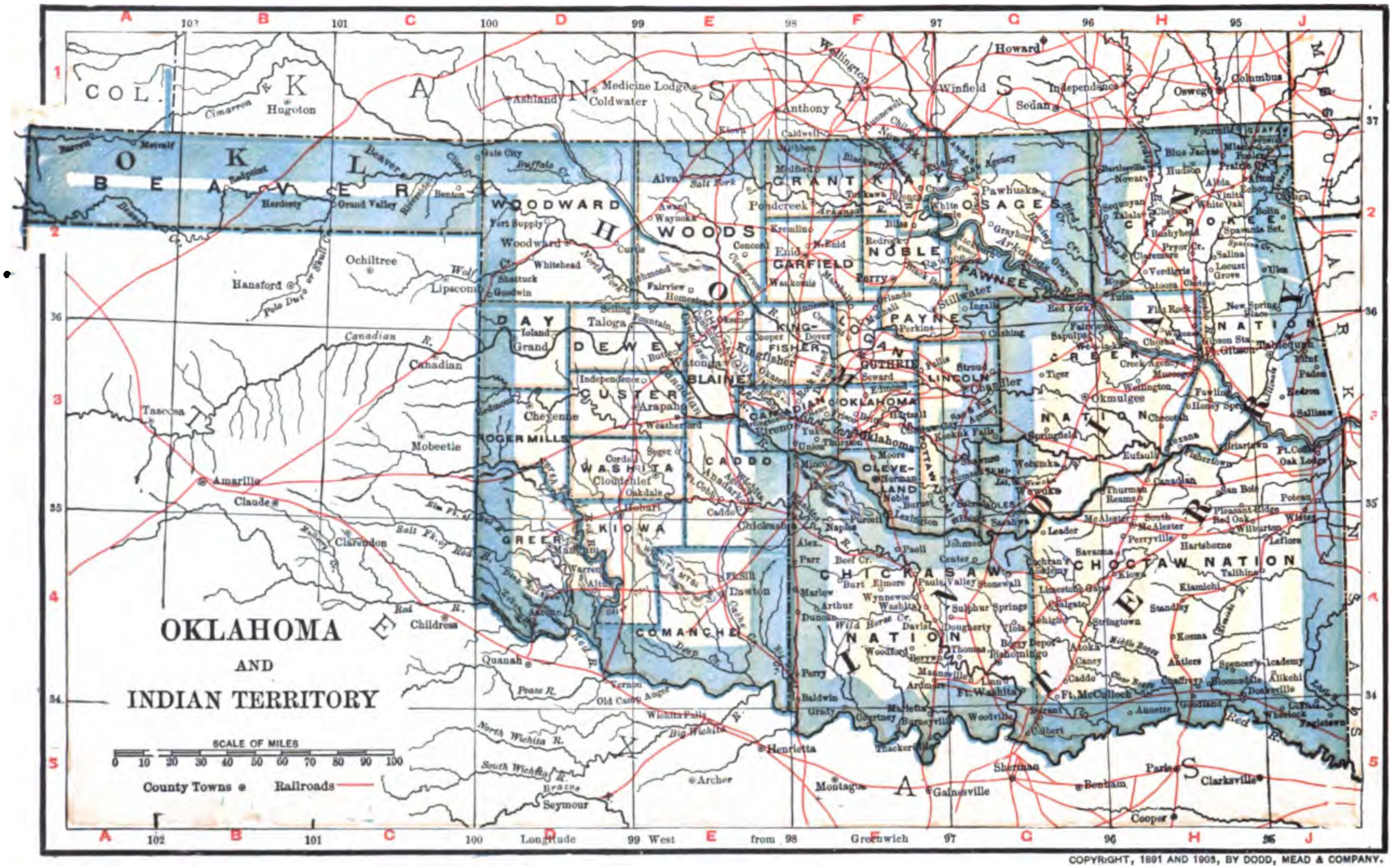
BANKS. The rapid economic growth of the Territory is also seen in the development of its banking facilities. There were only three banks when Oklahoma was organized. In 1892 there were 9 banks; in 1895, 57; and in 1902, 206. The banks are governed by a stringent banking law, passed January, 1898. It prohibits private banking, created the office of bank commissioner, makes quarterly reports obligatory, defines the minimum of capital and the liability of the officers. The condition of the various banks in 1905 is shown in the following table:

	National	State
Number	98	257
Capital	$3,780,000	$2,491,200
Surplus	391,491	293,702
Cash, etc	431,178	845,516
Loans	10,559,780	6,268,088
Deposits	12,822,192	8,239,201

FINANCES. The budget grew during 1890-1904 from less than $40,000 to more than $1,000,000. A small public bonded debt was created in 1893 for purposes of construction, but besides this an excess of expenditure over receipts was a constant feature from 1890 to 1900. This resulted in an accumulation of $684,176 of unpaid and interest-bearing warrants. However, there was December 1, 1904, a balance of $669,810 in the treasury. The main sources of income are a general tax and the rentals of public lands. The receipts from the latter source go mainly for support of the various educational funds. For the biennium ending November 30, 1904, the total receipts were $1,900,106; and the expenditures were $1,878,736, out of which 75 per cent. was devoted to educational purposes.

POPULATION. From 1890 to 1900 Oklahoma was a prominent centre for native-born American colonists. The great fertility of the land was an irresistible attraction to home-seekers. The population increased from 61,834 in 1890 to 398,331 (excluding Indians—13,873) in 1900, or 544 per cent. Kansas, Missouri, and Texas have been the largest contributors to the population. Naturally the urban population is small, only 5 per cent. being in cities of over 8000. The federal estimate of population in 1905 was 558,261. Oklahoma City had a population of 10,037 in 1900 and 33,918 in 1905; Guthrie, 10,006 in 1900, and 20,000 (local est.) in 1905.

INDIANS. The opening of 505,000 acres of the



OKLAHOMA

AND

INDIAN TERRITORY

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AREA AND POPULATION OF OKLAHOMA BY COUNTIES.

County.	Map Index.	County Seat.	Area in square miles.	Population.	
				1890.	1900.
Beaver	A 2	Beaver	5,739	2,674	3,051
Blaine	E 3	Watonga	941	.....	10,658
Canadian	F 3	Elreno	803	7,158	15,981
Cleveland	F 3	Norman	545	6,605	16,388
*Comanche	E 4	....	....	.....	......
Custer	D 3	Arapaho	1,001	.....	12,264
Day	D 3	Grand	1,044	.....	2,173
Dewey	D 3	Taloga	1,008	.....	8,819
Garfield	F 2	Enid	1,086	.....	22,076
Grant	F 2	Pondcreek	1,004	.....	17,273
Greer	D 4	Mangum	2,393	5,338	17,922
Kay	F 2	Newkirk	895	.....	22,530
Kingfisher	F 3	Kingfisher	891	8,332	18,501
*Kiowa	D 4	....	....	.....	......
Lincoln	F 3	Chandler	961	.....	27,007
Logan	F 2	Guthrie	749	12,770	26,538
Noble	F 2	Perry	631	.....	14,015
Oklahoma	F 3	Oklahoma	718	11,742	25,854
Pawnee	G 2	Pawnee	542	....	12,366
Payne	F 2	Stillwater	759	7,215	20,909
Pottawatomie	F 3	Tecumseh	790	.....	26,412
Roger Mills	D 3	Cheyenne	1,191	.....	6,190
Washita	D 3	Cloudchief	988	.....	15,001
Woods	E 2	Alva	2,749	.....	34,975
Woodward	D 3	Woodward	3,295	.....	7,469
Kaw Indian reservation	G 2	....	...	.. ..	768
Kiowa, Comanche and Apache Indian reservation	....	Anadarko	4,643	.....	4,968
Osage Indian reservation	G 2	....	2,298	.....	6,717
Wichita Indian reservation	....	....	988	.....	1,420

* Organized since the last census was taken.

AREA AND POPULATION OF INDIAN TERRITORY.

County.	Map Index.	County Seat.	Area in square miles.	Population.	
				1890.	1900.
Cherokee Nation	H 2	....	7,133	. ...	101,754
Chickasaw Nation	F 4	....	7,326	.....	139,260
Choctaw Nation	G 4	....	579	.....	99,681
Creek Nation	G 3	....	4,843	.....	40,674
Seminole Nation	G 3	....	10,910	.....	3,786
Modoc Indian reservation	J 2	....	210	....	140
Ottawa Indian reservation	J 2	....		.....	2,205
Peoria Indian reservation	J 2	....		.....	1,180
Quapaw Indian reservation	J 2	....		.....	800
Seneca Indian reservation	J 2	....		.....	970
Shawnee Indian reservation	J 2	....		.....	297
Wyandotte Indian reservation	J 2	....		.....	1,213

Kiowa and Comanche and Apache reservations between June 6 and December 6, 1906, left only small scattered tracts of Indian reservations. The Indians are slowly progressing, but in the main continue to live in idleness.

Religion. In 1900 there were about 900 church organizations, with a membership of 70,000. They owned church property valued at $500,000. The Catholic Church had a membership of 13,804. The Methodist Episcopal, Christian, Baptist, and Missionary Baptist churches each recorded a membership of nearly 8000, but the total number of adherents was much greater. The Methodist Episcopal South had 6340 members.

Education. In 1900 the illiterate population amounted to 5.5 per cent. of the total population ten years of age and over. Almost from the first Oklahoma has provided facilities for primary education equal to those of the most advanced States. The first public structure in almost every community was a schoolhouse. Two sections in each township were reserved for the use and benefit of the common schools. The total receipts for public schools in 1904 were $1,696,765, and the total expenditure was $1,359,624. In 1904 there were 204,716 children between the ages of five and eighteen, of whom 151,071 were enrolled in the elementary schools and 1815 in the public high schools. In 1901 the Legislature granted authority to counties having a population of over 6000 to establish high schools. There are separate schools for colored children. In 1904 there were 3593 teachers in the elementary schools and 78 teachers in the public high schools. Higher institutions of learning maintained by the Territory are as follows: University of Oklahoma, at Norman; an Agricultural and Mechanical College, at Stillwater; the Central Normal School, at Edmond; Northwestern Territorial Normal School, at Alva; Southwestern Normal School, at Weatherford; and the Agricultural and Normal University (colored), at Langston. There are also several sectarian colleges, and not a few academies and private schools. The United States Government maintains schools for the education of the Indians. The largest of these is the Chilocco Industrial School, in Kay County.

Charitable and Penal Institutions. The deaf mutes and insane of the Territory are cared for in private institutions by contract. The insane are kept in a sanatorium at Norman, the contract allowing $200 per patient. Convicts are cared for by contract in the Kansas State Penitentiary.

History. Oklahoma was a part of the Louisiana Purchase, and was included in the "unorganized or Indian country" set apart by Congress in 1834. The Creek Indians (June 14, 1866) ceded to the United States the western part of their domain in Indian Territory, for 30 cents an acre, while the Seminoles gave up their entire holdings for 15 cents an acre. The Sacs and Foxes, Cheyennes, and other tribes were settled upon part of these lands, but great tracts remained unoccupied. Though white men were forbidden by law to settle upon these lands, schemes for colonization were developed in 1879. President Hayes issued proclamations both in 1879 and 1880 forbidding settlement, but it was necessary to use troops to dislodge the 'boomers.' Congress in 1885 authorized the President to open negotiations with the Creek and Seminole Indians, for the purpose of opening these vacant lands to settlement. This was accomplished in 1889. Troops kept the expectant settlers in order until noon of the appointed day, April 22. A mad race for the best lands and town sites ensued. Canvas towns were laid out and each began to lay plans to secure the capital. There was at once a vast influx of settlers, and the population increased at an extraordinary rate. Additional lands were laid open to settlement in 1891, 1893, 1895, 1901, and 1906. There was no government in the Territory until Oklahoma Territory was created (March 2, 1890). The first Legislature met at Guthrie, August 27. The agitation for Statehood began in 1891, and a bill admitting Oklahoma as a State passed the House of the Fifty-seventh Congress, but failed to reach a vote in the Senate. Finally, after prolonged debate, Congress passed on July 16, 1906, the joint Statehood Bill, an act to enable Oklahoma and Indian territories to draft a constitution with a view to admission to the Union as one State under the name of Oklahoma. This act provided that 112 delegates should be chosen in November, 1906, to form a constitution, and that the capital should remain at Guthrie until 1915.

Governors of Oklahoma.

George W. Steele	1890–91
Robert Martin (acting)	1891–92
Abraham J. Seay	1892–93
William C. Renfrow	1893–97
Cassius M. Barnes	1897–1901
William M. Jenkins	1901
Thompson B. Ferguson	1901–1906
Frank Frantz	1906–

OKLAHOMA, University of. A coeducational institution established in 1892 at Norman, Okla., and supported by a general State tax of one-half mill, and by the income from lands reserved in the Cherokee outlet. The university consists of (1) a College of Arts and Sciences, embracing an undergraduate course, in the main elective, a combined course in collegiate and medical studies, and combined courses in collegiate subjects and engineering; (2) a School of Pharmacy; (3) a School of Fine Arts; and (4) a Preparatory School. Tuition is free to residents of Oklahoma and Indian Territory. The total enrollment in 1902 was 359 and the faculty numbered 28. The library contained 8000 bound volumes and 5000 pamphlets. The college property was valued at $250,000, and the grounds and buildings at $128,000; the income was $50,000.

OKLAHOMA CITY. The county-seat of Oklahoma County, Okla., 31 miles south of Guthrie; on the North Fork of the Canadian River; and on the Atchison, Topeka and Santa Fe, the Choctaw, Oklahoma and Gulf, the Saint Louis and San Francisco, the Missouri, Kansas and Texas, the Oklahoma City and Western, and the Oklahoma City and Southeastern railroads (Map: Oklahoma, F 3). It has a Carnegie Public Library, and is the seat of Epworth University, an institution under the joint control of the Methodist Episcopal Church and the Methodist Episcopal Church South. There are various manufactures, principally of flour; important wholesale interests, and a trade in cotton, grain, live stock, fruit, and produce, the city being the centre of a fine farming and stock-raising section. Settled in 1889, Oklahoma City was incorporated two years later. The government is vested in a mayor, elected biennially, and a unicameral council. The water-works are owned and operated by the municipality. Population, in 1890, 4151; in 1900, 10,037.

O'KRA. See Hibiscus, and Plate of Yam, Sweet Potato, etc.

OKUBO, ō'kụ-bō, Toshimichi (1830-78). A Japanese statesman and reformer. A native of the warlike clan of Satsuma, he was one of the five leaders in the restoration of the Emperor to power in 1867-68. After the establishment of peace he was equally prominent as the advocate of progressive measures. He was vice-ambassador in the Japanese embassy of 1872-73 which traveled around the world. Going to Peking in 1874, he settled the Formosan difficulty, which threatened war between the two empires. For eight years he was in the Cabinet of the Emperor. In 1877 a portion of the Satsuma clan, led by his old friend and comrade in arms, Saigo, rebelled. But Okubo remained in the Cabinet, aiding in the suppression of the rebellion. In revenge six clansmen of Satsuma killed him while he was on the way to the Emperor's palace, May 14, 1878. He received high posthumous rank, and his sons were ennobled.

OKUMA, ō'kụ-mȧ, Shigenobu (1837—). A Japanese statesman, born in the province of Hizen, Kiushiu, in 1837. Okuma was one of the younger leaders in the restoration of the Emperor (1867-68), and upon the conclusion of peace received prominent official positions, distinguishing himself especially by his work in putting the finances of the Empire on a sound basis. In 1881 Okuma seceded from the company of men who were governing Japan and established the Progressive Party, advocating a more rapid advance toward constitutional and parliamentary government. In addition to his work as statesman he established a large school for the teaching of law and political economy and literature, which exerts a wide and an increasing influence. After the establishment of the Parliament Okuma again held high office and continued to be a powerful factor in the public affairs of the nation.

OLAF I., ō'lȧf, Trygvasson (?-1000). King of Norway from 995 to 1000. He was a descendant of Harald Haarfagr, and in his early years was one of the Vikings who terrorized the coasts of the North Sea, and made descents upon England, Ireland, and France. In 995 he seized the Government of Norway. He had previously been baptized, and he now exerted himself to introduce Christianity among his subjects. Some of the nobles, who refused to acknowledge Olaf's authority, stirred up the rulers of Denmark and Sweden to make war upon him, and he was defeated and slain in a great naval battle in 1000.

OLAF II., surnamed the Saint or the Great (c.995-1030). King of Norway from about 1015 to 1028. He was a son of Harald Gränske, and at the age of fifteen he began his marauding expeditions, which extended to the coasts of Sweden, Germany, France, and Spain. At the age of about twenty he made himself master of Norway, where he completed the establishment of Christianity. (See Norway.) In 1028 he was driven out by Canute (q.v.) and fled to Russia. He was killed in 1030, in an attempt to recover his kingdom. Because of his zeal for Christianity, he was canonized in 1164 and became the patron saint of Norway.

ÖLAND, ẽ'länd', or **OELAND.** An island in the Baltic Sea, lying off the southeast coast of Sweden, from which it is separated by Kalmar Sound, from 4 to 17 miles wide (Map: Sweden, G 8). It is included in the Swedish Län of Kalmar. The island is 80 miles in length, and from 4 to 10 miles in breadth, with an area of 510 square miles. It consists mainly of a sandstone ridge scantily covered with soil, but in some parts it is well wooded, and has good pastures, on which cattle and sheep are reared. In favorable seasons, barley, oats, and flax yield good crops. The fishing is excellent all round the coasts. There are large alum-works on the island, and an extensive line of windmills along the Alwar Hills, near which stands Borgholm (population, in 1900, 926). This town is famous for the magnificent ruins of Borgholm Castle. Oeland was often a battlefield in the wars between Denmark and Sweden. Population, in 1890, 37,519; in 1900, 30,408.

OLATHE, ȯ-lā'thė. A city and the county-seat of Johnson County, Kan., 21 miles southwest of Kansas City; on the Saint Louis and San Francisco, the Missouri, Kansas and Texas, and the Atchison, Topeka and Santa Fe railroads (Map: Kansas, H 3). It is the seat of the State Institution for the Deaf and Dumb. The adjacent country is largely interested in farming and stock-raising; and the city manufactures flour, bricks, shoes, furniture, etc. There are municipal water-works. Population, in 1890, 3294; in 1900, 3451.

OLBERS, ȯl'bĕrs, Heinrich Wilhelm Matthäus (1758-1840). A German physician and astronomer, born at Arbergen, a small village near Bremen. He studied medicine at Göttingen from 1777 till 1780, and subsequently commenced to practice at Bremen. After 1779 all the leisure time that he could spare from professional occupations was devoted to the study of astronomy. He first became widely known through his calculation of the orbit of the comet of 1779, which was performed by him while watching by the bedside of a sick patient, and was found to be very accurate. In 1781 he rediscovered the planet Uranus, which had previously been supposed to be a comet, and in 1802 and 1807 respectively discovered the planetoids Pallas and Vesta. He also discovered five comets, in 1798, 1802, 1804, 1815, and 1821, all of which, with the exception of that of 1815, had been some days previously observed in Paris. His observations, calculations, and notices of various comets, which are of value to astronomers, were published in the *Annuaire* of Bode (1782-1829), in the *Annuaire* of Encke (1832), and in three collections by the Baron de Zach. Most of these calculations were made after a new method, discovered by himself, for determining the orbit of the comet from three observations. It is still employed by astronomers under the name 'Olbers's method.' The general equality of the elements of the planetoids led him to propound the theory that the planetoids are fragments of some large planet which formerly revolved round the sun at a distance equal to the mean of the distances of the planetoids from the same luminary. Olbers also made some important researches on the probable lunar origin of meteoric stones, and invented a method for calculating the velocity of falling stars. Consult Schilling, *Wilhelm Olbers: Sein Leben und seine Werke* (Berlin, 1894).

OLCHAS, ŏl′chȧz, or Mangun. One of the North Tungusic tribes dwelling at the mouth of the river Amur, in Asia, and closely related to the so-called Reindeer Tunguses. See Tungus.

OLD AGE, Diseases of. See Senility.

OLD AGE PENSIONS. Allowances paid to the aged workman either by the Government or by the employer. The term is commonly extended so as to include allowances from a fund to which the recipient has contributed, but which is derived only partially from such contributions. Old age pensions are usually defended on the ground that a large class of laborers are unable to make adequate provision for old age, and hence are certain to become paupers when no longer able to work. Of these aged paupers, a large number have been sober and industrious workers, and for this reason their fate serves to discourage the workmen of the lowest paid classes. Opponents of old age pensions contend that if provision for old age is made by the State, one of the chief incentives to thrift will be removed. Defenders of the plan argue that it is simple justice that a faithful workman should be decently fed and housed when incapacitated for work by age. It is questioned whether such pensions actually discourage thrift; whether the despair of escaping pauperism which is common in certain classes does not do more to destroy industrious habits than a judicious plan of old age pensions. In Europe the provision for old age is a subject of great practical importance. The recognition of State responsibility is an innovation of the last decade. A system of State pensions has been established in Denmark and compulsory insurance obtains in Germany and Sweden. Similar laws have been enacted for coal-miners in Austria (1889), France (1894), Rumania (1895), and Belgium. The State may create institutions for voluntary insurance and may offer inducements to the workmen to insure themselves, as in France and Belgium. Privately organized institutions, e.g. friendly societies controlled by the State, may perform this function, as may also be done through funds set apart by the employer—a common plan in transportation, mining, and the iron and steel business.

Compulsory insurance originated in Germany. Dr. Schaeffle, the founder of State insurance, conceived the plan in 1867. In the early seventies it was generally discussed, and Wagner and other economists gave it their support. The present law (Invalidity and Old Age Insurance, 1889; revised July, 1899) was enacted through the influence of Bismarck, who hoped thereby to check the growth of socialism. All workmen, assistants, journeymen, foremen, engineers, servants, clerks, and teachers, who are sixteen years of age and upward, and who do not receive more than $500 yearly, must contribute to a pension fund, to which the employer must contribute equal sums, while the Empire adds $12.50 annually to each annuity and pays the cost of administration. Thirty-one institutions have been provided to which payments are made by means of stamps. Pensions are paid to septuagenarians.

Sweden introduced compulsory insurance in 1889 and Iceland in 1890. A Parliamentary commission to investigate the subject was appointed in Norway in 1894. In Finland old age insurance is voluntary, with local pension funds administered by the State. Denmark (1891) grants small pensions in the form of additional income to the worthy poor. This differs from poor relief in that the recipient retains his right to vote.

In Belgium, the Caisse Général d'Epargne et de Retraite (1850) is guaranteed by the State. The system has rapidly developed since 1891. Subsidies are offered to friendly societies, and the attention of employers is called to the benefits of insurance. The new accounts increased from 568 in 1888 to 43,873 in 1898. In France the Caisse Nationale des Retraites pour la Vieillesse (1850) has not been popular. It is used by the railroads and other corporations which provide pensions for their employees. Among the many corporations which provide old age pensions may be mentioned the Joint Stock Company of Vielle (zinc workers) and the Gas Company of Paris. The pension funds are usually supported by contributions from the employees, but sometimes entirely from the profits of the company.

In England Canon Blackley first initiated the movement for old age pensions, but the name of Charles Booth is chiefly associated with its later development. He advocates granting pensions without regard to age or desert. Several reports of committees of Parliament (notably 1891, 1899) cover the ground extensively. Some trade unions provide pensions.

In 1898 New Zealand passed a pension law granting £18 yearly to citizens of twenty-five years' residence who were sixty-five years of age. Deductions are made when there are other sources of income, so that the stigma of poverty is attached to the scheme.

In the United States there has been no extensive demand for the adoption of the system by the Government, although it has long existed in embryo in the practice of retiring on half pay certain officials, who have served a given number of years or have attained a certain age. There is also a marked tendency among railroads and other large corporations to pension their aged employees. The Chicago and Northwestern Railroad on December 12, 1900, adopted a plan which is being followed by other roads. The pensions are managed by a board of four officials, and all employees may enjoy them. Men seventy years old who have been thirty years in service are retired; those from sixty to sixty-nine who have served thirty years and are incapacitated may be retired at the discretion of the board. The pension amounts to 1 per cent. of the average monthly payment, for the ten years preceding retirement, for each year of service. The Pennsylvania, Illinois Central, Union Pacific, Philadelphia and Reading, and the Grand Trunk have recently adopted pension systems. Among street railways, the Metropolitan, New York (July 1, 1902), provides for the retirement, voluntary and involuntary, of men between sixty-five and seventy-five years of age after a service of twenty-five years. For a continuous service of twenty-five years the pension amounts to 25 per cent. of a workman's salary, and increases with length of service. A number of gas companies have pensioned their aged employees, notably the Consolidated Gas Company of New York City, and the Gas Company of Grand Rapids, Mich. Andrew Carnegie has provided for the pensioning of employees at the Pittsburg mills. The Standard Oil Company has adopted a plan which provides for the pensioning of every official, no matter what his rank, the pension to be 25 per cent. of his salary. See FRIENDLY SOCIETY.

BIBLIOGRAPHY. Conrad, *Handwörterbuch der Staatswissenschaften,* art. "Arbeiterversicherung" (Jena, 1898); Willoughby, *Workingmen's Insurance* (New York, 1898). For German conditions, consult *Fourth Special Report of Commissioner of Labor* (Washington, 1893); for foreign countries in general, *Thirty-first Annual Report of New York Bureau of Statistics of Labor* (Albany, 1900). Consult also: Spender, *The State and Pensions in Old Age* (London, 1892); *Reports of English Parliamentary Committees, 1891, 1899.*

OLD ARM-CHAIR, THE. A poem by Eliza Cook recalling the writer's mother. It became popular and was set to music by Henry Russell.

OLD BAILEY (probably from OF. *baille,* palisade, inclosure, probably from Lat. *baculum,* rod). An ancient criminal court, with a prison adjoining, in London, England. It attained a gruesome reputation at a time when many crimes other than murder were punishable with death, because of the great number of convictions there for various capital offenses, and the apparent eagerness of the judges and juries serving there to convict any accused person brought to trial. It was graphically described by Charles Dickens in his *Tale of Two Cities* as the scene of the trial of the hero, Charles Darnay, for treason. It was destroyed by fire during the Gordon Riots of 1780, but was rebuilt, and is now officially known as the Central Criminal Court, although it is usually popularly referred to as the Old Bailey.

OLDBUCK, JONATHAN. The chief character in Scott's *Antiquary;* an irascible, good-hearted collector of antiquities. Scott says that he was modeled partly on George Constable, an old friend of the author's father.

OLD BULGARIAN. See OLD CHURCH SLAVIC LANGUAGE AND LITERATURE.

OLD'BURY. A manufacturing town in Worcestershire, England, five and one-half miles west by north of Birmingham (Map: England, E 4). Coal, iron, and limestone abound in the neighborhood; and in the town, iron, steel, aluminum, railway equipment, bricks, glass, chemicals, etc., are manufactured. The town exhibits much modern improvement, owning its gas supply, a free library, and a technical institute. Population, in 1891, 22,697; in 1901, 25,191.

OLDCASTLE, JOHN (?-1417). An English nobleman, who suffered death as a Lollard. He was born about the time of the accession of Richard II. (1377), probably in the Manor of Almeley, near Weobley, Western Herefordshire. He acquired the title of Lord Cobham by marriage (1409), and later signalized himself by the ardor of his attachment to the doctrines of Wiclif. He took part in the presentation of a remonstrance to the English Commons on the subject of the corruptions of the Church. At his own expense he had the work of Wiclif transcribed and widely disseminated among the people, and paid a large body of preachers to propagate the views of the reformer throughout the country. During the reign of Henry IV. (1399-1413) he commanded an English army in France, and forced the Duke of Orleans to raise the siege of Paris; but in the first year of the reign of Henry V. (1413) he was accused of heresy and was imprisoned in the Tower, whence after some time he escaped and concealed himself in Wales. A bill of attainder was passed against him and 1000 marks set upon his head. After four years' hiding he was captured, brought to London, and, being reckoned a traitor as well as a heretic, he was hanged and his body consumed as it hung in chains over a fire, December 14, 1417. He is said to have been the original of Shakespeare's Falstaff, as he was believed to have been in his youth the boon companion of Henry V. in his early days. Consult his *Life* by Gilpin (London, 1765), Gaspey (ib., 1843), Brown (ib., 1848), and in Maurice's *English Popular Leaders* (ib., 1872).

OLD CATHOLICS. A religious communion, found principally in Germany and Switzerland, which owed its origin to certain Roman Catholics who refused to accept the dogma of infallibility passed by the Vatican Council (q.v.), July 18, 1870. Before the Council assembled it was known that such a dogma would be discussed, and a determined opposition to it developed. Foremost among the opponents was the Munich professor Ignaz von Döllinger (q.v.), and after the dogma was promulgated he headed a gathering at Nuremberg, August 27, 1870, of professors from Bonn, Breslau, Braunsberg, Munich, Münster, Prague, Würzburg, and elsewhere, who sent forth a protest. The chief signers of the protest were deposed or excommunicated. Nevertheless, they persisted in the advocacy of their belief and found sympathizers. On September 22-24, 1871, the first Old Catholic Congress met at Munich, attended by about 300 delegates from Germany, Austria, and Switzerland, and friends from Holland, France, Russia, England, and other countries. In the resolutions adopted the congress defined its theological status. Döllinger was not in favor of forming an ecclesiastical organization, but the majority determined upon it. A large number of Old Catholic congregations sprang up in many places in Germany. The second congress met at Cologne, September 20-22, 1872; provision was made for the election of a bishop, intercommunion with the Eastern and Anglican churches was sought, and a claim to recognition by the State, with a share of the Church property, was asserted. Joseph Hubert Reinkens (q.v.), professor of theology in the University of Breslau, was elected bishop in the following June and consecrated in August at Rotterdam by Heycamp, Jansenist Bishop of Deventer. He continued to serve till his death, January 4, 1896, when he was succeeded by Theodor Weber, who had been consecrated coadjutor bishop the preceding year. Old Catholic bishops have been recognized by the governments of Baden, Hesse, and Prussia, and the latter has granted them a share in the ecclesiastical property. The third congress, held at Constance, September, 1873, further perfected the organization, and in the following year the Church was able to report 132 parishes and societies in Germany, with about 25,000 members, 41 priests, and 12 theological students. After the fourth congress (at Baden, 1874), a conference aiming at Church unity was held at Bonn. Dr. Döllinger presided, and representatives of the Eastern and Anglican churches participated.

The bishops of the Old Catholic Church in Germany are chosen by the clergy and people together. Its synods are representative bodies having the initiative in legislation. It rejects the doctrines of infallibility and the immaculate conception, the obligation to confess, and priestly absolution. Indulgences and the veneration of saints are modified. Many ecclesiastical taxes are abolished, and the mass is recited in the vernacular. The priests are allowed to marry. Unions for church improvement and charitable work have been formed. Between 1887 and 1900, 800,000 marks were spent in church building. The *Altkatholischer Press- und Schriftenverein* had, in 1900, 1476 members in about 200 places. The *Altkatholischer Schwesternverein* in Bonn maintains a deaconess work. The *Amalie von Lasaulx Haus* is a training institute for nurses at Essen. The *Charitas* mutual benevolent or burial society had 1742 members in 1900. An orphans' home was founded at Bonn in 1897. In 1901 there were 59 Old Catholic priests in Germany, and from 50,000 to 60,000 adherents.

The movement early took root in Switzerland, especially in Geneva, and resulted in 1873 in the formation of the Christian Catholic Church of Switzerland. Eduard Herzog (q.v.) was chosen bishop in 1876. In 1901 there were 41 congregations, 56 priests, with Dr. Thürlings as theological professor in the University of Bern, and 50,000 adherents.

In Austria the Old Catholic Church has 24 parishes and upward of 16,000 members. Dr. Amandus Czech of Warnsdorf has been chosen bishop, but not consecrated, the Government withholding its consent until adequate provision for an episcopal fund shall have been made. The Old Catholic Union of Austria has been organized to promote the work of the Church, and has local branches in some of the larger towns. A sisters' home was established at Warnsdorf in 1899. The progress of the Old Catholic Church in the Austrian Empire has been assisted in late years, particularly in Bohemia and Styria, by a popular movement whose battle-cry is 'Los von Rom.' It began with the publication in 1898 of a tract by an Old Catholic priest, Anton Nittel of Warnsdorf. At first political motives influenced the movement, but it has assumed more of a religious character as it has gone on. At the international Old Catholic congress in 1902 Bishop-elect Czech said that 7000 members had been added to the Church through the 'Los von Rom' movement. A report published in 1902 gave the entire number of new members in the Old Catholic churches in Bohemia, Moravia, Styria, Upper Austria, and Vienna as 8114, as compared with 18,082 who had joined the Lutheran and Reformed churches.

In Holland the Jansenist Church (see JANSENISM), which is affiliated with the movement, has 3 bishops, 8000 adherents, and 30 priests. In Italy there are 8 congregations and 10 priests; in Spain, 3000 adherents and 11 priests. In France the 'Gallican Church' at Paris, founded by Père Hyacinthe (see LOYSON, CHARLES), now under the charge of the Bishop of Utrecht, is in sympathy with the movement. There are also a few of the communion in Portugal and Mexico. The so-called Independent Catholic Church in the United States (q.v.), founded by the Rev. Anthony Koszlowski among the Polish immigrants in Chicago, has been generally regarded as representing the movement in America. There have also been a few congregations in Wisconsin. They have a bishop, René Vilatte. International Old Catholic congresses have been held at Cologne (in 1890), Lucerne (1892), Rotterdam (1894), Vienna (1897), and Bonn (1902).

A number of Old Catholic periodicals are published: the *Internationale theologische Zeitschrift* (*Revue internationale de théologie*), quarterly, Bern; *Amtliches altkatholisches Kirchenblatt*, occasional, Bonn; *Deutscher Merkur*, weekly, ib.; *Altkatholisches Volksblatt*, weekly, ib.; *Der Katholik*, weekly, Bern; *Le Catholique National*, weekly, ib.; *De Oud Katholiek*, monthly, Rotterdam; *Le Catholique Français*, monthly, Paris; *Il Labaro*, monthly, San Remo; *Girolamo Savonarola*, weekly, Piacenza; *La Luz*, Madrid.

The literature is voluminous. The reports of the congresses, synods, etc., the pastoral letters, addresses, and other publications of the bishops and leaders, and the periodicals, particularly the *Deutscher Merkur*, give detailed information of the progress of the work. For its origin, consult Friedberg, *Sammlung der Aktenstücke zum ersten vatikanischen Konzil* (Tübingen, 1872); and *Aktenstücke, die altkatholische Bewegung betreffend, mit einem Grundriss der Geschichte derselben* (ib., 1876). Consult, also, Herzog, *Beiträge zur Vorgeschichte der christkatholischen Kirche der Schweiz* (Bern, 1896); Nippold, *Die Anfänge der christkatholischen Bewegung in der Schweiz und der Los-von-Rom Bewegung in Oesterreich* (Bern, 1901). For the history of the movement, consult von Schulte, *Der Altkatholizismus* (Giessen, 1887), and the article "Altkatholizismus" by the same author in the Hauck-Herzog *Realencyclopädie*, which is complete and authoritative for Germany to 1896. Hergenröther, *Handbuch der allgemeinen Kirchengeschichte*, vol. ii. (3d ed., Freiburg, 1884), treats the movement from the Roman Catholic standpoint. A popular account in English may be found in an article by Beyschlag, "The Origin and Development of the Old Catholic Movement," in the *American Journal of Theology*, vol. ii. (1898).

OLD CHURCH SLAVIC LANGUAGE AND LITERATURE. The oldest language and literature of the Slavic group of Indo-Germanic languages, presenting one of the most important dialects for the study of comparative linguistics. (See PHILOLOGY.) Formerly called Old Slovenian, and even now frequently termed Old Bulgarian, the best name seems to be Old Church Slavic, for the language appears not to have coincided with any national or geographical division, while its use from an early time in the Greek Church (where it occupies a position somewhat analogous to Latin in the Roman Catholic Church), and its evident Slavic characteristics, amply justify the use of this term. The place of its origin cannot be exactly determined, although it seems to have been the dialect of a region in the Balkan Peninsula. The widespread use of the language, however, permitted the incorporation of certain Pannonianisms and Bohemianisms or Slovenianisms, even in the oldest records. It nevertheless remained free from the Russian, Servian, and other importations which characterize the later form of the language which may be called Church Slavic.

In its phonology Old Church Slavic adheres closely to the characteristic representations of the Indo-Germanic sound-system which mark the Slavic languages (q.v.).

The inflection of Old Church Slavic is full and in many cases primitive in type. The noun has three numbers, singular, plural, and dual; seven cases, nominative, genitive, dative, accusative, vocative, locative, and instrumental; and three systems of declension, nominal, pronominal, and compound. There are six nominal declensions, according as the stems end in *-o*, *-ā*, *-i*, *-u*, *-ŭ*, or a consonant. As in other Indo-Germanic languages, the pronominal declension was originally entirely different from the nominal, although transfers from one system of inflection to the other are not infrequent. The compound inflection, peculiar to the Slavic and Scandinavian languages, is formed by adding the pronoun *i* to an adjective or a participle, both parts of which are then declined, as *dobra*, 'of good (man)', *yego* 'of him,' *dobrayego*, 'of the good (man).' The process, therefore, is precisely analogous to the Scandinavian article suffixed to a noun, as Old Icelandic *borþs-ens*, 'of the shield.' The comparative of the adjective is formed by *-yĭs*, *-ēyis*, as *krēpŭkŭ*, 'strong,' *krēpyii; dobrŭ*, 'good,' *dobrēi;* and the superlative is either the comparative used with superlative force, or is formed by prefixing *nai-* to the comparative, as *naikrēpyii*, 'strongest.' The verb in Old Church Slavic, as in other languages of this group, is either perfective, expressive of a completed action, or imperfective, denoting either a continuous (durative) or interrupted (iterative) action. A durative verb becomes perfective if a preposition is prefixed (as *nesti*, 'to carry,' but *iznesti*, 'to carry out'), while under like conditions an iterative verb becomes durative, or more rarely iterative-perfective. Only two of the original tenses are retained, present and aorist, and only two moods, indicative and imperative, the latter being originally an optative. The Indo-Germanic middle voice has been lost, like the future and perfect tenses, while of the original passive only the present and perfect participles (as *vedomŭ*, *vedenŭ*, from *vesti*, 'to conduct') remain. In addition to the active infinitive there is a supine corresponding precisely to that found in Latin (as Latin *datum*, Old Church Slavic *datŭ*, from *dare*, *dati*, 'to give'). The aorist, inherited from the Pre-Indo-Germanic period, is formed either with or without *s*, the latter class steadily increasing at the expense of the former. The imperfect is specifically a Slavic formation, being made apparently by adding to a datival (or possibly locatival) infinitive an augmented imperfect of the root *as*, 'to be,' as *vedēachŭ*, *vedēchŭ*, from *vesti*, 'to conduct.' The future and perfect, like the pluperfect, future perfect, passive, and conditional, are periphrastic in formation, although the future is often expressed by the present, and the passive by a reflexive made by the active with the reflexive pronoun *se*, 'himself' (as *otŭ tebe krĭstiti se*, 'to be baptized by thee,' more rarely *bē napĭsano*, 'it was written'). In syntax the most noteworthy features are the use of the genitive instead of the accusative after negative verbs, and after transitive verbs in the case of proper names, a usage which probably arose from the desire to avoid the ambiguity resulting from the identity of form of the nominative and accusative singular of masculine nouns; the use of the dative as an absolute case, and the use of the predicative dative after verbs of becoming (as *i siroloyą dētištĭ ne bądetŭ*, 'and the child shall not become an orphan').

Old Church Slavic is written in two alphabets, called Glagolitic and Cyrillic. (See Glagolitsa; Cyrillic Alphabet.) The literature, which is of considerable extent, and consists altogether of translations, is entirely religious. Besides the Bible, there are versions of the Euchologium, homilies, legends of the saints, and certain apocryphal books.

Consult: Schleicher, *Formenlehre der kirchenslavischen Sprache* (Bonn, 1852); Ziljski, *Uzajemna slovnica* (Prague, 1865); Chodzka, *Grammaire paléoslave* (Paris, 1869); Leskien, *Handbuch der altbulgarischen (altkirchenslawischen) Sprache* (3d ed., Weimar, 1898); Vondrák, *Altkirchenslawische Grammatik* (Berlin, 1900); Wiedemann, *Beiträge zur altbulgarischen Conjugation* (Saint Petersburg, 1886); Meillet, *Recherches sur l'emploi du génitif-accusatif en vieux-slave* (Paris, 1897); Miklosich, *Lexicon Linguæ Slovenicæ Veteris Dialecti* (Vienna, 1850).

OLD COLONY. The name given to the territory of the Plymouth Colony in Massachusetts, and later extended to the whole State.

OLD CURIOSITY SHOP, The. A novel by Charles Dickens (1840). It appeared first as a serial in a weekly publication, *Master Humphrey's Clock*, but was published independently. The keeper of the shop and his grandchild, Little Nell, are driven by poverty to a wandering life, and meet kind friends, among them Mrs. Jarley and the schoolmaster, with whom they find their last refuge. Little Nell dies before help reaches them. Other prominent characters are the hideous dwarf, Quilp, Sally Brass and her brother, Dick Swiveller, and the Marchioness.

OLD DOMINION. Virginia. See States, Popular Names of.

OLDENBERG, ōl'den-bĕrk, Hermann (1854—). A German Orientalist and philologist. He was born in Hamburg, and was educated at Göttingen and Berlin. Upon graduation at the latter university he became privat-docent there, and later professor extraordinarius. He was called to Kiel in 1889 as professor of Sanskrit and comparative philology. He has published *The Dīpavaṁsa* (1879); *The Vinaya Pitakam* (1879-83); *The Theragāthā* (1883); "Vinaya Texts," in Max Müller, *Sacred Books of the East* (1881-85); *Buddha, sein Leben, seine Lehre und seine Gemeinde* (1881; 2d ed. 1890; trans. 1882); *Die Hymnen des Rigveda* (1888); *Die Religion des Veda* (1894); and "Vedic Hymns Translated," in Max Müller, *Sacred Books of the East* (1897).

OLDENBURG, ōl'den-bōōrk. A grand duchy of the German Empire, composed of the Duchy of Oldenburg and the two principalities of Birkenfeld (q.v.) and Lübeck. The Duchy of Oldenburg, which constitutes the bulk of the State, is bounded by the North Sea on the north, by the Prussian Province of Hanover and the State of Bremen on the east, and by Hanover on the south and west (Map: Germany, C 2). Total area, 2479 square miles. The Duchy of Oldenburg forms a part of the northwestern plain of Germany. It is low and marshy along the coast where it has to be protected from the sea, while the interior, somewhat higher, is mostly sandy and

by moors and heaths. The region
ins of the Weser and the Ems.
iefly by the Hunte, a tributary
d by the Haase and Soeste, both
e Ems. There are also a number
s flowing into the Jade, an inlet
a, and there is an extensive canal
ning purposes.

is mild, humid, and somewhat
he marshes of the north. About
e total area of Oldenburg proper
t under cultivation. The land
small holdings, only 69 of the
of the grand duchy in 1895
247 acres each. The best land
e marshy districts on the north.
cereals for export, and are famous
ent cattle. In the interior, cereals
product, and the proportion of
and is much greater. The forest
d. The manufacturing industries
but slightly, and the domestic
duction still largely prevails. The
ctures are tobacco, corks, woolen
n, brick, knit goods, etc. The rail-
grand duchy had a total length of
n 1900, and are all operated by the

one of the grand duchy is hereditary
le line. The Constitution, adopted in
revised in 1852, provides for one
whose members are elected indirectly
ate of one Deputy for every 10,000
ts. The Landtag ordinarily assembles
ee years, and during its intermission
ented by a permanent committee. The
lities of Birkenfeld and Lübeck have
e provincial diets. The executive power is
in a responsible Minister representing the
l Duke. Oldenburg is represented by one
ber in the Bundesrat, and returns three
ties to the Reichstag. For the administra-
of justice the Duchy of Oldenburg has a
vincial court of appeal and a supreme court.
principalities of Birkenfeld and Lübeck are
nected for judicial purposes with Cologne and
mburg, respectively.

The three divisions of the grand duchy have
parate budgets, but there is also a common
udget for the grand duchy, which derives its
evenue from customs duties, State domains, and contributions from its constituent States. The budget of the grand duchy balanced in 1900 at $901,425. The total estimated revenue and expenditure for the three constituent States in 1900 were $1,859,511 and $2,254,776, respectively. The total indebtedness of the three constituent States amounted in 1900 to $13,295,700. Population of the Duchy of Oldenburg in 1890, 279,008; in 1900, 318,434. The population of the grand duchy was 354,968 in 1890 and 399,183 in 1900. Over three-fourths of the population is Protestant. Capital, Oldenburg (q.v.). Most of the inhabitants are of Saxon stock, but there are also found descendants of the Frisians in the north and west of the Duchy of Oldenburg.

History. The territory now included in the Grand Duchy of Oldenburg was in ancient times occupied by the Germanic tribe of the Chauci, who were subsequently merged with the Frisians. In the early centuries of the German Kingdom the dukes of Saxony held sway in the region. A Count of Oldenburg first appears about the beginning of the twelfth century. In 1247 Count Otho II. founded the town of Delmenhorst, and his descendants were henceforth known as counts of Oldenburg and Delmenhorst. In 1448 Count Christian of Oldenburg became by election King of Denmark. The Reformation was early introduced into Oldenburg. After the death of Count Anthony Günther, without heirs, in 1667, the territories of Oldenburg passed to the royal house of Denmark. In 1773 Christian VII. of Denmark transferred the principality to Paul, Duke of Holstein-Gottorp (the future Paul I. of Russia), who immediately made it over to his cousin, the Prince-Bishop of Lübeck. In 1777 Oldenburg was raised to the rank of a duchy. The present reigning family is descended from Duke Peter, of the line of Holstein-Gottorp. This Prince in 1808 became a member of the Confederation of the Rhine. He soon grew restive under the obligations imposed upon him by Napoleon, and, abandoning the French alliance, left the country, which was thereupon (1810) annexed to the French Empire. The victories of the Allies restored Peter to power in 1813. The Congress of Vienna increased the territory of Oldenburg, and raised it to the rank of a grand duchy. The secularized See of Lübeck had been annexed to the principality in 1803. The revolutionary movement of 1848 affected Oldenburg, and in 1849, after having lived for centuries without even a show of constitutional or legislative freedom, the country entered suddenly into possession of the most liberal of constitutions. The reaction in favor of absolutism, which the want of purpose of the popular party induced, led in 1852 to a revision and modification of the Constitution. In the Seven Weeks' War Oldenburg sided with Prussia, and afterwards joined the North German Confederation. In 1866 a treaty was concluded with Prussia, by which the Grand Duke renounced his claims to the Holstein succession in return for the cession of a small portion of Holstein territory and an indemnity. In 1871 Oldenburg became part of the new German Empire.

Consult: *Jahrbuch für die Geschichte des Herzogtums Oldenburg* (Oldenburg); Kollmann, *Das Herzogtum Oldenburg* (ib., 1893); Erdmann, *Geschichte der politischen Bewegungen in Oldenburg* (ib., 1897); Pleitner, *Oldenburg im 19. Jahrhundert* (ib., 1899-1901).

OLDENBURG. The capital of the Grand Duchy of Oldenburg, Germany, on the Hunte, and the Hunte-Ems Canal, 25 miles west of Bremen (Map: Germany, B 2). Its Church of Saint Lambert, built in the thirteenth century, and restored in 1874, contains the vaults of the reigning family. The palace, surrounded with fine gardens, has a choice collection of paintings and sculptures, and a large library. The city has a museum of natural history, a gymnasium, a higher *Realschule*, and a public library of over 100,000 volumes. There are manufactures of glass, cigars, leather, machinery, and musical instruments. There is a trade in grain and cattle. Population, in 1890, 23,118; in 1900, 26,635. Oldenburg is mentioned as early as 1108. It became a city in 1345.

OLDENBURG, House of. A princely family which has given rulers to a number of European countries. Count Dietrich the Fortunate, of Oldenburg, married in 1424 the daughter of Gerhard VI., Duke of Schleswig-Holstein. His eldest son, Christian, was chosen King of Denmark (1448) and of Norway (1450), and Duke of Schleswig-Holstein (1460), thus founding (1) the royal line of Denmark, which became extinct in 1863, in the person of Frederick VII. A younger son of Dietrich continued the line of Oldenburg which became extinct in 1667. Adolph, son of Frederick I. of Denmark, founded (2) the ducal line of Gottorp, whose representative, Duke Charles Peter Ulrich, ascended the Russian throne in 1762 as Peter III. A grandnephew of Peter III., Adolph Frederick, was chosen King of Sweden in 1751, while a younger brother of Adolph Frederick became the founder of the new grand ducal line of Oldenburg. (3) The ducal line of Sonderburg founded by John the Younger, the third son of Christian III. of Denmark, fell apart into a number of lines, of which the line of Augustenburg alone survives. (4) The line of Beck or Glücksburg was founded by a grandson of John the Younger. Prince Christian, fourth son of Duke Willian of this line, ascended the Danish throne in 1863 as Christian IX. (q.v.). His second son, George, became in the same year King of Greece.

OLD ENGLISH. See English Language; English Literature; Anglo-Saxon Language and Literature.

OLD-FASHIONED GIRL, An. A story by Louisa M. Alcott (1869). It was begun as a serial for *Merry's Museum*, a child's magazine, and afterwards enlarged. The cheery, unaffected little heroine is effectively contrasted with some gay city friends.

OLD′FIELD, Anne (1683-1730). A noted English actress. Though she was of good birth, her family was in humble circumstances, and she was apprenticed to a seamstress in Westminster, till as a girl she attracted the attention of Farquhar by her beauty and her expression in reading a play. She was then given an opportunity at Drury Lane. At first the critics were doubtful of her dramatic gifts, but she made steady progress in her art and became the foremost actress of her time. One of her greatest successes was as Lady Betty Modish in Colley Cibber's *Careless Husband* (1704), and she created many parts in the 'genteel comedy' of the period, though she long felt a reluctance to tragedy. Yet she created the rôle of *Jane Shore* (1714), and was a superb Cleopatra in Cibber's *Cæsar in Egypt* (1724), and her acting of Sophonisba (1730), her last new rôle, was said to have thrilled even the actors upon the stage. Her private life furnished occasion to the gossips, and she was the acknowledged mistress of Arthur Mainwaring, and after his death of Gen. Charles Churchill. She was nevertheless on intimate terms with the great ladies of her day, and she was buried in Westminster Abbey. Consult: the *Authentick Memoirs of the Life of that Celebrated Actress, Mrs. Ann Oldfield* (London, 1730); Geneste, *History of the English Stage* (Bath, 1832); Doran, *Annals of the Stage*, ed. by Lowe (ib., 1888); Baker, *English Actors from Shakespeare to Macready* (New York, 1879); Russell, *Representative Actors* (London, 1872?).

OLD-FIELD LARK. A local name in the Southern United States for the meadow-lark (q.v.).

OLD FOLKS AT HOME. One of the most famous of Southern plantation songs (1850). First line: "'Way down upon the Suwanee Ribber." Both words and music are by Stephen Collins Foster, and were written before the author reached the age of twenty years. He realized the sum of $15,000 for the song, which still continues in undiminished popularity.

OLD FORGE. A borough in Lackawanna County, Pa., four miles southwest of Scranton; on the Lackawanna River, and on the Delaware, Lackawanna and Western, the Lehigh Valley, and the New York, Susquehanna and Western railroads (Map: Pennsylvania, F 2). It is in the anthracite region and is principally engaged in coal-mining. There are also a silk mill, large chemical and fertilizer works, and a glass-blowing plant. The high-school building is one of the finest in the county. The government is vested in a burgess, elected every three years, and a borough council. Settled in 1830, Old Forge was incorporated in 1899, having been organized from a part of the township of the same name. Population, in 1900, 5630.

OLD GRIMES. A poem and popular song by the American writer Albert G. Greene (1802-68), the name being taken from one of Crabbe's metrical tales.

OLD GUARD, The. The name borne by a select body of French troops during the First Empire. It was created by Napoleon I. in 1804 out of the preëxisting Consular Guard and comprised picked men from every arm of the service. The Old Guard had its own general staff and received orders only from its own commander. Subsequently the name was usually restricted to a body of infantry consisting of three regiments of grenadiers and two regiments of chasseurs. The Old Guard played a leading part in the Napoleonic battles and suffered proportionately, its numbers after the Russian campaign being reduced to 500 men. In 1812 the Young Guard was created to act as a source of supply for the Old Guard. The latter, greatly increased in number, ended its career in glory in the last desperate charge at Waterloo.

OLDHAM, ōld′am. A manufacturing town in Lancashire, England, on the Medlock, seven miles northeast of Manchester (Map: England, D 3). The parish church, the town hall, the Blue-Coat and the grammar schools, are the chief edifices. With its incorporation as a town in 1849, its municipal activity commenced. It owns its gas and water since 1853, electric lighting plant, tramways, baths, wash-houses, hospitals, cemeteries, markets, libraries, art gallery, technical school, and the Alexander Park of 60 acres. Modern destructors and installations dispose of refuse and sewage. Oldham owes its rapid increase in population and wealth to the extensive coal mines in the vicinity, and to its cotton manufactures, which engage 300 mills with more than 12,000,000 spindles. The damp air of the region gives the humidity necessary for the spinning of yarn. It is also celebrated for its manufactures of machinery for cotton-spinning and wool-weaving. In 1760 it was a village of 60 houses. Population, in 1801, 12,000; in 1851, 52,800; in 1891, 131,500; in 1901, 137,200.

OLDHAM, John (c.1600-1636). An early settler in New England. He was born in England in 1600, and emigrated to Plymouth in 1623. In 1624 he and an Episcopalian minister named John Lyford conspired against the Government of Plymouth and dispatched letters containing charges against the established authorities to England. The plot was detected, and Oldham was banished from the colony, although he later became reconciled with the inhabitants and rendered them some services. Settling in the Massachusetts Bay Colony, he became a man of prominence, and was a deputy from Watertown to the first General Court of Magistrates and Representatives. In 1636, while he was on a trading expedition, his pinnace was treacherously captured near Block Island by Indians, and he was killed. His murder was the immediate cause of the famous Pequot War.

OLDHAM, John (1653-83). An English satirical poet, born at Shipton-Moyne, near Tetbury, in Gloucestershire. He graduated at Saint Edmund Hall, Oxford, in 1674, and the next year became usher in a school at Croydon. Four years later he left Croydon to become tutor to the grandsons of a retired judge named Sir Edward Thurland, with whom he remained until 1681, when he became tutor to the son of Sir William Hickes. During his latter years he was aided by William Pierrepont, Earl of Kingston, at whose home he died. Oldham's poems, some of which possess real merit, had considerable influence on Pope and other English poets of the succeeding century. Among them are the satires *To a Friend About to Leave the University,* which he wrote while occupying his position at Croydon; *Satires upon the Jesuits* (1681), which reflect the panic-stricken condition of the people after the alleged discovery of 'the Popish plot;' and a *Satire Against Virtue* (1681), which was taken so literally by the public that its author was compelled to explain in an *Apology* and a *Counterpart.* Though Oldham produced poems other than satirical, these and some adaptations of Horace and Juvenal are the works on which his reputation rests. Consult Thompson, *The Compositions in Prose and Verse of Mr. John Oldham, to Which are Added Memoirs of His Life* (3 vols., 1770).

OLDHA'MIA (Neo-Lat., named in honor of Thomas Oldham, an English geologist of the nineteenth century). The oldest known fossil alga, found in Cambrian rocks of Ireland. The type species, Oldhamia antiqua of Forbes, appears to be a coralline alga, while another species, Oldhamia radiata, is of uncertain affinity and may be a worm trail or even a series of minute wrinkles produced by distortion of the slate rocks upon which it is found. Oldhamia is of very doubtful occurrence in the Cambrian of America.

OLD HICKORY. An affectionate nickname of Andrew Jackson, given because of his tough and unbending characteristics.

OLD HUNDRED. A favorite hymn tune. By some the music is credited to Guillaume le Franc, a musician of Rouen, but is probably an adaptation of a popular tune of the fifteenth century. The melody was adapted to Beza's version of Psalm cxxxiv., included by him in the Geneva Psalter, the first copy of which, with his additional tunes, was printed in 1554. It was arranged by Louis Bourgeois, the musical editor of that book. The tune is found with different endings in the Flemish Psalter (Antwerp, 1540); in the Dutch Psalter (London, 1561); in the Psalms with music by Marot and Beza (Lyons, 1563); in Claude Goudimel's famous collection of tunes (Paris, 1565); and also in English and German tune-books. In England it was sung to Kethe's version of the hundredth Psalm, "All people that on earth do dwell," and called the "Hundredth Tune." The word 'old' was added in Brady and Tate's new version of the Psalter (London, 1596). Another name is "Savoy." Consult: Bovet, *Histoire du psautier des églises réformées* (Neuchâtel and Paris, 1872); and Fitzgerald, *Stories of Famous Songs* (London, 1897).

OLD IRONSIDES. The name popularly given to the United States frigate *Constitution* (q.v.).

OLD JEWRY. A street in London, near Mercer's Hall, deriving its name from the Jews, who were settled there before their persecution in 1291. On the site of their former synagogue stands Grocers' Hall.

OLD KENTUCKY HOME. A well-known plantation melody by Stephen Collins Foster (1850), beginning: "The sun shines bright in the old Kentucky home."

OLD LADY OF THREADNEEDLE STREET. In popular language, a name frequently given, from its location, to the Bank of England.

OLD LAW, The, or A New Way to Please You. A comedy by Middleton, Massinger, and Rowley, published in 1656. An earlier version was written by Middleton in 1599, and was altered by Massinger and Rowley into the later form. The 'law' was the compulsory removal of all aged men and women, which was modified in the course of the play.

OLD LIGHT ANTI-BURGHERS. See Burgher and Anti-Burgher.

OLD LINE STATE. Maryland. See States, Popular Names of.

OLD MAN OF THE MOUNTAIN. The name applied in mediæval times to the ruler of the Assassins (q.v.).

OLD MAN OF THE SEA. A monster in the form of an old man, described in the *Arabian Nights' Entertainments.* Sindbad the Sailor met him and took him on his shoulders in order to assist him, but was unable to release himself from the clutch of the old man until he made him drunk and so released his hold. The expression is used to describe any bore or incubus from which release is difficult.

OLD (WISLER) MENNONITES. See Mennonites, section *The Old, or Wisler, Mennonites.*

OLDMIX'ON, John (1673-1743). An English historian, born at Axbridge in Somerset. During his early life he wrote a number of poems and plays, but in 1708 turned his attention to more serious work and published *The British Empire in America.* For a number of years he enjoyed the perquisites of the post of collector of the port at Bridgewater, but spent three years in London writing one of his histories, and then found that his deputy at Bridgewater had involved him in a debt for £360; whereupon he turned over the arrears of his salary and resigned. His histories are now of little value, as they were written for party purposes. His attacks on Pope led the latter to give him a place in the *Dunciad*. The titles of some of his works are: *The Secret History of Europe* (1712-15); *The History of England During the Reigns of the Royal House of Stuart* (1730); and *The Arts of Logick and Rhetorick* (1728).

OLD MORTALITY. A novel by Sir Walter Scott (1816). The title is taken from the nickname of Robert Paterson, who for years kept in order the tombstones of the Covenanters. The story purports to have been told by him to the author as Cleishbotham, and describes the conflict of the Covenanters with the royal forces under Claverhouse, about 1670.

OLD NORTH STATE. See NORTH CAROLINA.

OLD OAKEN BUCKET, THE. A very popular song by Samuel Woodworth, written in New York in 1817 and first published under the title of "The Bucket." The air is an adaptation by Frederick Smith of Kiallmark's music composed for Moore's "Araby's Daughter."

OLD PERSIAN. The ancient Iranian language of Persia. Its entire grammatical structure is closely akin to Avesta (q.v.). The inadequacy of the alphabet in which it is written (see CUNEIFORM INSCRIPTIONS) and the scantiness of the remnants of the language, however, prevent a complete knowledge either of its phonology or morphology. Its principal phonological characteristics are as follows: Indo-Germanic *ṛ* is represented by *ar*, as Skt. *kṛta*, 'deed,' Old Pers. *karta;* Indo-Germanic nasalized vowels lose their nasalization, at least in the script, as Skt. *aśaṁsam*, 'I said,' Old Pers. *aθaham;* epenthetic *u* is developed between *d* and *r*, and between *g* and *d*, as Skt. *adruhyat*, 'he deceived,' Old Pers. *adūrūjiya*, Av. *Suγδa*, 'Sogdiana,' Old Pers. *Sugūda, Suguda;* Indo-Germanic *tr* becomes *θʳ*, as Skt. *putra*, 'son,' Old Pers. *puθʳa;* Indo-Germanic *i*, *u*, are written *iy*, *uv* after consonants, as Skt. *yadi*, 'if,' Old Pers. *yadiy*, Skt. *dadātu*, 'let him give,' Old Pers. *dadātuv;* Indo-Germanic *ti* becomes *š*, as Skt. *mṛtyu*, 'man,' Old Pers. *maršiya;* Indo-Germanic final *t* and *d*, the only final consonants remaining in Iranian, are lost in Old Persian, as Skt. *abharat*, 'he bore,' Old Pers. *abara*, but Av. *barat̰;* Indo-Germanic *s* is lost, at least in the script, before *u*, *r*, and *m*, as Skt. *svaśva*, 'rich in horses,' Old Pers. *uvaspa*, Skt. *asmi*, 'I am,' Old Pers. *amiy*, Skt. *srōtas*, 'river,' Old Pers. *rauta;* Iranian *s* and *z* become *θ* and *d* before vowels and *r*, as Av. *sarəδa*, 'sort,' Old Pers. *θarda*, Av. *nisrinaomi*, 'I restore,' Old Pers. *niyaθʳārayam*, 'I restored.' The inflection, so far as it can be reconstructed, does not differ essentially from Avesta, except that the imperfect tense of the Old Persian verb invariably has the augment which is usually lacking in Avesta, as Old Pers. *adadā*, 'he gave,' Av. *daθāt̰*. The attempt which has been made by certain scholars to prove the existence of various dialects in the extant Old Persian texts can scarcely be regarded as successful.

The Old Persian records, apart from glosses and proper names, consist of a number of cuneiform inscriptions carved by the Achæmenian Kings Cyrus, Darius I., Xerxes I., Artaxerxes I., Artaxerxes Mnemon, and Artaxerxes Ochus. These inscriptions are chiefly at Behistun, Persepolis, Naks-i-Rustam, Elvand, Van, Susa, and Suez. Of them by far the most important are the five tablets, amounting to 410 lines, and a few minor texts, carved by order of Darius I. on the mountain-side at Behistun (q.v.). Here the King relates his history in a dignified tone, which in the fourth tablet rises to some degree of literary merit. Next in importance is the inscription of Darius at Naks-i-Rustam (see PERSEPOLIS) in sixty lines, conspicuous for its stylistic merit, and two briefer texts, of 24 lines each, of the same King at Persepolis. The texts of Xerxes and the three Artaxerxeses are little more than replicas of the minor tablets of Darius. In the latest inscriptions, especially in the single one of Artaxerxes Mnemon, set up by him at Susa, a decay in grammar seems evident. The style of the Old Persian inscriptions, which shows marked traces of literary influence from the Assyro-Babylonian tablets, is simple narrative, and in general the meaning of the words is tolerably certain. There are, however, a number of difficult passages, where the Babylonian and New Susian versions carved side by side with the Persian inscription of Behistun give no help. This Babylonian translation is, unfortunately, very fragmentary, while the New Susian, interpreted only by identifying words in it which correspond to known Old Persian terms, is not a safe guide in doubtful passages. There are a number of gaps in the Old Persian inscriptions, and the reading of several words is not yet determined. It is almost certain that there are other Old Persian inscriptions which have not yet been discovered, and which when found may give a solution of at least some of the problems which now beset the interpretation of these texts.

Consult: Rawlinson, "The Persian Cuneiform Inscription at Behistun," in *Journal of the Royal Asiatic Society*, old series, vols. x., xi. (London, 1846-49); Benfey, *Die persischen Keilinschriften* (Leipzig, 1847); Oppert, "Mémoire sur les inscriptions achéménides conçues dans l'idiome des anciens Perses," in *Journal Asiatique*, fourth series, vols. xvii.-xix. (Paris, 1851-52); Kossowicz, *Inscriptiones Palæo-Persicæ Achæmenidarum* (Saint Petersburg, 1872); Spiegel, *Die altpersischen Keilinschriften* (2d ed., Leipzig, 1881); Tolman, *Grammar of the Old Persian Language with the Inscriptions* (Boston, 1892); id., *Guide to the Old Persian Inscriptions* (New York, 1893); Weissbach and Bang, *Die altpersischen Keilinschriften* (Leipzig, 1893); Hüsing, *Die iranischen Eigennamen in den Achämenideninschriften* (Norden, 1897); Spiegel, *Vergleichende Grammatik der altiranischen Sprachen* (Leipzig, 1882); Bartholomae, *Handbuch der altiranischen Dialekte* (ib., 1883); id., "Awestisch und Altpersisch," and Weissbach, "Die altpersischen Inschriften," in Geiger and Kuhn, *Grundriss der iranischen Philologie* (Strassburg, 1895-1903); Pizzi, *Grammatica elementare dell' antico iranico* (Turin, 1897); Lagarde, "Die persischen Glossen der Alten," in his *Gesammelte Abhandlungen* (Leipzig, 1866); Justi, *Altiranisches Namenbuch* (Marburg, 1895).

OLD POINT COMFORT. A frequented watering place in Elizabeth City County, Va., six miles north of Norfolk (Map: Virginia, H 5). Its location on a small peninsula, where Hampton Roads and Chesapeake Bay join the Atlantic Ocean, is one of great natural beauty. A fine beach for bathing and good boating and fishing, together with the activities of garrison life at Fort Monroe (q.v.), situated here, are prominent attractions. The climate is remarkably mild and equable. There is a large hotel, besides several cottages, and the resort is frequented in both summer and winter.

OLD PROBABILITIES. A popular American nickname for the head of the Weather Bureau, or loosely for the personification of weather prophecies in general.

OLD PRUSSIAN LANGUAGE. An extinct member of the Baltic group of Indo-Germanic languages which was spoken until the seventeenth century in Prussia. The remnants of the language are very scanty, and are too meagre to permit a reconstruction of the grammar. The Old Prussian fragments consist of translations of two catechisms, printed in 1545, and of the Short Catechism of Luther (1561). There are also two Old Prussian-German vocabularies, that of Elbing, compiled in the first half of the fifteenth century, containing 802 words, some of which, however, are loan-words, and that of Grunau, who composed a list of 100 words between 1517 and 1526. This vocabulary of Grunau is so inaccurate as to be of little value. The Elbing list, on the contrary, if used with caution, is the most valuable source of our knowledge of the language next to Luther's catechism. The chief phonological characteristics of Old Prussian are as follows: Indo-Germanic *ē* remains *ē* in Old Prussian under the circumflex accent, but becomes *ī* under the acute, as *semmē*, 'earth,' accented on the ultimate like the equivalent Russian *zemlyá* but with the circumflex like Lithuanian *duktē̃*, 'daughter); *turrīt*, 'to do,' Lithuanian *turéti*. Indo-Germanic *o* becomes *a* in Old Prussian as in the other Baltic dialects (Lettic and Lithuanian), as Latin *oculus*, Old Church Slavic *oko*, 'eye,' but Old Prussian *ackis*, Lithuanian *ãkys*, Lettic *azs*, while *ō*, like *ā*, is represented by *ā* or, after gutturals, by *ū* in Old Prussian, *o* (*u̇*) in Lithuanian, and *ā* (*u̇*) in Lettic, as Gothic *frōþs*, 'wise,' Old Prussian *prātin*, 'counsel,' Lithuanian *prõtas*, 'understanding,' Lettic *prāts*, 'will,' but Old Latin *hemōn*, 'man,' Old Prussian *smūni*. Indo-Germanic *r̥*, *l̥*, *m̥*, *n̥* become in Old Prussian as in the other Baltic dialects *ir*, *il*, *im*, *in*, as Sanskrit *vṛthā*, 'in vain,' Old Prussian *prawilts*, 'to betray,' Lithuanian *vilstu*, Lettic *wilt*, 'to deceive.' In script at least there is no distinction between *s* and *z*, as Skt. *daśa*, Latin *decem*, Old Prussian *dessimtons*, Lithuanian *dēszimtis*, 'ten,' Old Church Slavic *desetĭ*, but Sanskrit *jñā*, Greek *γιγνώσκειν*, Old Prussian *posinnāt*, Lithuanian *zinóti*, Lettic *zināt*, Old Church Slavic *znati*, 'to know.' In accent Old Prussian seems to have resembled Lettic rather than Lithuanian. The Old Prussian long diphthongs, long vowel plus liquid, and nasal plus consonant, therefore correspond, like the Lettic acute accent, to the Lithuanian circumflex, while like combinations with unlengthened vowel correspond, like the Lettic lengthened vowel, to the Lithuanian acute. The noun had five cases, nominative, accusative, genitive, dative, and vocative, as well as a few traces of an instrumental. The original Indo-Germanic terminations are, in general, well preserved, as dative singular *wirdai*, 'to the word,' Lithuanian *vaȓdui*, cf. Avesta *vəhrkāi*, Greek *λύκῳ*, 'to the wolf'; accusative plural *wirdans*, 'words,' cf. Cretan Greek *λύκους*, Gothic *wulfans*, 'wolves'; genitive plural, as *grikan*, 'of sins,' Lithuanian *grẽkũ*, Lettic *griku*, cf. Vedic Sanskrit *vṛkām*, 'of wolves,' Greek *λύκων*, Latin *deum*, 'of gods.' On the other hand, the genitive singular of *s*-stems is borrowed from those in *-ā-*, as *Deiwas*, 'of God' (cf. *gennas*, 'of a woman,' Greek *χώρας*, 'of a country'), but Lithuanian *vil̃ko*, 'of a wolf,' Lettic *vilka*, Old Church Slavic *vlŭko*, and the dative plural receives an *s* from the accusative plural, as *auschautenīkamans*, 'to debtors,' but Lithuanian *rañkomus*, *rañkoms*, 'to hands,' Lettic *rōkeem*, Old Church Slavic *rąkomŭ*. The verb has a present and past indicative, an imperative (optative), an optative of secondary formation, present and past active and passive participles, and an infinitive. The third person plural, as in the other Baltic dialects, coincides in form with the singular. The ending is *a*, as *senrīnka*, 'he gathers,' Lithuanian *reñka*, and is a relic of the Indo-Germanic present injunctive, as Sanskrit *cōdayat*, 'he is to rouse.' The first person singular is also old, as *imma*, 'I take,' Greek *λύω*, 'I loose.' The infinitive appears in three forms, undifferentiated in meaning, as *dātwei*, *dāton*, *dāt*, 'to give.' The form *dātwei* is usually compared with such Vedic Sanskrit infinitives as *dhātavē*, 'to place,' while *dāton*, like Lithuanian *dėtų*, and Old Church Slavic *dētŭ*, is to be compared with Sanskrit *dhātum*, Latin *con-ditum*, 'to place.' The explanation of such infinitives as *dāt* is not yet clear. Consult: Nesselmann, *Die Sprache der alten Preussen* (Berlin, 1845); id., *Thesaurus Linguæ Prussicæ* (ib., 1873); Berneker, *Die preussische Sprache* (Strassburg, 1896).

OLD RED SANDSTONE. The name given to a large series of Paleozoic rocks, of which red sandstones are the most conspicuous portions, but which contain also white, yellow, or green sandstones, as well as beds of clay and limestone. The group lies below the Carboniferous strata, and was called 'Old' to distinguish it from a newer series of similar beds which occur above the coal measures. The discovery that the highly fossiliferous calcareous rocks of Devonshire and the Continent occupied the same geological horizon, showed that the name was very far from being descriptive of all the deposits of the period, and suggested to Murchison and Sedgwick the desirability of giving them a new designation. They consequently proposed Devonian, which has been extensively adopted. The name has been rendered classical by Hugh Miller in his books, *The Old Red Sandstone*, and *Footprints of the Creator*. The formation which has been laid down in inland seas is noted for its abundant fish remains.

OLD ROWLEY. A popular name of Charles II. The name is derived from Rowley, a favorite horse of the monarch, and is also explained as alluding to the saying "A Roland for an Oliver," referring to the relations of Oliver Cromwell and Charles.

OLD SCHOOL (or PRIMITIVE) **BAPTISTS.** See BAPTISTS.

OLD SLOVENIAN. See OLD CHURCH SLAVIC LANGUAGE AND LITERATURE.

OLD SQUAW, or OLD WIFE. A sea-duck (*Clangula hyemalis*) of all northern regions, easily recognized by its much elongated tail feathers; the 'long-tailed duck.' See DUCK.

OLDSTYLE, JONATHAN. The pseudonym under which Washington Irving contributed to the New York *Morning Chronicle*, in 1802.

OLD TOWN. A city in Penobscot County, Maine, 12 miles north-northeast of Bangor; on the Penobscot River, and on the Maine Central and the Bangor and Aroostook railroads (Map: Maine, F 6). It has a public library and a city hospital; and among the prominent buildings are the city hall, high school, and Odd Fellows Block. The lumber interests of the city are very important, and there are also manufactories of wood pulp, bateaux and canoes, boots and shoes, woolens, patent medicines, chemical fibre, and machinery and foundry products. Under a revised charter of 1895, the government is administered by a mayor, annually elected, and a unicameral council. Settled about 1820, Old Town was set off from Orono and incorporated as a town in 1840, and in 1891 was chartered as a city. Population, in 1890, 5312; in 1900, 5763.

OLD UNCLE NED. One of Stephen Collins Foster's popular negro songs (1847), beginning "There was an old darky and his name was Uncle Ned."

OLD WIVES' TALE, THE. A farce or interlude by George Peele, printed in 1595, but acted probably in 1590. The plot of this lively farce is taken from Ariosto, but its chief interest is the fact that it suggested to Milton the plan of *Comus*. The troupe who act part of the *Tale* are transformed into the Lady, the Brothers, and Spirit of the poem.

OLD WOMAN'S SUMMER. See INDIAN SUMMER.

OLDYS, ōl′dĭs, WILLIAM (1696-1761). An English antiquary; natural son of Dr. William Oldys, a civil lawyer. He seems to have been born in London. He inherited some property from his father, but lost heavily through connection with the 'South Sea Bubble' in 1720. For several years he aided Dr. Knowles in editing the *Earl of Strafforde's Letters and Despatches* (2 vols., 1739). During this time, also, he collected a valuable library, which he sold in 1731 to the Earl of Oxford, whose literary secretary he became in 1738. After Oxford's death, in 1741, Oldys's life became one of drudgery and hardship. For a number of years he collaborated with Dr. Johnson in preparing a catalogue of the Oxford library, which had been purchased by Thomas Osborne, the bookseller; but in 1751 he was imprisoned in the Fleet for debt, and remained there two years before friends came to his aid. In 1755 the Duke of Norfolk secured for him the post of Norroy king-at-arms, which he kept until shortly before his death. His works, which have been often used by later writers, show deep learning and thorough research. Among the best known is the *Life of Raleigh*, originally prefixed to the *History of the World* (2 vols., 1736), and later to the collected edition of Sir Walter's *Works* (8 vols., Oxford, 1829). Another valuable work is his *British Librarian* (1737), a critical catalogue; and almost equally useful are his annotations and notes on the works of earlier writers. Consult Yeowell, *A Literary Antiquary: Memoir of William Oldys, Norroy King-at-Arms* (London, 1862).

OLEAN, ō′lē-ăn′. A city in Cattaraugus County, N. Y., 70 miles south by east of Buffalo; at the confluence of the Allegheny River with Olean Creek, and on the Erie, the Pennsylvania, and the Pittsburg, Shawmut and Northern railroads (Map: New York, B 3). It has the Foreman Library, General Hospital, a State armory, a fine high-school building, and City Park. The driving park here has been the scene of famous races; and in the vicinity is the well-known 'Rock City,' a collection of massive conglomerate rocks. Olean is noted for its extensive oil and lumber interests. Owing to the proximity of the Pennsylvania oil fields, it is a storage place for large quantities of petroleum, and the terminus of several pipe lines. Leather interests also are prominent, and great hemlock forests are near by. The industrial establishments include oil refineries, tanneries, planing mills, stave, heading, and barrel factories, carriage and wagon works, railroad shops, marble works, foundries, glass factories, brick yards, flouring mills, a brewery, and bicycle works. Settled in 1804, Olean was chartered as a city in 1893, the charter of that date now being in operation, and providing for a government vested in a mayor, elected biennially, and a unicameral council. The waterworks are owned and operated by the municipality. Population, in 1890, 7358; in 1900, 9462.

OLEANDER (Fr. *oléandre*, Sp. *oleandro*, *eloendro*, ML. *arodandrum*, corrupted by popular etymology with Lat. *olea*, olive tree, from Lat. *rhododendron*, Gk. *ῥοδόδενδρον*, oleander, from *ῥόδον*, *rhodon*, rose, + *δένδρον*, *dendron*, tree), *Nerium*. A genus of plants of the natural order Apocynaceæ. The species are evergreen shrubs with leathery leaves, which are opposite or in threes; the flowers in false umbels, terminal or axillary. The common oleander (*Nerium Oleander*), a native of the Mediterranean region and many of the warmer temperate parts of Asia, is frequently planted in many countries as an ornamental shrub, and is very common in northern latitudes as a house plant. It has beautiful red or sometimes white flowers. The English call it rose bay, and the French rose laurel (*laurier rose*). It attains a height of 8 to 10 feet. Its flowers give a splendid appearance to many ruins in the south of Italy. It delights in moist situations, and is often found near streams.

OLEANDER.

The charcoal obtained from the tender, light wood is used in Algeria in the manufacture of powder. The propagation of the plant is readily effected by layers and cuttings. The cuttings are taken from leading shoots, potted singly, and placed in a warm frame. A very common practice is to start the roots of the cuttings in bottles of water and to pot them afterwards.

OLEARIUS, ō'lâ-ä'rê-ụs, ADAM (c.1600-71). A German author, who introduced Persian poetry into the literature of the seventeenth century. He was born at Aschersleben; Latinized his family name Oelschläger; and studied at Leipzig. In 1633, with the poet Fleming (q.v.), he was sent to Russia and Persia with an embassy from Frederick III. of Holstein-Gottorp, as secretary and counselor, but more especially for scientific and linguistic research. He made several valuable maps; studied the customs, literature, and language of Persia; and became the greatest Persian scholar of contemporary Europe. He was a member of the famous literary association the *Fruchtbringende Gesellschaft*, and an elegant prose writer. His fame rests on his *Beschreibung der neuen orientalischen Reise* (1647, translated into French and Dutch, and in an English version, 1661), a work valuable alike as a literary production and as a source of scientific knowledge. Olearius also made a rather free, yet forcible and adequate, version of Saadi's *Gulistan*, under the title of *Persianisches Rosenthal* (1654 and 1660). Consult: Grosse, *Adam Olearius* (Aschersleben, 1867), and the sketch "Olearius," by Ratzel, in the *Allgemeine deutsche Biographie*.

OLE'AROS. The ancient name of Antiparos (q.v.), one of the Cyclades.

OLEASTER. A shrub. See ELÆAGNUS.

OLE BULL. See BULL, OLE BORNEMANN.

OLE'FIANT GAS. See ETHYLENE.

O'LEIC ACID (from Lat. *oleum*, oil), $C_{18}H_{34}O_2$. A colorless liquid of an oily consistence, devoid of smell and taste, and (if it has not been exposed to air) exerting no action on vegetable colors. At low temperature it solidifies to a firm, white, crystalline mass, and in this state it undergoes no change in the air; but when fluid it readily absorbs oxygen, becomes yellow and rancid, and exhibits a strong acid reaction with litmus paper. The melting-point of the pure acid is 14° C. (57° F.). It is not a volatile acid, and on the application of a strong heat, under ordinary atmospheric pressure, it breaks up into several substances; it may, however, be distilled under reduced pressures, or in a current of superheated steam, when it passes over undecomposed. If oleic acid be exposed to the action of nitrous acid, it is converted into another acid, termed *elaidic acid*. The latter is a crystalline substance melting at about 46° C. (115° F.) and having the same molecular composition as oleic acid. A very small quantity of nitrous acid is sufficient to effect this remarkable change, the nature of which is unknown. When heated with caustic potash, oleic acid breaks up into palmitic and acetic acids, as shown by the equation:

$$\underset{\text{Oleic acid}}{C_{18}H_{34}O_2} + \underset{\text{Caustic potash}}{2KOH} =$$
$$\underset{\text{Palmitate of potassium}}{C_{16}H_{31}O_2K} + \underset{\text{Acetate of potassium}}{C_2H_3O_2K} + \underset{\text{Hydrogen}}{H_2}$$

Oleic acid is a component of *olein* (q.v.), which exists in most of the fats and fatty oils of the animal and vegetable kingdoms, and most abundantly in the liquid fats or oils, whence its name. It may be readily prepared in a pure state from fats rich in olein. For this purpose the fat employed is saponified by heating with a solution of caustic potash, and the soap thus obtained is decomposed with hydrochloric acid, which sets free the acids originally contained in the fat. The mixture of acids is then treated with lead oxide at 100° C. (212° F.), and the oleate of lead is dissolved out of the mixture of lead salts obtained, by means of ether. On filtering and distilling off the ether, the oleate of lead is decomposed with hydrochloric acid, and the oleic acid is purified by cooling to about 6° or 7° below zero centigrade (about 20° F.), and removing the impurities, which remain liquid, by pressure and washing with small quantities of alcohol.

With reference to the chemical constitution of oleic acid, it is known to contain a normal chain of eighteen carbon atoms and one double bond; but which two of the carbon atoms are linked to each other by that double bond has not yet been exactly ascertained. By the action of nascent hydrogen, oleic acid is readily converted into stearic acid (q.v.).

Of the *oleates*, or salts of oleic acid, the most important are the alkali salts, which are among the constituents of soap; they are soluble in water and in alcohol, and are precipitated from their aqueous solution by common salt. The lead salt, used as 'lead plaster' (diachylon plaster), may be obtained by adding lead acetate to an aqueous solution of sodium oleate; its formula is $(C_{18}H_{33}O_2)_2Pb$; it melts at 80° C. (176° F.).

OLEIN, ō'lê-ĭn (from Lat. *oleum*, oil), or TRIOLEIN, $C_3H_5(C_{18}H_{33}O_2)_3$. The glyceride of oleic acid. Pure olein is a colorless and inodorous oil, insoluble in water, and only slightly soluble in cold alcohol, but dissolves in ether in all proportions. By exposure to the air it darkens in color, becomes acid and rancid, and finally assumes a resinoid appearance. Nitrous acid converts it into an isomeric white solid fat named *elaidin*—the glyceride of elaidic acid. (See OLEIC ACID.) Pure olein is obtained by cooling olive oil to 0° C. (32° F.), which occasions the separation of the stearin and palmitin in a solid form. The fluid portion is then dissolved in alcohol, which on being cooled to 0° C. (32° F.) deposits in a solid form everything but olein, which is obtained in a pure state by driving off by heat the alcohol from the decanted or filtered solution.

Olein is one of the three constituents common to all fats, the other constituents being palmitin and stearin. It forms the predominating constituent of liquid fats, such as olive oil and oil of almonds. See FATS; OILS; GLYCERIN; OLEIC ACID.

OL'ENEL'LUS (Neo-Lat., diminutive of *olenus*). An important genus of trilobites characteristic of the Lower Cambrian series, for which reason these beds are termed the 'Olenellus zone.' The animal had a flat, tapering body covered by a hard shell like that of a crab, made up of 14 loosely jointed segments, a broad head with large kidney-shaped eyes and long slender cheek spines, and there was a long slender spine at the end of the tail or pygidium. See TRILOBITA.

OLE'NUS (Neo-Lat., from Lat. *Olenos*, Gk. Ωλενος, name of a man changed to stone). A trilobite from the Upper Cambrian and Lower Ordovician formations of Europe. See TRILOBITA.

O'LEOGRAPH (from Lat. *oleum*, oil + Gk. *γράφειν*, *graphein*, to write). A chromo-lithograph which has been 'roughed' on a lithographic stone engraved so as to imitate canvas. The resemblance to oil-painting is further increased by mounting the oleograph on canvas, sizing and varnishing. The colors used in printing oleographs are a little darker than in the case of chromo-lithographs in imitation of water-color paintings.

OLEOMARGARINE, ō'lē-ō-mär'gȧ-rĭn (from Lat. *oleum*, oil, Eng. *margarine*, from Lat. *margarita*, from Gk. *μαργαρίτης*, *margaritēs*, pearl, from *μάργαρος*, *margaros*, pearl-oyster), ARTIFICIAL BUTTER, or BUTTERINE. An artificial or manufactured substitute for dairy butter, made from 'oleo-oil' and other fatty substances worked together with coloring matter. The material originated in France, as the result of a prize offered at the instance of Napoleon III. for the best substitute for butter. This was awarded in 1869 to Hippolyte Mège, whose process, considerably modified, is still employed in the manufacture of oleomargarine. In preparing oleo-oil, the fat that is removed from beef animals at the time of slaughtering is thoroughly washed in warm water, and chilled and hardened by means of ice water. It is then finely cut up by machinery and melted in steam-jacketed caldrons at about 160° F. (71° C.), after which it is allowed to settle. Salt is scattered over the surface of the fat, which accelerates the settling of the fibre or membrane. After the first settling the clear oil is siphoned to a second series of jacketed caldrons, where more salt is added and the temperature controlled until the second settling is completed, when it is siphoned into vats, in which it is allowed to stand from three to five days at a temperature favorable to the crystallization of the stearin. The mass is then thoroughly mixed, wrapped in cloths and submitted to powerful pressure, which separates the oleo-oil from the stearin. Several grades of oleo-oil are made, the quality depending upon the grade of animals and the part of the body from which the fat is obtained. Neutral lard, or 'neutral,' another important constituent of oleomargarine, is prepared from the leaf and the back fat of the hog, the best grade coming from the leaf. Cottonseed oil enters quite largely into the composition of oleomargarine, especially of the cheaper grades. These fats are mixed in various proportions by different manufacturers, each having his own working formula. So much depends on the handling of the oils and the regulation of the temperature at each successive stage, that different manufacturers using the same grade of oils in similar combinations will secure quite different results. The oleo-oil and the neutral lard are each melted in separate tanks, and are piped into a mixing tank mounted on scales, so that the exact proportions called for by the formula may be used. If cottonseed oil is used, it is added at this stage. The mixed fats are piped to the churn, where the melted butter, cream or milk, and the coloring matter are added. Milk is used much more commonly than butter or cream, and this is 'ripened' or fermented with a special culture of bacteria to give a pronounced lactic-acid flavor resembling that of butter. The mixture is then churned, and the liquid oleomargarine is drawn into a vat of ice water, which chills and hardens it before it can crystallize; after which it is softended by standing in the 'tempering room,' worked in a machine butter-worker, salted, and put up in tubs or rolls.

There are various grades of oleomargarine, depending upon the grades and proportions of the materials used. The cheapest grades are made from low-grade oils obtained from 'scrap' fat and made firm by the addition of stearin or similar substance, so that a greater proportion of cottonseed oil can be employed. Such grades are churned with skim milk, or buttermilk, and glycerin is sometimes added to improve the appearance of the product. The highest grades are made from pure oleo-oil and neutral lard of the best quality, with little or no cottonseed oil, and are churned with whole milk, cream, or creamery butter.

Butterine is a commercial name for oleomargarine, which was originally used to indicate a product of a higher grade or containing a considerable proportion of butter. The term now has no special significance in trade, and is not used in the oleomargarine laws, although still employed by some dealers for obvious reasons.

When made from good stock, oleomargarine is a cleanly, wholesome, and nutritious article of food. Numerous experiments have shown it to possess a food value practically equal to that of butter, and it has the advantage of keeping better and longer than butter, as it does not tend to become rancid. It has not the delicate flavor of the best butter, but with most people the objection to it is founded on sentiment and on its fraudulent sale, a large proportion of it being sold to the retail consumer as butter. Stringent laws have been made to regulate its manufacture and sale, requiring it to be labeled and taxing it heavily when colored in imitation of butter. The object of these laws has, however, been very largely defeated by the ingenuity of manufacturers, and oleomargarine is now placed on the market which apparently contains no artificial coloring matter, and yet imitates the color of butter very closely.

The production of oleomargarine in the United States has increased enormously in recent years. In 1890 there were, according to the census, 12 factories. In 1900 there were 24. The output for the fiscal year 1890, as shown by the returns of the Treasury Department, was 32,324,032 pounds; in 1900 it was 107,045,028 pounds; and in 1902, 126,316,436 pounds. In the fiscal year 1900 the taxes paid into the Treasury Department by the industry amounted to $2,543,785. The exports of oleomargarine in the fiscal year 1900 amounted to 4,182,536 pounds, valued at $409,083; and of oleo-oil, 146,739,681 pounds, valued at $10,503,856. The oleomargarine went largely to the British West Indies, Germany, and the United Kingdom; the oleo-oil, for use in manufacture of oleomargarine, was taken by Holland (over 60 per cent.), Germany, Norway, Sweden, Denmark, the United Kingdom, and Belgium. Consult reports of the United States

Treasury Department, and Census Bulletin No. 138 (1902), on oleomargarine.

O'LEOM'ETER (from Lat. *oleum*, oil + Gk. *μέτρον*, *metron*, measure), or ELAÏOMETER. An areometer used for ascertaining the densities of fixed oils.

OLEO-OIL. See OLEOMARGARINE.

OLÉRON, ō'lā'rōN'. An island on the west coast of France, belonging to the Department of Charente Inférieure (Map: France, E 6). It lies opposite the mouth of the river Charente, 10 miles north of the Gironde estuary, is 19 miles long, and has an area of 65 square miles. It is low, and for the greater part covered with sand dunes and salt lagoons, but some portions are well cultivated, producing grain, vegetables, and grapes. Salt is one of the chief products of the island, and ship-building is carried on at the harbor of Le Château, which has steamship communication with Rochefort and other coast towns. The population of the island in 1901 was 17,033. The principal town is Saint-Pierre-d'Oléron, with a population of 1338.

OLÉRON, LAWS OF, etc. A mediæval code of maritime laws promulgated and published some time during the twelfth century, by Eleanor, Duchess of Guienne (Aquitaine). These laws consisted of a collection of the judgments of the maritime court of Oléron, together with a compilation of the customs and usages of the sea having the force of law among the mariners of that island, which was a shipping centre. Some years after this codification was made and published in Oléron, Richard I., son of Eleanor, introduced the whole body of these laws into England. They were one of the sources of the maritime laws of Wisby, and were published in and had an important influence on the maritime laws of probably all the countries of Europe.' The modern English and American maritime law has been developed from these laws as a basis, influenced by the Rhodian maritime laws, the laws of Wisby, the civil law, and the customs and usages of those engaged in shipping. See ADMIRALTY LAW; MARITIME LAW; RHODES, LAW OF; WISBY, LAWS OF. Consult the authorities referred to under ADMIRALTY LAW, and Twiss, *Monumenta Juridica. The Black Book of the Admiralty* (London, 1871).

OLEVIANUS, ō'lā-vē-ä'nụs, KASPAR (1536-87). A German Church reformer. He was born in Treves and studied law in Paris, Orleans, and Bourges, where he became acquainted with the works of Calvin, of whom, after having continued his theological studies at Geneva, he became an ardent follower. In 1559 he obtained the post of teacher at a high school in Treves, and here he explained in popular lectures the principles of the Reform. He thus came into collision with the archbishop of the diocese, who had him imprisoned. On the payment of a large sum he was released, but was expelled from the town together with his followers. At the invitation of the Elector Frederick III., Olevianus became teacher and in 1561 professor of theology in Heidelberg, where, in conjunction with Ursinus, he remodeled the Church of the electorate according to the principles of Calvin, and also worked out what is known as the 'Heidelberg Confession.' Upon the accession of Louis VI. Olevianus was deprived of his position and banished from the land. He then took up his quarters in Berleburg, where he subsequently wrote his work on the covenant of grace, *De Substantia Fœderis Gratuiti.* He was also successful in introducing the Reformed Church in Nassau-Siegen, Solms, Wied, and elsewhere. Consult Cuno, *Blätter der Erinnerung an Olevianus* (Barmen, 1887).

OL'GA, SAINT (?-969). A saint of the Russian Church. She was the wife of Prince Igor of Kiev, who, having undertaken an expedition against Constantinople, which proved unsuccessful, was slain on his return to his own dominions (945). His widow avenged his death, assumed the government in his stead, and governed with much prudence and success until her son Sviatoslav came of age (955), when she repaired to Constantinople, where she was baptized by the Patriarch Theophilaktes, and received into the Church, assuming at baptism the name of Helena, in honor of Saint Helena, mother of Constantine. She returned to Russia, and labored with much zeal for the propagation of her new creed. She is held in high veneration in the Russian Church. Her festival is on July 11th (24th), and the practice of venerating her appears to date from the early period of the Russian Church, before the schism between the Eastern and Western churches. Consult D'Elissalde Castremont, *Histoire de l'introduction du christianisme sur le continent russe, et la vie de Sainte Olga* (Paris, 1879).

OLIB'ANUM (ML. *olibanum*, probably from Ar. *al-lubān*, the incense, from *al*, the + *lubān*, incense, connected with Heb. *lebōnā*, incense, from *lāban*, to be white, Aramaic *lebūnetā*, Syriac *lebontā*, Phœnician *lebōnat*, incense, whence Gk. *λίβανος*, *libanos*, Lat. *libanus*, frankincense). A gum resin that flows from incisions made in certain species of Boswellia (q.v.), growing in Northeastern Africa and on the southeastern coast of Arabia. It occurs in commerce in semi-transparent yellowish tears and masses; has a bitter nauseous taste; is hard, brittle, and capable of being pulverized; and diffuses a strong aromatic odor when burned. It was formerly used in medicine, chiefly to restrain excessive mucous discharges; but its use for such purposes is now rare. It sometimes enters as an ingredient into stimulating plasters. It is chiefly employed for fumigation, and is used as incense in Roman and Greek Catholic churches. Large quantities of it are used in China. Practically all the olibanum of commerce passes through Aden.

OLIER, ō'lyā', JEAN JACQUES (1608-57). A French priest, founder and first head of the famous Seminary of Saint Sulpice in Paris, and of the congregation of that name. (See SULPICIANS.) He studied at the Sorbonne, and then entered into close relations with Saint Vincent de Paul, whose zeal for the conversion of souls he shared. He was ordained priest in 1633, and Cardinal Richelieu later offered him the bishopric of Châlons-sur-Marne, but he declined it, having already formed his plans for raising the spiritual and mental tone of the clergy by the foundation of a seminary. In 1642 he collected a few clerics about him at Vaugirard near Paris, and a few months later transferred his small community to Saint Sulpice, a parish in the Faubourg Saint-Germain which was in a very bad condition. Olier, however, instituted all manner of reforms and incentives to holiness, and by the aid of zealous colleagues transformed the neighborhood. Having built a new church, he established his seminary in connection with it. In 1652, being in very poor health, he resigned his parochial charge and devoted himself altogether for the next five years to the upbuilding of the seminary and of the growing community of associates. He also founded seminaries at Montreal and several other places, as well as schools and institutions for the care of the poor and infirm. He died April 2, 1657. By far the best *Life* of him is that of Faillon (3 vols., Paris, 1873); an excellent English one, based upon it, is by Healy Thompson (London, 1885).

OLIGARCHY (Gk. *ὀλιγαρχία*, *oligarchia*, from *ὀλίγος*, *oligos*, few, little + *ἄρχειν*, *archein*, to rule). A form of government in which the supreme power is vested in a small class of persons. (See ARISTOCRACY.) It is a term applied by Greek political writers to that perversion of an aristocracy in which the rule of the dominant part of the community ceases to be the exponent of the general interests of the State, owing to the cessation of those substantial grounds of preëminence in which an aristocracy originated. The governing power in these circumstances becomes a faction, whose efforts are chiefly devoted to their own aggrandizement and the extension of their power and privileges.

OLIGOCENE EPOCH (from Gk. *ὀλίγος*, *oligos*, few, little + *καινός*, *kainos*, new). A subdivision of the Tertiary epoch, preceding the Miocene epoch. The term is seldom used in the United States for the reason that rocks of this age attain only limited development. The White River formation of Colorado comprising freshwater strata is referred to this epoch, and there are smaller areas of contemporaneous beds in North Dakota and in the Northwest Territory of Canada. Oligocene strata cover wide areas in Central and Southern Europe. See TERTIARY SYSTEM.

OLIGOCHÆTA, ōl′ĭ-gō-kē′tȧ (Neo-Lat., from Gk. *ὀλίγος*, *oligos*, few, little + *χαίτη*, *chaitē*, mane). A suborder of chætopod annelids, of which the common earthworm (q.v.) is a good example. The head is not well marked, and there are no tentacles or eyes. The locomotive appendages are in the form of simple bristles attached in rows to the sides and ventral surface of the body; there are no branchiæ or parapodia. All are hermaphrodite, and the young pass through no metamorphosis. The species are mostly fresh-water or terrestrial.

OLIGOCLASE (from Gk. *ὀλίγος*, *oligos*, few, little + *κλάσις*, *klasis*, fracture). A mineral sodium-calcium-aluminum silicate, intermediate between albite and anorthite, and belonging to the feldspar group. Its crystalline form is of the triclinic system, its color is generally white, though sometimes shaded with gray, green, or red tints, and it has a vitreous lustre. It occurs in the older rocks such as granite, and also in various eruptive rocks, such as andesite; it is found in Sweden, Finland, Germany, Switzerland, and in the United States at various localities in New Hampshire, Connecticut, New York, Pennsylvania, and North Carolina. Certain varieties of this mineral, especially those of a reddish color, show internal fire-like reflections that are due to finely disseminated crystals of iron oxide, and when polished form the gems known as *sun stones*.

OLINDA, ō-lēɴ′dȧ. A town in the State of Pernambuco, Brazil, situated on the coast 4½ miles north of Pernambuco, with which it is connected by a street railway (Map: Brazil, L 5). It was founded in 1535, being the first settlement and for a long time the most important commercial city of Northern Brazil. It was the capital of the Province of Pernambuco, and of the Dutch colony established there in the seventeenth century. The Dutch burned the town and made the neighboring Recife (now Pernambuco) the capital. Olinda long remained a favorite place of residence of wealthy Pernambucans, but it has now fallen into decay. Population, about 8000.

OLIPHANT, ŏl′ĭ-*fant*, LAURENCE (1829-88). An English author and traveler, son of Sir Anthony Oliphant. He was born at Cape Town in 1829. Laurence Oliphant passed his early boyhood in England, but in 1841 he went to Ceylon, where his father was Chief Justice; traveled with his parents in Europe (1846-47); returned to Ceylon as private secretary to his father; practiced as criminal lawyer; went on a hunting excursion in Nepal; returned to England, and was called to the English and the Scotch bar. He was in Russia and the Crimea (1852); in Canada and the United States as secretary to Lord Elgin, Governor-General of Canada (1853-54); at Sebastopol, and served under Omar Pasha at the battle of Ingour (1855); at New Orleans, engaged in a filibustering expedition (1856); in China and Japan with Lord Elgin (1857-59); with Garibaldi in Italy (1860); envoy to the British legation in Japan, where he was dangerously wounded by assassins (1861); and afterwards he traveled in Egypt, Poland, and Palestine. He was elected to Parliament in 1865, but two years later he resigned to join the brotherhood founded by T. L. Harris (q.v.) at Brocton in western New York. He married in 1872, and his wife and mother joined the community. For years the Oliphants were the spiritual slaves of Harris; but they finally came to distrust him. After breaking with him, Oliphant settled for a time at Haifa in the Bay of Acre, where he devised schemes for restoring the Jews to the Holy Land. He died at Twickenham, near London, December 23, 1888. Oliphant served as special correspondent for the *Times* on various occasions and was a brilliant journalist. His many published books are mostly accounts of his travels. Among them are: *A Journey to Khatmandu* (1852); *The Russian Shores of the Black Sea* (1853); and *Earl of Elgin's Mission to China and Japan* (1859). His strange erratic character is boldly displayed in *Episodes in a Life of Adventure* (1887); his religious opinions in *Sympneumata* (1886); *Scientific Religion* (1888); and his novel *Massollam* (1886). What he might have been may be seen in his novel *Piccadilly* (*Blackwood's Magazine*, 1865), one of the most brilliant satires on English life ever written. With less success he worked the same vein in *Altiora Peto* (1883). Consult the *Memoir of Laurence Oliphant and His Wife, Alice Oliphant*, by Margaret Oliphant (Edinburgh, 1891).

OLIPHANT, Mrs. MARGARET (born Wilson) (1828-97). An English novelist and miscellaneous writer, born in Wallyford, near Musselburgh, Midlothian, Scotland, April 4, 1828. In 1852 she married her cousin, Francis Oliphant, who died at Rome in 1859, leaving her penniless with three children to support. Already favorably known as a novelist, she could gain a livelihood with her pen, but the story of her efforts to rear her children and look after her helpless kinsfolk is a painful one. Her work during the next forty years, in spite of the speed with which it was done, is of a good quality, both in fiction and literary history. In 1864 she again went to Italy, and in 1890 she visited the Holy Land. From 1868 she received a civil list pension of £100. She died at Windsor, June 25, 1897. Her first novel, *Passages in the Life of Mrs. Margaret Maitland of Sunnyside* (1849), won instant attention and approval. Its most distinctive charm is the tender humor and insight which regulate its exquisite delineation of Scottish life and character at once on their higher and lower levels. It was followed by *Merkland* (1851); *Adam Graeme of Mossgray* (1852); *Henry Muir* (1853); *Magdalen Hepburn* (1854); *The Quiet Heart* (1854); *Zaidee* (1856); and several other novels, some of which originally appeared in *Blackwood's Magazine*. It was, however, by the *Chronicles of Carlingford* that Mrs. Oliphant's reputation as a novelist was first assured. In the first of them, *The Rector and the Doctor's Family* (1863), aside from its other merits, which are great, the character of Netty, the heroine, enlivens the whole work, and may rank as an original creation. The other, *Salem Chapel* (1863), perhaps indicates a wider and more vigorous grasp than is to be found in any other work of the authoress. Among succeeding novels are: *Three Brothers* (1870); *Squire Arden* (1871); *A Rose in June* (1874); *The Primrose Path* (1878); *Kirsten* (1890); *The Marriage of Elinor* (1892); and *A Widow's Tale* (1898). Other works are the *Life of Edward Irving* (1862); *Saint Francis of Assisi* (1868); *Memoir of the Comte de Montalembert* (1872); *The Makers of Florence* (1874); *The Literary History of England from 1790 to 1825* (1882); *The Makers of Venice* (1887); *Royal Edinburgh* (1890); *Life of Laurence Oliphant* (1891); *The Victorian Age of English Literature* (1892); *The Reign of Queen Anne* (1894); *The Makers of Modern Rome* (1895); and *William Blackwood and His Sons* (1897). Although most of these afford sober entertainment, none of them is deep enough to give Mrs. Oliphant the highest rank as a critic or as an historian. Consult the *Autobiography*, ed. by Coghill (New York, 1899).

OLIPHANT, Thomas Laurence Kington (1831—). An English biographer and philologist. He was born near Bristol, was educated at Eton and Oxford, and studied in the Inner Temple. Besides his historical works, *The Emperor Frederick the Second* (1862), *The Jacobite Lairds of Gask* (1870), and *The Duc de Luynes* (1875), he wrote excellent sketches of the historical development of English, among which the more important are: *The Sources of Standard English* (1873); *The Duke and the Scholar* (1875); *Old and Middle English* (1878; 2d ed. 1893); and *New English* (1886).

OLIVÁREZ, ō'lē-vä'rāth, Gásparo de Guzman, Count, Duke of San Lucar de Barrameda (1587-1645). Prime Minister of Philip IV. of Spain. He was born at Rome, where his father was Ambassador. He received an excellent education at Salamanca, became the friend of Philip IV., his confidant in his amours, and (1621) his Prime Minister, in which capacity he exercised almost unlimited power for twenty-two years. Olivarez was able, and earnestly desirous of improving the condition of his country; but he yielded to the ambitions of Philip, which plunged Spain into the Thirty Years' War. The war for the subjugation of the Netherlands, which had been resumed in 1621, was waged without success. Resorting to any means to raise money, his oppressive measures caused insurrections in Catalonia and Naples, and roused the Portuguese to shake off the Spanish yoke in 1640. Repeated defeats encountered by Spain forced the King to dismiss Olivarez in 1643. He died at Toro.

OLIVE (Lat. *oliva*, from Gk. *ἐλαία*, *elaia*, olive). A plant of great economic value which has been in cultivation from prehistoric times, belonging to the genus Olea, of which there are some 30 species. The cultivated sorts originated from *Olea Europæa*. The nativity of the olive is accredited to Southern Europe and Asia Minor, and by some authorities to Syria. The tree is of great vitality, specimens being known which are said to be 1000 years old. It sometimes attains a height of 40 feet; has opposite, leathery, grayish-green smooth evergreen leaves, and drupaceous fruits which vary in color from waxen yellow to black. The area for successful olive culture is restricted by its heat requirements more than by soil or moisture. It enjoys a dry climate, and will thrive on a thin soil and produce well if only the pomace is returned to the land from the oil press. Since this contains all the compounds derived from the soil, fertilization and cultivation increase the yield. The trees should be planted at least 33 feet apart each way, and if given the culture usually given prunes or plums will thrive well. The olive thrives best in dry climates like that of Syria and Assyria. It succeeds at the Cape of Good Hope, in Australia, and in California, where it was introduced at an early date by the Spanish missionaries, from which fact the variety most extensively cultivated in California has been called 'Mission.' Areas which were considered unfit for the industry have proved well suited to some of the early sorts lately imported from Spain and Italy, and the industry is an important factor in the horticultural resources of the State.

OLIVE

The tree is propagated either from twig-cuttings, sprouts or truncheons of old wood set in moist ground, or from gnarled, woody buds that form near the base of the trunk. Such plants begin to bear when from seven to nine years old, and yield crops either annually or in alternate years, the crop reaching its maximum when the trees are about 30 years of age. The fruits are the chief commercial product of the olive. They are used for pickling, drying, and for oil production. In the Mediterranean countries this oil takes the place of butter and the animal fats used by other nations in culinary operations. The wood of the olive tree is very hard, possesses a beautiful grain and color, and is used for ornamental cabinet work. Among the Greeks the olive was sacred to Pallas Athene (Minerva), who was honored as the bestower of it; it was also the emblem of chastity. A crown of olive-twigs was the highest distinction of a citizen who had merited well of his country, and the highest prize of the victor in the Olympic games. An olive branch was also the symbol of peace; and the vanquished, who came to supplicate for peace, bore olive branches in their hands.

OLIVES, FOOD VALUE. Two food products of considerable importance are made from olives, viz. olive oil or salad oil, and pickled olives. A third product, little known in the United States, is the dried olive, much eaten in Greece and some other neighboring countries. Different varieties of olives vary greatly in size, ranging from less than 100 to over 400 to the pound, the majority, perhaps, ranging from 150 to 250 to the pound. The pit constitutes about 20 per cent. of the whole fruit, but here a considerable range is also found. Both pulp and pit contain oil. The amount of oil in the pulp in Californian olives ranges from 13 to about 88 per cent.; that in the pit from 0.36 to 1.52 per cent.

Whether used for oil-making or for pickling, the olive should be carefully gathered. The ripe fruit is used for oil-making and for pickling, the exact stage when it is best suited for this purpose being a matter which must be learned by experience. The green fruit used for pickling should be gathered when full grown and just before it begins to color and soften. The pickled olives usually found in the American market are made from the green fruit. The pickled ripe olives are also met with and may be recognized by their dark color.

The best oil is made by crushing the carefully picked fresh olives. To facilitate the extraction of the oil, the olives are often partially dried before crushing. In California old-fashioned stone mills are commonly used to crush the fruit, although bronze crushers are being tried with good results. The ground mass is pressed to extract the liquid portion, which contains watery plant juices in addition to the oil and more or less pulpy matter. Various devices are used to separate the oil and to purify it. It is said that the best oil is obtained by allowing the pulp, etc., to settle, and decanting the clear oil. It generally takes about one month for oil to settle the first time. Three rackings are usually sufficient. The oil thus obtained is almost as bright as can be produced by the most effective filtration, and it has, besides, the distinctive olive flavor and lacks the greasiness characteristic of all filtered oils. Great cleanliness must be observed in oil-making and every precaution taken to prevent rancidity.

In making pickles from ripe and green olives essentially the same process is followed. The unpleasant acid and bitter flavor is removed by soaking the fruit in a solution of potash lye for a short time or by a longer soaking in water. In addition to removing the unpleasant flavor, the lye softens the skin of the fruit, so that the undesirable substances may be more readily extracted by water. Olives treated with lye must be soaked in clear water, which is frequently changed, to remove the potash. They are then placed in weak brine for a short time and afterwards in stronger brines. The details of each step of the process vary considerably, and much depends upon skill and experience. An abundant supply of pure water is of the first importance, and great care must be exercised to prevent the growth of molds, etc.

The uses of olive oil and olives as articles of diet are familiar. The former is used chiefly for dressing salads and for frying, the latter as a relish, for seasoning sauces, etc., and for garnishing various foods. The oil, like all fats, has a high fuel value, and on this its value as a food depends. The average percentage composition of pickled ripe olives follows: Water, 65.1; fat, 25.5; carbohydrates, 3.8; protein, ash, etc., 5.6; of pickled green olives, water, 78.4; fat, 12.9; carbohydrates, 1.8; protein, ash, etc., 6.9. It has been claimed that while the pickled green olive is chiefly valuable as a relish, the pickled ripe olive is really worthy of attention as a wholesome and fairly nutritious food. In Southern Europe and other regions the ripe olive is used as a staple article of diet.

OLIVE-BACKED THRUSH. See THRUSH.

OLIV'ENITE (from Ger. *Oliven*-erz, olive-ore, from *Olive*, olive). A hydrated mineral copper arsenate that crystallizes in the orthorhombic system. It has a vitreous lustre, and is of various shades of green to brown in color. The crystallized varieties are found in Cornwall, Devonshire, and Cumberland, England, in the Tyrol, and in the Ural district, while in the United States it occurs in the Tintic district of Utah, both crystallized and in the fibrous form, the last named being known as 'wood copper.'

OLIVENZA, ō'lé-vän'thȧ. A town of Spain, in the Province of Badajoz, situated near the Portuguese frontier, 15 miles southwest of Badajoz (Map: Spain, B 3). It was formerly a garrison town, but its fortifications have been razed. The town manufactures leather, earthenware, and hats, and has steam flour mills. It was ceded to Spain by Portugal in 1801. Population, in 1900, 8933.

OLIVE OIL. A vegetable oil expressed from the fruit of *Olea Europea*, and in its purest state an inodorous, pale-yellow oil, with a specific gravity of .918 at 15° C. The olive oil of commerce differs greatly in quality. The seed yields about 32 per cent. of oil, of which 21 per cent. is furnished by the pericarp, and the remainder, which is much inferior, by the seed and woody matter of the fruit. In Sicily, where large quantities of olive oil are produced, the operation is performed in the following primitive fashion: The olives are first placed on a circular platform of masonry, about seven feet in diameter, upon which a heavy millstone is turned by means of a pole and donkey. The mass, which has been thoroughly pulped by this process, is now placed in soft rush baskets and put under a press which is compressed by means of a wooden screw worked by five or six men. By this means the cold oil is expressed, heat being used to extract the remainder. The oil is allowed to settle and clarify for several days before it is ready for use.

Olive oil is used as a food or condiment, in pharmacy, as an illuminant and lubricant, and in the manufacture of soap. The olive oil of commerce is much adulterated, especially with cottonseed oil. The lowest grade is known as *tournaut oil*. *Gallipoli oil* is made from the fruit after it has been allowed to ferment. It is chiefly used in dyeing. See OILS.

OL'IVER, ANDREW (1706-74). A Lieutenant-Governor of Massachusetts. He was born in Boston, and graduated at Harvard in 1724. In 1743 he was elected to the Massachusetts General Court, in 1746 was chosen a member of the Council, and in 1756 became Secretary of the Colony. Upon the passage of the Stamp Act in 1765, he was appointed distributor for Massachusetts, and thus incurred the displeasure of the people. On August 14, 1765, he was hanged in effigy on the 'Liberty Tree,' and a mob destroyed a new building which, it was thought, was intended for his office. So great was his danger that a few days later he promised he would not receive the stamps. In the following December, upon a rumor that he still intended to serve, he was taken by a mob to the 'Liberty Tree' and there compelled to swear that such had never been his purpose. He continued, however, to uphold the cause of the Crown, and in 1770, on the promotion of his brother-in-law, Hutchinson, to the Governorship, Oliver was made Lieutenant-Governor in his stead. In 1773 certain letters written by Oliver in which he recommended changes in the Massachusetts charter and hinted at the desirability of taking off the 'principal incendiaries,' came into the hands of Benjamin Franklin, the agent of the colony in England; and these letters, together with some from Hutchinson and others, were published in Massachusetts and aroused such a storm of indignation against Hutchinson and Oliver that a petition was sent to England for their removal.

OLIVER, GRACE ATKINSON (1844-89). An American author, whose maiden name was Little. She was born in Boston, was educated in private schools there, and married J. H. Ellis in 1869. After his death (1871) she began to write for the press under his name, and her published works are lives of *Mrs. Barbauld* (1873), *Maria Edgeworth* (1882), and *Dean Stanley* (1885). She also edited the *Poems of Ann and Jane Taylor* and wrote their memoirs (1883). She married Dr. J. P. Oliver in 1879.

OLIVER, HENRY KEMBLE (1800-85). An American musician, born at Beverly, Mass. He graduated at Dartmouth College in 1818, and after teaching school for a number of years settled in Lawrence, Mass., of which city he became Mayor in 1859. From 1861 to 1865 he was Treasurer of the State of Massachusetts. He founded several musical societies, but was better known as the composer of the hymn-tunes, "Federal Street," "Morning," and "Beacon Street." He also composed motets, chants, and songs, and published: *The National Lyre* (1848); *Collection of Church Music* (1860); *Original Hymn Tunes* (1873).

OLIVER, JAMES EDWARD (1829-95). An American mathematician, born at Portland, Maine. He graduated at Harvard in 1849, and in 1850 was appointed assistant in the office of the newly established *Ephemeris and Nautical Almanac*, from which he resigned in 1867. After three years of research in chemistry and physics, he was chosen professor of mathematics in Cornell, where, in 1873, he became senior professor. He was an able teacher and with lectures and his own unsparing devotion to study seemed long on the point of ruining his health. He wrote *A Treatise on Trigonometry* (1886), and edited a series of mathematical text-books. As a mathematician he was reckoned by Peirce of Harvard the ablest in America.

OLIVER, PETER (1713-91). An American jurist, a brother of Andrew Oliver. He was born in Boston, and graduated at Harvard in 1730. After holding various minor offices, he was, in 1756, although not a lawyer, made a justice of the Superior Court of Massachusetts, and in 1771 was raised to the position of Chief Justice. Like his brother Andrew, he was a Loyalist, and in 1774 was the only one of the judges to refuse to decline the offer of a fixed salary from the King. Because of his refusal he was impeached by the House. He upheld the royal cause with considerable skill in *The Censor*, a Loyalist paper, and upon the evacuation of Boston by the British in 1776 he quitted the town with them. The remainder of his life was spent in England.

OL'IVERS, THOMAS (1725-99). A Methodist preacher. He was born at Tregynon, Wales, received little schooling, and became a wandering cobbler. Being in Bristol, he went to hear Whitefield, was converted, and was made by John Wesley an itinerant preacher. In 1775 he became coeditor of *The Arminian Magazine*, but was removed in 1789 on the charge of carelessness. He died in London. His repute rests upon his hymns, one of which, "The God of Abraham praise," is deservedly famous. It is, however, not original, but a paraphrase from the Hebrew doxology of Daniel ben Judah, which summarizes the thirteen articles of the Hebrew creed. Consult the article on the hymn in Julian's *Dictionary of Hymnology* (London, 1892); and Rev. John Kirk's *Memoir of Olivers* (London, 1868).

OLIVER TWIST. A novel by Charles Dickens (1838). It appeared serially in *Bentley's Miscellany* between January, 1837, and March, 1839. It describes the evils of the workhouse, in which Oliver's childhood was passed, and the degraded and vicious life in London to which he was exposed during his apprenticeship to Fagin, the thief-trainer. Brutal Bill Sykes, Nancy, the Artful Dodger, and pompous Bumble, the parish beadle, are other leading characters.

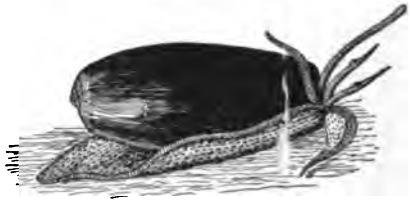
OLIVES, MOUNT OF (also called Mount Olivet). The mountain east of Jerusalem, separated from the city by the Kidron Valley. It is, properly speaking, but one of a range of hills which starts out from the central highland about two miles north of Jerusalem. Just north of the city is the high elevation known in ancient times as Scopus, where the Roman army under Titus encamped. After a depression the range deflects and is continued southward for about two miles by the Mount of Olives. Farther south (and southeast of Jerusalem) is a third hill, the Mount of Offense, where, according to tradition, Solomon erected altars for the heathen gods of his foreign wives (I. Kings xi. 7-8; II. Kings xxiii. 13). On the steep western slopes of the Mount of Offense lies the village of Siloam and in the valley between this mount and the Mount of Olives is one fork of the road to Jericho, on which lay Bethany, whence Jesus started on His triumphant entry into Jerusalem (Matt. xxi. 1 and parallels). The height of the Mount of Olives averages over 2600 feet, about 200 feet higher than the city. The name has come down from early times (cf. II. Sam. xv. 30), and there is thus reason to believe that it was once largely covered with olive trees. It was even called (II. Kings xxiii. 13) the Mount of Anointing, symbolical of the oil produced on it (cf. also Neh. viii. 15). During the siege by the Romans (A.D. 70) the trees were all cut down, and it has since been almost treeless.

As early as the days of David the mount appears to have had on it a sanctuary, perhaps originally instituted by the Canaanites and afterwards appropriated by the Israelites. From its commanding situation, east of the temple hill, as a great protecting wall before the city, the Mount of Olives was regarded with veneration by the Jews. It was called the Mountain of the Three Lights, since it was lighted up at night by the altar fire of the temple opposite, and by the first rays of the rising sun, and because it furnished the oil for the temple lamps. In prophecy (Zech. xiv. 4; Ezek. xi. 23) and in Rabbinic teaching it plays a rôle in the scenes of judgment connected with the Messianic era.

The mountain was the scene of several important incidents in Jesus' ministry. On its western slope, near the road leading down to the main eastern gate of the city, lay the Garden of Gethsemane, whither He often resorted for prayer, and where He was arrested. Somewhere on the same roadside He sat and discoursed to the disciples concerning the coming doom of the city opposite, and in His triumphal entry He passed down its slope on the same highway.

Christian tradition has altered and amplified the notices in the Bible by transferring the scene of the Ascension from near Bethany to the summit of Olivet (Luke xxiv. 50; cf. Acts i. 12), where two different spots claim the honor. One of these, an elevation directly east of the old temple site, is occupied by the Church of the Ascension, a small modern building, but on the ruins of a church built in the fourth century. It is in possession of Moslems, but Christians are permitted to use it on certain occasions. The rival spot is on a second eminence farther north, called Viri Galilæi (Acts i. 11), also (but wrongly) Scopus, now the property of the Greek Catholic Bishopric of Jerusalem and well cared for. On this hill extensive catacombs have been recently discovered, indicating that it was once a Jewish burial place, afterwards appropriated and enlarged by Christians. Near the Church of the Ascension is a wretched village, Kafr et-Tur. A little to the east on Russian property a fine observation tower has been erected. South of the Church of the Ascension are the possessions of the Latin Church, with the two chapels, that of the Creed, where the Apostles are said to have formulated the Apostles' Creed, and the Pater Noster, built by a French princess in 1865. Deep down in the valley, just east of the bridge across the Kidron, is a chapel over the legendary site of the grave of Mary, mother of Jesus, whence her body was carried by the angels to heaven. Consult the works treating of the city of Jerusalem (see JERUSALEM); reports of the Palestine Exploration Fund, especially volumes for 1889 and 1896; and Baedeker, *Palestine and Syria* (Leipzig, 1898).

OLIVE-SHELL. A mollusk of the gastropod family, Olividæ, which has a beautiful shell that resembles an olive in general shape. Many species, whose shells are brilliantly ornamented, inhabit the Indian Ocean and Australian seas. They occur at various depths down to fifty feet or so, and creep about the bottom, seizing and feeding upon small animals and carrion, from which they suck the juices.



BLACK OLIVE (*Oliva Maura*).

OLIVE-SIDED FLYCATCHER. A migratory tyrant-flycatcher (*Contopus borealis*) of North America, which is slaty-brown above, with darker streaks, and olive-gray below, with the median line of the abdomen white. It frequents mountains and northern pine forests, and makes its nest on the branch of a pine or similar tree. The eggs are cream-colored, marked with reddish-brown and lavender spots. Few breed south of Canada, except in Northern New England. Consult Baird, Brewer, and Ridgeway, *North American Birds*, vol. ii. (Boston, 1874). See Colored Plate of EGGS OF SONG BIRDS.

OLIVÉTAN, ô'lê'vâ'täɴ', or **OLIVETANUS**, PIERRE ROBERT (?-1538). A French Reformed theologian, born at Noyon. He was a kinsman of Calvin and is credited with stimulating him to theological studies. Olivétan taught at Geneva for a year (1532-33), and was then banished to Neuchâtel. His great work was a version of the Bible, a basis for the work of subsequent scholars; it was published at Neuchâtel (1535) and at Geneva (1540). He was a painstaking, but not a great scholar.

OLIVET'ANS. A religious Order of the Roman Catholic Church, one of the many remarkable products of the great spiritual movement which characterized the twelfth and thirteenth centuries. The Olivetans, or Brethren of Our Lady of Mount Olivet, are an offshoot of the great Benedictine Order, and derive their origin from Giovanni de' Tolomei, a native of Siena, born in the year 1272. Tolomei had been a distinguished professor of philosophy in the university of his native city; but his career was suddenly interrupted by the loss of his sight. Although he was cured of his blindness (and, as he himself believed, miraculously), this visitation convinced him of the vanity of earthly things; and in company with some friends he withdrew to Monte Oliveto, near Accona, between

THE MOUNT OF OLIVES

Siena and Arezzo, where he devoted himself to prayer and religious exercises. After this he took the name of Bernard. By the direction of the Pope, John XXII., the new brethren adopted the Benedictine rule; but they chose as their especial province the cultivation of sacred science and the duty of teaching. In the year 1319 Tolomei was chosen as the first general; and even before his death, in 1348, the institute had made rapid progress, especially in Italy. It numbered at one time eighty-three houses, but at present the number is reduced to about a dozen, including one in Rome, which contains the grave of Saint Frances of Rome. The ancient mother house of Monte Oliveto and the beautiful cloister at Florence have been appropriated by the Italian Government, which uses the latter for barracks.

OL'IVET COLLEGE. A coeducational institution at Olivet, Mich., established by a colony of citizens from Oberlin, Ohio, under the leadership of Rev. John J. Shepherd, the founder of Oberlin College. The school was opened in 1844, and continued as Olivet Institute until 1859, when a charter was obtained. The institution comprises collegiate and preparatory departments and a conservatory of music, with a total registration in 1902 of 260 and a faculty of 23. The library contained 28,000 volumes. The college has a campus of 15 acres, valued, with the buildings, at $158,757, the value of all the college property being $355,940, and its endowment $150,000. The income for the year was $55,120.

OLIV'IA. (1) In Shakespeare's *Twelfth Night*, a countess sought by Duke Orsino. She falls in love with Viola, disguised as a page, and marries Viola's brother Sebastian, mistaking him for Viola. (2) In Wycherley's *Plain Dealer*, a hypocritical character loved by Manly. (3) In Goldsmith's *Good-Natured Man*, the daughter of Sir James Woodville. She is confined by her scheming guardian in a Paris convent, and is released by Croaker, whom she marries. (4) In Goldsmith's *Vicar of Wakefield*, the Vicar's elder daughter. She elopes with Squire Thornhill. (5) In Mrs. Cowley's *Bold Stroke for a Husband*, the daughter of Don Cæsar, who by various pretenses drives away other suitors in order that she may marry Julio de Melessina.

OLIVIER, ō'lē'vyā', Juste Daniel (1807-76). A Swiss poet, born at Eysins (Vaud). He studied at the Academy of Lausanne, and afterwards taught literature there for several years. After the political troubles of 1845 he went to Paris and remained there until 1871, when he returned to Geneva, where he died. His poems include: *L'avenir* (1831); *Les chansons lointaines* (1847); *Dernières chansons; Théâtre de société fantaisies dramatiques* (1870); and some studies in natural history: *Le canton de Vaud* (1837-41); *Etudes d'histoire nationale* (1842); and *Mouvement intellectuel de la Suisse* (1845).

OLIVINE. See Chrysolite.

OLLA PODRIDA, ōl'yȧ pō-drē'dȧ (Sp., putrid pot). Originally an accumulation of remains of flesh, vegetables, etc., thrown together into a pot, but generally employed to designate a favorite national dish of the Spaniards, consisting of a mixture of different kinds of meat and vegetables stewed together. It has also come to be figuratively applied to literary productions of very miscellaneous contents.

OLLIER, ō'lyā', Léopold Louis Xavier Edouard (1830—). A French physician, specialist in the pathology of the bones. He was born at Vans, Department of Ardèche; studied medicine at Lyons, and was professor of clinical surgery there, after several years as chief surgeon to the Hôtel Dieu (1860-77). He wrote: *Traité expérimental et clinique de la régénération des os* (1867); and *Traité des résections et des opérations conservatrices* (1885-90).

OLLIVIER, ō'lē'vyā', Emile (1825—). A French statesman. He was born at Marseilles, and studied there for the bar. Ledru-Rollin made him Commissary General at Marseilles in 1848, and Cavaignac appointed him Prefect of the Department of Bouches-du-Rhône the next year. He soon resumed his law practice, however, and was elected to the Legislative Assembly from Paris in 1857. As one of the 'Five' that constituted the opposition during the early Empire, he gained great reputation as an orator. Gradually he became a Conservative, and finally a Bonapartist. On January 2, 1870, Napoleon called him to be head of a constitutional Cabinet. Whether duped or bought, he became subservient to the Emperor, and lost the support of his fellow Ministers. He entered upon the German War 'with a light heart,' and after the first disasters, discredited, with all his colleagues, he retired, August 9, 1870. He became a member of the French Academy in 1870. He wrote: *Démocratie et liberté* (1867); *Lamartine* (1874); *L'église et l'état au concile du Vatican* (1879); *Thiers à l'Académie et dans l'histoire* (1879); *Nouveau manuel de droit ecclésiastique français* (1885); *Le concordat et le gallicanisme* (1885); *L'empire libéral* (1894-98).

OLMEDO, ōl-mā'dō, José Joaquin (1782-1847). A Spanish-American poet, born at Guayaquil, Ecuador. He was educated for the bar and practiced law in his native city. Afterwards he took a prominent part in politics, was a member of the Junta de Gobierno of Guayaquil (1820), the Constitutional Assembly of Peru (1823), Minister Plenipotentiary to London, Vice-President of Ecuador, and Governor of the Department of Guayas. He was one of the leaders in the revolution of 1845, but did not receive the expected election to the Presidency. His best known poem is an ode addressed to General Bolivar, as the deliverer of Peru. The works of Olmedo are very popular in South America, though his style is a little antiquated. They are to be found in Gutierrez, *América Poética* (1846); the *Poesías inéditas de Olmedo* (1861); and Herrera's *Apuntes biográficos de D. J. J. Olmedo* (Quito, 1887).

OLMSTED, ōm'stĕd *or* ŭm'-, Denison (1791-1859). An American physicist and astronomer, born at East Hartford, Conn. He graduated at Yale in 1813, was chosen professor of chemistry, mineralogy, and geology at the University of North Carolina in 1817, and in 1825 was called to Yale as professor of mathematics and natural philosophy. He published a number of works that had a wide circulation, among which were the *Student's Commonplace Books* (1828); *Introduction to Natural Philosophy* (1832); and *Introduction to Astronomy* (1839).

OLMSTED, Frederick Law (1822-1903). A great American landscape architect. After special studies at Yale University (1845-46), he sought practical knowledge of agriculture by working on a farm in central New York and subsequently on Staten Island, contributing on rural subjects to technical periodicals. In 1850 he made a tour afoot in England and on the Continent for the study of landscape gardening and agricultural methods. His observations are found in *Walks and Talks of an American Farmer in England* (1852). He then went on a similar quest through the Southern and Southwestern States, studying also the effects of slavery on production, and embodying his experience in *A Journey in the Seaboard Slave States, with Remarks on Their Economy* (1856); in *A Journey Through Texas; or, a Saddle Trip on the Southwestern Frontier, with a Statistical Appendix* (1857); and in *A Journey in the Back Country* (1860). The three volumes were reissued as *The Cotton Kingdom* (2 vols., 1861), were much quoted in the controversies that arose out of the Civil War, and are still valuable as authorities. In 1856 Olmsted was made superintendent of the New York Central Park Commission, and a plan for this park, prepared by him and Calvert Vaux, was adopted in 1857. In 1861 he was appointed member of a commission of inquiry and advice on the sanitary condition of the United States troops. Of this commission he became general secretary and was active in Washington from 1861 to 1864, visiting also the armies in the field. Later he was prominent on the Southern Famine Relief Commission and in the organization of the New York State Charities Aid Association. In 1871 he presented to the Territorial Government of the District of Columbia the plans, since in large measure executed, for the 'parking system' of the streets of the capital. He helped also to found in New York the Metropolitan Museum of Art and the American Museum of Natural History. In 1872 he was made president of the Department of Public Parks in New York, and devised the plan, in large measure carried out, of the street system of New York north of the Harlem River, as well as for Riverside and Morningside parks in New York, Prospect and Washington parks in Brooklyn, Washington and Jackson parks in Chicago, and many others. He planned also the approach from Pennsylvania Avenue to the Capitol in Washington, was first commissioner of the Yosemite Park, and prominent in the Niagara Falls Reservation Committee, and in devising the system of parks and parkways in and around Boston. Important public works were conducted by him also in Bridgeport, Trenton, Montreal, Buffalo, Milwaukee, and Louisville.

OLMÜTZ, ôl′mụts. The second town of Moravia, Austria, situated on an islet of the river March, about 40 miles northeast of Brünn (Map: Austria, E 2). It was formerly strongly fortified, but its works have been converted since 1886 into promenades and parks. The chief square of the town is the Oberring, adorned with a column dating from 1742, and two fountains. Facing the Oberring is the town hall, with its astronomical clock, constructed in 1422, and an interesting chapel now serving as an historical museum. The cathedral is a Gothic edifice of the fourteenth century, and the Church of Saint Mauritius, dating from the eleventh and twelfth centuries, is noted for its fine organ. Among the other interesting buildings may be mentioned the old Jesuit monastery, now used as barracks, the cloth hall, the buildings of the former university, and the archiepiscopal residence. Olmütz is well supplied with educational institutions. Besides the theological faculty (the remnant of the university founded in 1581 and abolished in 1855), there are two higher gymnasia, a higher *Realschule*, three training schools for teachers, a commercial school, an historical and an industrial museum, a library of about 75,000 volumes, with a considerable number of incunabula and manuscripts. The town has been the seat of an archbishop since 1777. The bishopric was founded in 1063, and the bishops held princely rank from 1588.

Olmütz has a number of breweries, manufactures of hardware, chemicals, and flour. The commerce in agricultural products is of some importance. Olmütz is mentioned as a town with a castle in 863. In 1063 it became the seat of a bishopric (changed to an archbishopric in 1777), whose incumbents later attained princely rank. Until 1640 the town was the capital of Moravia. In 1848 it was the scene of the abdication of Ferdinand I. in favor of Francis Joseph. Olmütz is noted for the conference held there in 1850 between the representatives of Austria, Prussia, and Russia for the adjustment of the difficulties which had arisen between Austria and Prussia as a result of the convulsions of 1848-49. In this conference the policy of Austria triumphed completely, and all hopes of a liberal Germany under Prussian leadership disappeared for the time. Population, in 1890, 19,761; in 1900, 21,933, mostly Roman Catholics, and over 50 per cent. German. Consult Müller, *Geschichte der königlichen Hauptstadt Olmütz* (Olmütz, 1895).

OL′NEY. A city and the county-seat of Richland County, Ill., 118 miles east of Saint Louis; on the Baltimore and Ohio Southwestern, the Illinois Central, and other railroads (Map: Illinois, D 5). It is interested mainly in agriculture, and in exporting the fruit, hay, and seed of this region, and has flouring mills, brick and tile works, cold storage plant, and a creamery. There are a public library and a sanatorium. Olney, first settled in 1843, is governed by a mayor, biennially elected, and a unicameral council. The water-works are owned and operated by the municipality. Population, in 1890, 3831; in 1900, 4260.

OLNEY, Jesse (1798-1872). An American educator, born at Union, Tolland County, Conn. He taught in northern New York and in the Hartford Grammar School; was a member of the Connecticut Legislature for ten terms; and in 1867 was elected State Comptroller. Olney was one of the most prominent educators of his time and is especially well known for his reforms in the methods of teaching geography, which he began by studying the home of the pupil and sweeping outward in wider circles to township, county, State, and so on. He published: *A Geography and Atlas* (1828); *The National Preceptor* (1831); and many other text-books.

OLNEY, Richard (1835—). An American politician, born in Oxford, Mass. He graduated at Brown University in 1856, studied law in Harvard Law School, was admitted to the Boston bar in 1859, and immediately became associated with Judge Benjamin F. Thomas, whose daughter he married in 1861. Olney rose rapidly in his profession, and was for many years chief counsel for the Eastern Railroad, and later for the Boston and Maine, as well as for other roads. Until 1893 he was not particularly active in public affairs, although he was a Democratic member of the Lower House of the Massachusetts Legislature in 1874, and was once an unsuccessful candidate for the office of State Attorney-General. In 1893 he was offered the place of Attorney-General of the United States by President Cleveland and accepted it. His most important act while occupying this office arose out of the great railroad riots of 1894. In June of that year he applied to the United States Circuit Court for the Northern District of Illinois for an injunction to prevent the strikers from interfering with the United States mails or with interstate commerce. The injunction was granted, it was enforced by United States troops, and the strike was broken. The action of the Circuit Court was later sustained by the Supreme Court, and as this was the first instance in which the power of injunction had been used for such a purpose, it furnished a precedent of the utmost importance. Upon the death of Gresham, in 1895, Olney became Secretary of State, and continued to hold that position until the end of Cleveland's Administration in 1897. In this period it fell to him to conduct the negotiations with England growing out of the disputed boundary between Venezuela and British Guiana, and his famous letter to Bayard, Minister to England, for the information of the English Government as to the American position in the matter, attracted great attention both in this country and in Europe. Previous to the Democratic Convention of 1896, Olney was much talked of as a possible candidate for the Presidency. Upon the nomination of Bryan and the adoption of the free-silver plank, Olney refused to support the Democratic ticket. In 1900, however, he advised the election of Bryan, and gave as his chief reason for so doing the imperialistic tendencies of the Republicans.

OLONETZ, ȧ-lō'nyĕts. A northern government of Russia, bounded by the Government of Archangel on the north, by Vologda on the east, by Novgorod on the south, and by Finland on the west (Map: Russia, D 2). Area, about 57,500 square miles. The northwestern part belongs orographically and geologically to Finland. It is traversed in different directions by rocky ridges not exceeding 1000 feet in altitude, and separated from each other by lakes and marshes. The southeast part is flat, with the exception of the northern portion, which is somewhat elevated.

Many of the lakes and marshes contain iron ore, and the Devonian formations near Lake Onega yield marble and sandstone. There are also found some copper, clays, and mineral springs. Olonetz belongs to the basins of the Baltic and the White seas. Its chief rivers are the Svir; the Vytegra, which communicates with the Mariinsk Canal system; the Sunna, belonging to the basin of the Baltic; the Onega; and the Vyga, flowing into the White Sea. The number of lakes is estimated at over 2000, the largest of them being the Onega (q.v.), Sego, Vigo, and Vadlo.

The climate is harsh and moist. The mean annual temperature varies from 34° to 37° F. The natural conditions are unfavorable for agriculture, and the local crops only partially suffice for domestic demands. Fishing is carried on extensively. Many of the inhabitants are engaged in lumbering. The manufacturing industries are insignificant, and mining is in a state of decline. Population, in 1897, 366,175, or less than seven inhabitants to a square mile. The population is composed chiefly of Great Russians, but there is also a perceptible admixture of Karelians (a race allied to the Finns) and Tchuds. Capital, Petrozavodsk.

OLORON-SAINTE-MARIE, ô'lô'rôɴ' săɴt' mȧ'rē'. The capital of an arrondissement in the Department of Basses-Pyrénées, France, 15 miles southwest of Pau (Map: France, F 8). Its principal buildings are the eleventh-century Church of Saint Croix, and in the residential suburb of Sainte Marie, a Romanesque-Gothic cathedral also dating from the eleventh century. The town is in an agricultural region, and manufactures leather, flour, and woolens. It is the Roman Iluro; during the Reformation it was a stronghold of Catholicism. Population, in 1901, 9078.

OLOT, ô-lôt'. A small town of Northeastern Spain, in the Province of Gerona, situated among the foothills of the Pyrenees (Map: Spain, G 1). It is the centre of an interesting volcanic region, and is surrounded by 14 volcanic cones. The lava in and around the town is perforated in many places by blowholes, through which continuous currents of cool air are expelled. Population, in 1900, 8017.

OLOZAGA, ō'lô-thä'gȧ, SALUSTIANO (1803-73). A Spanish politician, born at Logroño. He studied law, practiced in his native district, Logroño, and in 1831 conspired with other Liberals to assassinate King Ferdinand VII. He fled to France, but returned to Spain after the King's death, was elected to the Cortes, and became a leader of the followers of Queen Maria Christina. In reward for his services, the Queen sent him to Paris as Ambassador (1840). In 1843 he formed a Progressist Ministry, from which opposition on the part of the Cortes forced him to resign. He was threatened with a judicial inquiry into his actions, and again escaped to France, returning to Spain in 1846. Olozaga took a prominent part in the adoption of the Constitution of 1855; received his Ambassadorship in Paris again and held it for ten years, when he was ousted by O'Donnell's revolution. After the deposition of Isabella in 1868, for which Olozaga had striven, he was for the third time appointed French Ambassador.

ÖLS, or **OELS**, ẽls. The capital of a circle in the Province of Silesia, Prussia, and formerly capital of a principality on the Oelsbach, 17 miles northeast of Breslau (Map: Prussia, G 3). Its castle, built in 1558, is the property of the Prussian Crown Prince. Among its churches are the Schlosskirche, from the twelfth century, and the Gothic Propstkirche, from the fourteenth century. There are manufactures of agricultural machinery, cloth, wagons, and shoes. Population, in 1900, 10,580. Oels was founded in the tenth century.

OLSHAUSEN, ōls′hou′zen, Hermann (1796-1839). A German theologian. He was born at Oldesloe, in Holstein, entered the University of Kiel in 1814, and two years later went to the University of Berlin, where the teaching of Schleiermacher and Neander gave direction to his life studies and writings. In 1817 he was awarded the prize at the festival of the Reformation for an essay, *Melanchthons Charakteristik aus seinen Briefen dargestellt* (1818). This essay brought him to the notice of the Prussian Minister of Public Worship, and he was made privat-docent at Berlin in 1820, passing the next year to Königsberg as professor extraordinary, and in 1827 was elected full professor. He removed from Königsberg to Erlangen in 1834. His most notable work is his *Kommentar über sämmtliche Schriften des Neuen Testaments* (4 vols., 1830; completed and revised by Ebrard and Wiesinger; Eng. trans., 1847-49). An earlier work adducing from the writings of the first two centuries historical proofs of the genuineness of the Gospels is *Die Echtheit der vier kanonischen Evangelien, aus der Geschichte der zwei ersten Jahrhunderte erwiesen* (1823). His method of exegesis is presented in *Ein Wort über tieferen Schriftsinn* (1824), and *Die biblische Schriftauslegung*. In these latter works he rejects the doctrine of verbal inspiration.

OLSHAUSEN, Justus (1800-82). A German Orientalist, brother of the preceding, who made contributions to Semitic and Iranian philology. He was born at Hohenfelde; studied at Kiel, Berlin, and Paris (under De Sacy); and from 1830 to 1852 was professor at Kiel. Removed in the latter year by the Danish Government, which he had energetically opposed, he became professor at Königsberg (1853-58), then councilor in the Ministry of Education, and retired in 1874. Olshausen's more important works are: *Emendationen zum Alten Testament* (1826); *Fragments relatifs à la religion de Zoroastre* (1829), written in collaboration with Julius von Mohl (q.v.); *Die Pehlewi-Legenden auf den Münzen der letzten Sassaniden* (1843); *Lehrbuch der hebräischen Sprache* (1861); *Prüfung des Charakters der in den assyrischen Keilinschriften enthaltenen semitischen Sprache* (1864). Consult Schrader, *Gedächtnisrede auf Justus Olshausen* (Berlin, 1883).

OLSHAUSEN, Robert (1835—). A German gynecologist, son of the Orientalist Justus Olshausen. He was born in Kiel, studied medicine there and at Königsberg, and taught at Halle (1862-77) and at Berlin. He is especially famed as an able operator; as the author of *Diseases of the Ovaries* (Eng. trans., 1887), and of *Klinische Beiträge zur Gynäkologie* (1884); and as the editor of the *Zeitschrift für Geburtshilfe und Gynäkologie*.

OLSHAUSEN, Theodor (1802-69). A German author and politician, prominent in the Patriotic Party in Schleswig-Holstein, brother of Justus Olshausen. He was born at Glückstadt, studied law at Kiel and Jena, and, for his part in the demagogic disturbances, was forced to live in France and Switzerland until 1830. Then he settled in Kiel, and became an ardent advocate of the independence of the provinces. He was imprisoned in 1846 for his bold opposition, but his influence was all the stronger in the Revolution of 1848, and he became a member of the provisional Government, resigning to enter the Diet. In 1851 he was excluded from the amnesty, went to America, and lived in New York City and Saint Louis until 1865, when he returned to Hamburg. He wrote two popular works on America, *Geographisch-statistische Beschreibung der Vereinigten Staaten* (1853-55, incomplete), and *Geschichte der Mormonen* (1856).

ÖLSNITZ, ēls′nĭts. A town in the Kingdom of Saxony, Germany, on the White Elster, 25 miles southwest of Zwickau (Map: Germany, E 3). The ancient Jakobskirche and a handsome Rathaus are the only buildings of note. The town has one of the largest carpet factories in Germany. Corsets, curtains, machinery, varnish, and dyes are also manufactured; and there is considerable trade, especially in cattle. Population, in 1900, 13,606.

OLSSON, ōl′son, Olof (1841-1900). An American theologian and educator, born in Vermland, Sweden. He studied at Upsala, became a Lutheran minister in 1863, and in 1869 came to the United States and received a charge in McPherson County, Kan. In 1891, Olsson left his congregation at Woodhull, Ill., to return to Augustana College, Rock Island, Ill., in which he had been professor (1877-88), and of which he now became president.

OLTEN, ōl′ten. A town of the Canton of Solothurn, Switzerland, 36 miles northeast of Bern, on the left bank of the Aar (Map: Switzerland, B 1). The town is an important railway junction, with railway shops, extensive shoe and felt factories, and wool and linen weaving, and is a noted tourist resort. Population, in 1900, 6969.

OLYM′PIA (Lat., from Gk. 'Ολυμπία). The scene of the celebrated Olympic games, held every four years by the Greeks. It was situated in the Pisatis, the southeastern district of Elis, at the junction of the Cladeus with the Alpheus. It was never a town, but only a sanctuary with the buildings connected with the worship and the games. The central spot was the *Altis*, or sacred inclosure, an irregular quadrangle about 200 meters from east to west and 175 meters from north to south. On the west and south it was inclosed by a wall in Roman times, and at this period was somewhat enlarged, as there are traces of an earlier inner Greek wall. On the north was the hill of Cronos, the Prytaneion, and the row of *Treasuries;* on the east the *Stadium*, to which a vaulted passage led, the *echo portico* opening into the Altis and southeast building, which seems to have been demolished to make room for a Roman house built for the Emperor Nero. Within the inclosure the chief structures were the temples of Zeus and Hera, the Metroön, the Pelopion, the Philippeion, and the great altars. The oldest place of worship seems to be marked by the remains of a great altar south of the Heræum, and evidently antedating that temple, as the earth and ashes containing very rude bronzes extended under the foundations. The *Heræum*, or Temple of Hera, was the oldest temple, and is probably the oldest Doric building known. It was a hexastyle peripteros with sixteen columns at the sides. The walls were of crude brick on a stone foundation and the colonnade was originally of wood, though these columns were gradually displaced by stone, a fact which has led to a great variety in the capitals. In the second century after Christ the building seems to have contained many ancient relics and works of art, among them the venerable chest of Cypelus, covered with scenes from Greek legend in early Corinthian style, and the Hermes of Praxiteles, the great prize of the German excavations. In the southwestern part of the Altis was the great Temple of Zeus, erected by the Eleans about B.C. 460, and containing the colossal statue of the god in gold and ivory by the Athenian Phidias. The sculptures of the pediments and metopes, though the artists are unknown, and the very school is disputed, are valuable examples of Greek art just before its full development at Athens and Argos. The *Pelopion* was an irregular inclosure consecrated to Pelops. The *Philippeion* was a circular Ionic building, erected by Philip of Macedon after the battle of Chæronea, and containing statues of Philip, his parents, his wife Olympias, and his son Alexander, all by the Athenian Leochares. Besides the buildings, the whole inclosure was filled with statues of victors and votive offerings, conspicuous among which was the Nike of Pæonius, on a triangular basis about 30 feet in height, erected by the Messenians and Naupactians shortly after B.C. 425. Outside of the Altis lay the Palæstra, or wrestling-school, and the great Gymnasium where all competitors were obliged to train for at least one month. After the suppression of the games (A.D. 394) the decline of Olympia was rapid. To provide a defense against the barbarian invaders, a fort was built in the Altis, of which the Temple of Zeus formed the northwest corner, while to provide material for the wall the other buildings were ruthlessly destroyed. Early in the sixth century of our era the Temple of Zeus seems to have been overthrown by earthquakes, and inundations of the Cladeus covered the plain with gravel. Though a scanty population still inhabited the place, the rivers frequently flooded it, and finally buried the whole field, in some places to a depth of twenty feet. Suggestions as to excavations were made by Montfaucon and Winckelmann, and in 1829 the French expedition to the Morea worked for a time at the Temple of Zeus and secured a few sculptures. The final excavation was due to Ernst Curtius, who aroused the interest of the Prussian Crown Prince (afterwards the Emperor Frederick) and secured the support of the German Government. From 1875 to 1881 the work was carried forward in a masterly fashion, and finally, at an expense of 800,000 marks, the entire Altis and a great part of the surrounding buildings were cleared. Preliminary reports were published yearly under the title *Die Ausgrabungen zu Olympia* (Berlin, 1876-82), but the authoritative publication is *Olympia, die Ergebnisse der von dem deutschen Reiche veranstalteten Ausgrabungen*, 5 vols. text and 4 vols. plates (Berlin, 1891-97). A popular account is Bötticher, *Olympia* (Berlin, 1882). Consult also: Flach, in Baumeister, *Denkmäler des klassischen Altertums*, s. v. Olympia (Munich, 1889); Gardner, *New Chapters in Greek History* (London, 1892); Diehl, *Excursions in Greece* (Eng. trans. London and New York, 1893). Ancient Olympia is described by Pausanias (Books v. and vi.), best consulted in the edition of Hitzig and Blümner (Leipzig, 1901), or the translation and full commentary of Frazer (London, 1898). An attempt at reconstruction is found in Laloux et Monceaux, *La restauration d'Olympie* (Paris, 1889).

OLYMPIA. A city, county-seat of Thurston County, Washington, and capital of the State, 65 miles southwest of Seattle; on the southernmost inlet of Puget Sound, at the mouth of the Deschutes River, and on the Northern Pacific Railroad (Map: Washington, C 2). The new State Capitol is a handsome structure, costing $400,000, and among other prominent buildings are the county court house, Saint Peter's Hospital, McKenny Block, and the Capital National Bank building. The State Library contains 27,000 volumes. There are two bridges here, that across Budd Inlet being over 2000 feet in length. Olympia is a commercial centre of importance, the port for a considerable area rich in timber, agricultural, and mineral resources. The oyster industry is extensive, and much fruit is grown in the vicinity. The manufacturing interests are promoted by abundant water power, the river, with a succession of three falls, making a descent of more than 80 feet. Lumber is the chief manufactured product, but the city has also iron works, a brewery, a salmon cannery, etc. Settled in 1846, Olympia was laid out in 1851 and was chartered as a city in 1859. Population, in 1890, 4698; in 1900, 3863.

OLYM'PIAD (from Gk. *ὀλυμπιάς*, *olympias*, from Ὀλυμπία, *Olympia*, Olympia). The period of four years that elapsed between two successive celebrations of the Olympic games (q.v.). The use of Olympiads as a convenient system of chronological reckoning among the Greeks was of comparatively late date. Timæus (c.300 B.C.) seems to have been among the first to date events by Olympiads, and after him the addition of the separate years in the period was introduced. The name of the winner of the foot-race in the games was frequently used with or instead of the number of the Olympiad. The first Olympiad, or that of Corœbus, corresponds with B.C. 776. As the Olympic games did not coincide with the beginning of any calendar year in use among the Greeks, most of the writers call the Attic or Macedonian or some other year in which the games fell the first year of the Olympiad, though even here there are many variations, and the usage of each author must be determined separatively. This system is confined to literature, and never appears on coins and only very rarely in late inscriptions. It is sometimes used now by historians in dating Greek events, though commonly the year according to our era is added. The ordinary rule for changing Olympiads to years before or after Christ is as follows: Multiply one less than the number of the Olympiad by 4, add the number of the year in the Olympiad, and subtract this from 777 for dates before Christ, or subtract 776 for dates after Christ. Thus Ol. 81.3 is reduced $(80 \times 4) + 3 = 323$; $777 - 323 =$ B.C. 454; Ol. 218.2 is reduced $(217 \times 4) + 2 = 870$; $870 - 776 =$ A.D. 94. Simpler is Unger's rule: to find the first year of any Olympiad multiply the number of the Olympiad by 4 and either subtract from 780 or subtract 779, as the case requires. It should be noted that if the date is from an author who reckons by Attic years allowance must be made for the fact that such years begin about July 1st, so that dates in the spring are in an earlier Julian year than those in the autumn.

OLYM'PIAS (Lat., from Gk. Ὀλυμπιάς). The wife of Philip II., King of Macedonia, daughter of

Neoptolemus I., King of Epirus, and mother of Alexander the Great. She was married to Philip in B.C. 359. When Philip, after neglecting her, separated from her and married Cleopatra, niece of Attalus (B.C. 337), she withdrew from Macedonia and went to reside with her brother Alexander, King of Epirus. It is generally believed that she was implicated to a greater or less degree in the assassination of Philip (B.C. 336). After Philip's death she returned to Macedonia, where she enjoyed great influence under Alexander and helped to bring about the death of Cleopatra and her infant daughter. After the death of Alexander (B.C. 323) she again withdrew from Macedonia to Epirus, where she stayed several years, until the death, in B.C. 319, of Antipater, who had been at the head of affairs in Macedonia, brought her a new opportunity to assert her pretensions to the Macedonian throne. Joining forces with the new regent, Polysperchon, she invaded Macedonia and in B.C. 317 defeated Arrhidæus, the weak-minded stepbrother and successor of Alexander, and his wife, Eurydice, both of whom she caused to be put to death. Being now in power, she followed up her vengeance and executed wholesale slaughter on the Macedonian nobles who had shown themselves hostile to her. Thereupon Cassander (q.v.), her principal adversary, who had previously been in alliance with Eurydice and whose brother Nicanor was one of those put to death by Olympias, marched northward from the Peloponnesus, forced her to take refuge in Pydna, and there besieged her throughout the winter. In the spring of B.C. 316 she was at length compelled to surrender, and was immediately after put to death. Olympias was a woman of fierce and ungovernable passions, jealous, ambitious, and cruel, but having withal something of the spirit and impetuosity of her son Alexander.

OLYMPIC GAMES. The most famous of the four great national festivals of the Greeks. They were celebrated in the sanctuary of Zeus at Olympia (q.v.) every four years, but, owing to the fluctuations of the Greek lunar calendar, the time varied from the beginning of August to the middle of September. At first the contests only occupied a single day, but in later times five or six days were needed to complete the sports. The origin of the games was lost in antiquity, and legend attributed the foundation to Hercules, Pelops, who was worshiped with special honor as a hero at Olympia, and other mythical characters. They were said to have fallen into neglect until King Iphitus of Elis and Lycurgus of Sparta established the 'truce of God' at the celebration of the games and restored them to honor. It was not till much later, however, that the official list of victors began with Corœbus, who won the foot-race in B.C. 776. The authority of the list, however, is small for any period before the fifth century, as it does not seem to have been compiled before that time, and there are many indications that it was not based on ancient records. According to the accepted belief, the earliest and for long the only contest was the *stadion* or short foot-race. In Olympiad 14 (B.C. 724) the *diaulos*, or race of two *stadia*, was introduced, and at the next celebration the *dolichos*, or long run. In the same year the contestants abandoned the loin cloth and appeared naked, a custom which prevailed ever after. In B.C. 708 the *pentathlon* and wrestling were introduced, in B.C. 688 boxing, and in B.C. 680 the race for four-horse chariots, to which were added in B.C. 648 the race for ridden horses, and the *pancratium*, a combination of boxing and wrestling. In B.C. 632 contests for boys were established, which from B.C. 616 consisted of running, wrestling, and boxing. In B.C. 520 the foot-race for men in armor was added, and in the fourth and third centuries other novelties, especially in horse-racing, were from time to time attempted. From B.C. 396 there was a contest of trumpeters and heralds, and the successful competitor in the latter was allowed to show his skill in announcing the victors in the other contests. During the greater part of their existence the games were in charge of the Eleans, though the city of Pisa, in whose ancient territory Olympia was situated, frequently disputed this right, until early in the sixth century Pisa was destroyed by Elis and Sparta. The chief officials were the *Hellenodikai*, whose number varied from one or two to twelve, though the usual number seems to have been ten. Early in the year of the games envoys from Elis were sent throughout the Greek world to invite the States to join in honor to Olympian Zeus, but at first the games seem to have had merely a local character, though they soon became a national festival. To them the States sent *Theoriæ*, sacred embassies, to bring their offerings and vie with one another in the splendor of their equipment and entertainment. The crowd of spectators included representatives of all branches of the Greek race, and many barbarians were drawn by the reputation of the spectacle. Merchants and traders were there in abundance, while poets, orators, and artists exhibited their powers to a gathering which could easily secure a world-wide fame to a successful display.

The competitions were open only to those of Greek descent, and free from taint of impiety, blood-guiltiness, or grave breach of the laws. All contestants were required to train faithfully for ten months before the games, while the last thirty days must be spent at Elis under the eyes of the officials, though it is possible that this was only required of novices. Just before the games the list of entries was prepared, and from that time withdrawal was punished with heavy fines. The order of the events is uncertain, and possibly varied at different times, but the first athletic contest was almost certainly the *stadion*, and the name of this victor served to designate the Olympiad. The first day of the festival was given to sacrifices, especially to Zeus, while the officials and contestants took a solemn oath, the former to judge fairly, the latter that they had observed the prescribed training and would compete with fairness. The second day probably began with the foot-races, and for these the crowd gathered in the Stadion, an oblong plain inclosed by sloping banks of earth. The course was marked at both ends by a marble sill, about 80 feet long and 18 inches wide, in which were two grooves to give a foothold in starting. The finish was always at one end, but the starting point varied for the single and double courses. The length of the course was 600 Olympic feet of 0.32045 meter, or about 630 English feet. In the long run the double course seems to have been covered twelve times. Another group of contests was formed by wrestling, boxing, and the pancratium. In the first, the object was to throw the antagonist three times, but the struggle was not continued on the ground. Boxing became more and more brutal, for while at first the pugilists wound straps of soft leather over the fingers as a shield and to deaden the blows, in later times hard leather, sometimes even weighted with metal, was used. Still the highest praise was won by athletes who owed their success to such perfect defense that they exhausted their opponents without striking a blow or receiving a scratch. In the pancratium, the most severe of the sports, both wrestling and boxing were employed, and the contest continued until one of the contestants acknowledged his defeat. For these contests the competitors were paired by lot, and it was regarded especially creditable to pass through the successive rounds without the rest afforded by drawing a bye, which might occur whenever the number of contestants was uneven. The horse-races were run in the Hippodrome (q.v.), of which no traces have been discovered, but which is said to have had a length of four stadia. As this would mean that a complete circuit was nearly a mile, and as we are told that the four-horse chariots made twelve circuits, it follows that the race must have been far more a test of endurance than of speed, or else, which is more probable, that these figures have suffered in transmission. This sport was naturally confined to the wealthy, but was very popular, and the successful owner received high honor in his State, while princes commemorated their victories on their coins. After the horse-racing came the *pentathlon*, or five-fold competition in running, jumping, throwing the javelin and the discus, and wrestling. The exact order of the competition and the method of determining the winner are unknown, but it is clear that it was necessary to show decided all-round ability. The running was the short race, or Stadion, and the jumping was for distance, not height, but was probably analogous to the modern hop, step, and jump, for the ground was softened to a distance of 50 feet, and we hear of two men who cleared 52 and 55 feet, respectively. The javelin was a light spear, and was thrown with the aid of a strap which was wrapped about the shaft, by which a rotary motion and greater distance and accuracy was secured. The discus was a plate of bronze, probably lens-shaped, and much heavier than the one now in use in athletic games (4½ pounds), as the best throw recorded is 95 Olympic feet. The last event of the games seems to have been the race in armor, twice the length of the Stadion. At first the runners wore the full armor of a hoplite, but later they carried only the shield. On the last day of the festival the victors received in front of the temple the crowns of wild olive from the sacred tree, which were the only prize, and afterwards were banqueted by the State of Elis at the Prytaneion. The victor returned home in triumph to enter the city in a chariot, often through a breach in the walls, with songs and processions. His praises were sung by poets, and in many cities he lived thereafter at public expense.

The games were at their height during the fifth and fourth centuries, when the contestants were of the best blood in Greece. Gradually, however, a change took place, as the training became more and more a profession, and in Roman times, although the crowds and the splendor continued, the competitors were nearly all the professional athletes against whose mode of life physicians and moralists alike directed their censure. Yet the games continued until A.D. 394, when they were finally suppressed by the Emperor Theodosius, supposedly on the ground that they were opposed to the interests of Christianity.

MODERN OLYMPIC GAMES. Largely owing to the efforts of the Baron Pierre de Coubertin, a number of individuals banded themselves together and organized an International Athletic Committee, which held its first meeting in Paris in 1895. The object of the committee was to reëstablish the Olympian games by organizing a series of athletic contests to be held once in every four years, and to take place at such time and in such country as the International Committee might decide. The first games in the modern series were held at Athens in 1896, the ancient Stadium, which had been specially prepared for the purpose, serving as the theatre. The patriotic munificence of a wealthy Greek of Alexandria (George Abéroff), together with the efforts of the Greek national committee, under the Crown Prince Constantine, alone made this possible. The different competitions were for the most part open to the world. The second and more important festival was held at Paris in 1900, the games being divided into ten sections, as follows: Athletic sports and games; gymnastics; fencing; shooting; equestrian sports; cycling sports; motor car racing; aquatic sports; firemen's drill; and ballooning. A conspicuous feature was the large number of American entries, to secure which the authorities had purposely delayed the date of the games. It was announced that the 1904 games would be held in the United States. Consult: Krause, *Olympia, oder Darstellung der olympischen Spiele* (Vienna, 1838), which is still of value; Bötticher, *Olympia; Das Fest und seine Stätte* (2d ed., Berlin, 1886); Mommsen, *Ueber die Zeit der Olympien* (Leipzig, 1891); Stengel "Die griechischen Kultusaltertümer," in Müller's *Handbuch der klassischen Altertumswissenschaft* (Munich, 1898); Gardner, *New Chapters in Greek History* (London, 1892).

OLYM'PIODO'RUS (Lat., from Gk. Ὀλυμπιόδωρος, *Olympiodōros*). (1) An historian of the fifth century A.D., born at Thebes in Egypt, who continued the work of Eunapius. In his history (Ἱστορικοὶ λόγοι), in twenty-two books, he covered the period A.D. 407-425. Only a fragment has been preserved to us by Photius.

(2) An Alexandrian philosopher of the fifth century A.D., famous for his knowledge of Aristotelianism and as the master of Proclus.

(3) One of the latest of the Alexandrian Neo-Platonists who lived in the sixth century A.D., during the reign of the Emperor Justinian. Of the details of his life we know nothing. Of his writings we possess a life of Plato with commentaries on several of the Platonic dialogues. In these he shows himself to have been a man of large learning and of acute thought. His *Life of Plato* is best edited by Westermann

(Berlin, 1850). The scholia are edited by Fincke (Heilbronn, 1847).

(4) An Alexandrian Peripatetic who flourished in the latter half of the sixth century A.D. His commentary on Aristotle's *Meteorology* is still extant, edited by Stüve (Berlin, 1900).

OLYM'PUS (Lat., from Gk. Ὄλυμπος, *Olympos*). The ancient name of several mountains or chains of mountains—e.g. one in Northeastern Mysia, two peaks in the island of Cyprus, others in Lycia, Lydia, Cilicia, Lesbos, Elis, another in Laconia, commonly called Lycaon, and, most famous of all, one on the boundary between Thessaly and Macedonia. The last is the highest peak (9754 feet) and greatest mountain mass in Greece, and early appears as the seat of the gods. The mountain is precipitous and rugged, especially toward the sea, but on the lower slopes is well wooded, though the upper part is bare rock, which is snow-covered during a large part of the year. Even in the Homeric poems is found a transference of the Olympus of the gods from the actual summit of the Thessalian mountain to a heavenly region free from snow and storm, and filled with dazzling light. It lies above the heaven, though in later usage it seems often indistinguishable from it. This begins in Æschylus and Pindar, and characterizes the later poets, except when they are copying Homer. Traces of the old belief are still found among the peasants who live at Olympus, and who tell of strange palaces on the mountain, or magic virtues in its air. Consult Henzey, *Le Mont Olympe et l'Acarnanie* (Paris, 1860).

OLYNTHIAC ORATIONS. Three speeches of Demosthenes in warm support of the citizens of Olynthus who besought Athens for aid when Philip laid siege to the city. The orations were delivered in Athens in B.C. 349.

OLYN'THUS (Lat., from Gk. Ολυνθος, *Olynthos*). A Greek city in Chalcidice (q.v.), at the northern end of the Toronaic Gulf. It was one of the numerous colonies sent out there by the Chalcidians and Eretrians of Eubœa. In the autumn of B.C. 480 it was sacked by Artabazus, the Persian general who had accompanied Xerxes in his retreat. Reëstablished by Chalcidians of Torone, it first became prominent as the head of the Chalcidians in their revolt from Athens (B.C. 432). The inhabitants of neighboring villages gathered within its walls, and when Brasidas appeared the town supported him heartily. During the Peloponnesian War and the early part of the fourth century the region was little disturbed, and Olynthus became the head of a confederacy, which can almost be called a federal State. Treaties and wars with the Macedonians resulted in such an increase of power that Apollonia and Acanthus, which the Olynthians wished to force into the league, and Amyntas of Macedon appealed to Sparta for support. A powerful Spartan force invaded the Chalcidian Peninsula, and after some reverses the city was forced to surrender (379), and the confederacy was broken up. Olynthus still remained powerful, but the chief check to the growth of Macedon was removed. Philip, son of Amyntas, at first won the friendship of Olynthus by the gift of Potidæa, which he had taken from Athens, but later hostility arose, and the Olynthians sought an alliance with Athens. Though Demosthenes in his three famous Olynthiacs urged prompt and energetic action, the Athenian succors were inadequate and tardy. In 348 Philip, aided by traitors within, seized the city, leveled it to the ground, and sold the inhabitants into slavery.

OLYPHANT, ŏl'ĭ-f*a*nt. A borough in Lackawanna County, Pa., five miles northeast of Scranton; on the Lackawanna River, and on the Delaware and Hudson and the New York, Ontario and Western railroads (Map: Pennsylvania, F 2). It is engaged extensively in mining and shipping coal, being in the heart of the anthracite region of the State, and in manufacturing blasting powder. Settled in 1857 and incorporated twenty years later, Olyphant is governed by a burgess, elected every three years, and a borough council. The electric light plant is owned by the municipality. Population, in 1890, 4083; in 1900, 6180.

OM, ōm. A Sanskrit sacred syllable, to which especial sanctity and mystic significance is attached. It seems originally to have been an exclamation, an emphatic assent, or solemn affirmation, and instances of its use in that way may be cited early in connection with Vedic literature. Perhaps it was primarily nothing more than an emphatic *o* with gradual lip-closure ending in a nasal murmur. According to Manu, the syllable must be uttered at the beginning of every Vedic recitation and pronounced again at its close; otherwise the sacred knowledge and its merit will slip away, be lost, or prove of no avail. Indian tradition plainly looks upon the word *ōm* as a composite of three elements (*a-u-m*), and as containing the very essence of the three canonical Vedas, and especially in later times *ōm* was regarded as the equivalent or mystic designation of the Hindu Trinity, symbolizing in a word the union of the three great divinities, Vishnu, Siva, and Brahma. See also OM MANI PADME HUM.

OMAGH, ō-mä′ (Ir. *Oigh magh*, Seat of the chiefs). The capital of Tyrone County, Ireland, on the Strule, 34 miles south of Londonderry (Map: Ireland, D 2). Its public buildings include a handsome court house, where the county assizes are held, endowed and national schools, a district lunatic asylum, a workhouse, and a barrack station. Its trade is chiefly in brown linens, corn, and agricultural produce. Omagh grew up around an abbey founded in the year 792, but is first heard of as a fortress of Art O'Nial at the end of the fifteenth century, about which time it was forced to surrender to the English. Population, in 1901, 4789.

OMAGUA, ô-mä′gwȧ, or CAMBEVA. A famous and powerful tribe of Tupian stock (q.v.), formerly centring chiefly about the Marañon (Amazon) from the Javary to the Ica, on the Peru-Brazil frontier, but now mostly retired to the headwaters of the Yapura and Uaupes, Southeastern Colombia. Both names signify 'Flatheads,' in allusion to a custom practiced in the tribe. At the time of the Spanish conquest the Omagua were reputed to be the richest and most civilized tribe east of the Cordilleras, with cities, temples, and stores of golden treasure. Three successive attempts were made to conquer their country in 1536, 1541, and 1560, but in each case the invaders were driven back with loss. In 1645 the Jesuit missionary Cujia entered their territory, and after several years of hard work succeeded in gathering them into villages along the Amazon. Forty years later these mission villages numbered forty, all in flourishing condition, and continued to prosper in spite of attacks by Portuguese slave-hunters, until the expulsion of the Jesuits from the Spanish colonies in 1767. The mission settlements were gradually broken up, and the Indians retired to the forests and relapsed into their original condition.

They still maintain their reputation as a superior tribe, being of fine physique and light complexion, intelligent, industrious, honest, kindly, and cleanly in house and person. They bury their dead in large earthen jars beneath the floors of their huts, the relatives wailing constantly for a month after the funeral. Young men are subjected to a whipping ordeal to try their fortitude, while girls are hung up in a net over a smoldering fire. They have long since abandoned the practice of head-flattening. Our knowledge of caoutchouc or india-rubber was derived first from this tribe.

OMAHA, ŏ'mȧ-hạ. An important Siouan tribe, formerly claiming an extensive territory on the west side of the Missouri, between the Platte and Niobrara, within the present limits of Nebraska, and now gathered, together with the Winnebago, upon a reservation in the northeastern part of that State. The name signifies 'upper-stream' people, in distinction from the Quapaw, or 'down-stream' people. They speak a dialect of the same language used also by the Ponca, Quapaw, Kaw, and Osage, from whom, according to their tradition, they separated at no very distant period. They made a treaty of peace and alliance with the Pawnee in 1800, but were constantly at war with the Sioux, from whom they repeatedly suffered until the United States Government interfered and put a stop to hostilities. In spite of war and smallpox, they have held their own in population, and number now about 1200, being slightly on the increase, while the Winnebago, on the contrary, are decreasing. Their agent reports them as prosperous and steadily improving in industry and civilized habit. The majority still occupy the circular long house, covered with earth, formerly common to the semi-sedentary tribes of the Upper Missouri region.

OMAHA. The largest city of Nebraska and the county-seat of Douglas County, 492 miles west by south of Chicago, Ill.; on the Missouri River, opposite Council Bluffs, Iowa, and on the Burlington Route, the Chicago, Milwaukee and Saint Paul, the Chicago, Rock Island and Pacific, the Chicago, Saint Paul, Minneapolis and Omaha, the Fremont, Elkhorn and Missouri Valley, the Chicago and Northwestern, the Illinois Central, the Missouri Pacific, and the Union Pacific railroads (Map: Nebraska, J 2). The great bridges across the Missouri are among the sights of the city. These unite it, through Council Bluffs on the east side, with a great radiating system of railways to all points eastward. A belt line encircles the city, affording railway intercommunication.

Omaha is finely situated on a plateau, rising into bluffs which are largely used for residence sites, the business district lying adjacent to the river. From its important position, with reference to the West, it has been called the 'Gate City.' It occupies an area of 24½ square miles at an elevation of about 1030 feet above sea level, and 80 feet above the river, and has broad streets, of which 85 miles are paved. The public park system, nearly 600 acres in extent, includes the more notable Hanscom, Riverview, Bemis, Miller, and Elmwood parks, and Jefferson Square. Omaha is the seat of Creighton University (Roman Catholic), founded in 1879, a Presbyterian Theological Seminary, Creighton Medical College, Omaha Medical College, Nebraska College of Pharmacy, Brownell Hall, Academy of the Sacred Heart, and Saint Catherine's Academy, and has several libraries. The Public Library contains more than 55,000 volumes, and is located in one of the prominent buildings of the city. Other architectural features are the city hall, county court house, United States Government Building, high school, New York Life Insurance Building, office of the *Omaha Bee*, Paxton Block, the Exposition Building, the Coliseum (a large convention hall), and Protestant Episcopal and Roman Catholic cathedrals. The State School for the Deaf is in the city, and there are also several well-equipped hospitals, among which particular mention may be made of Saint Joseph's, Presbyterian, Methodist, and Immanuel (Swedish) hospitals. Omaha is the seat of the United States military headquarters of the Department of the Platte. The city has extensive shops of the Union Pacific Railroad, and one of the most complete establishments in the country for smelting and refining the ores of gold, silver, copper, lead, and zinc which come from the mining regions along the line of the Union Pacific and other railways. The meat-packing industry, represented by five separate plants located in South Omaha (q.v.), has assumed an extent excelled only by Chicago and Kansas City. Other manufactures include linseed oil, white lead, carriages, malt and distilled liquors, boilers and steam-engines, and bricks. The trade in live stock, grain, lumber, dry goods, and groceries is enormous, due to the city's excellent facilities for transportation.

The government is vested in a mayor, chosen every three years; a unicameral council; and in subordinate administrative officials, appointed by the executive with the consent of the council. The board of education, composed of 15 members, is independently elected by popular vote. Omaha spends annually, in maintenance and operation, nearly $1,500,000, the principal items being about $375,000 for schools, $295,000 for interest on debt, $120,000 for the fire department, $80,000 for the police department, and $80,000 for municipal lighting. The city carries (1901) a bonded debt of over $5,600,000. Population, in 1860, 1883; in 1870, 16,083; in 1880, 30,518; in 1890, 140,452; in 1900, 102,555, including 23,600 persons of foreign birth and 3400 of negro descent.

In 1804 Lewis and Clark held a council with the Indians on or near the present site of Omaha, and in 1825 J. B. Royce, a fur-trader, built here a stockade and trading station, which, however, soon fell into decay. The first permanent settlement was made in 1854, and from that date to 1867 Omaha (so called from the Omaha Indians, a tribe of the Dakotas) was the capital of Nebraska. It was incorporated as a city in 1857. The growth of Omaha was greatly accelerated by the construction of the Union

Pacific Railroad, work on which was begun here in 1864. Previous to its completion Omaha was the most northerly outfitting place for overland wagon trains to the 'far West.' From June 1 to November 1, 1898, the great Trans-Mississippi and International Exposition was held here. Consult: Savage and Bell, *History of the City of Omaha* (New York, 1894); Sorensen, *Early History of Omaha* (Omaha, 1876); Powell, *Historic Towns of the Western States* (New York, 1901).

O'MAHONY, ô-mä′ô-nê, JOHN FRANCIS (1816-77). An Irish politician, born at Kilbeheny, County Limerick. He received a good education at a classical school in Cork and at Trinity College, Dublin, though he never took a degree. Early in his career he became deeply impressed with a sense of the wrongs of Ireland, and practically his whole life was devoted to efforts to free her. He was a 'repealer,' but was more radical than O'Connell, and in 1845 seceded with the 'Young Irelanders.' He joined in the insurrection of Smith O'Brien in 1848, and after its failure fled to France, where he lived for some years in great poverty. In 1852 he went to New York, and there in 1858 was a member of the committee that sent a delegate to James Stephens in Dublin with proposals for the founding of the secret society later known as the Fenian Brotherhood. O'Mahony was one of the most active and influential promoters of the organization, and was for a time its president. In his later years he had a hard struggle to secure the bare means for subsistence. He died in New York in 1877, and his body was taken back to Ireland and buried in Glasnevin Cemetery, near Dublin, with great honors. In 1857 he published *The History of Ireland by Geoffrey Keating, D.D., Translated from the Gaelic and Copiously Annotated.* Consult Webb, *Irish Biography* (Dublin, 1888), and articles in the *Celtic Magazine* (New York).

OMALIUS D'HALLOY, ō′må′lê-ụs′ då′lwä′, JEAN BAPTISTE JULIEN, Baron d' (1783-1875). A Belgian administrator and geologist, born at Liège. He was appointed successively sub-intendant of the Arrondissement of Dinant (1814), general secretary of the Province of Liège (1815), and Governor of the Province of Namur (1815), and in 1848 was elected to the Senate. Geology was his avocation, and in recognition of his scientific work he was elected in 1816 a member of the Academy of Brussels, and in 1842 a corresponding member of the Academy of Sciences at Paris. In addition to many contributions to the bulletins of the Academy of Brussels and to technical journals, he published a *Description géologique des Pays-Bas* (1828); *Eléments de géologie* (1831; 3d ed. 1839); *Introduction à la géologie* (1833); *Coup d'œil sur la géologie de la Belgique* (1842); and other volumes.

O'MAL′LEY, CHARLES. The hero of Charles Lever's novel of the same name. The original of the character was an officer in an Irish regiment, Francis G. Keogh, who came to America after the appearance of the book, and is buried in Toronto, Canada.

O'MALLEY, GRACE. An Irish chieftainess. See GRAINNE NI-MHAILLE.

O'MALLEY, THADEUS (1796-1877). An Irish Roman Catholic priest and political writer, born at Garryowen, near Limerick. After his ordination in 1819 he went to America. In 1827 he was suspended on account of his ecclesiastical views, and returned to Dublin to be assistant priest of the cathedral. The first object of his pamphleteering was to obtain a poor law for Ireland, the second to improve the national school system, of which he published his opinion in *A Sketch of the State of Popular Education in Holland, Prussia, Belgium, and France* (2d ed. 1840). Founder of the *Social Economist* (1845), he used a later newspaper which he started, called the *Federalist*, for the advocacy of his views, which differed from O'Connell's in their disapproval of complete severance from England and belief that recourse to arms was necessary to accomplish the ideal federal union. O'Malley tried unsuccessfully to unite O'Connell's Old Ireland Party with his own Young Irelanders, and after 1870 he was a conspicuous home rule advocate, but, though orthodox in faith, was frequently rebuked by his superiors in the Church for the freedom with which he criticised their discipline in such works as his *Harmony in Religion* (1870). His last book was *Home Rule on the Basis of Federation* (1873).

OMAN, ō-män′. An independent sultanate occupying the southbeastern end of the peninsula of Arabia. It reaches along the Persian Gulf, the Gulf of Oman, and the Arabian Sea from El Hasa to the Hadramaut region (Map: Asia, E 6). The area is about 80,000 square miles. The boundaries in the interior are very indefinite, the authority of the ruler of Oman being recognized only over a small portion of the territory nominally embraced in the sultanate. The region along the coast is very mountainous, rising in its highest peaks probably to about 10,000 feet. Behind the mountain chains the country gradually passes into the great desert of Arabia. The most favorable part of the country is in the central valleys, which are characterized by a temperate climate and rich vegetation. The chief products are dates, which constitute the main article of export, and other fruits. Pearls and mother-of-pearl and fish are also of some commercial importance. The chief port is Muscat (q.v.). The exports and imports of Oman amounted in 1900-01 to $1,359,893 and $3,365,883, respectively. The imports consist of rice, cotton goods, coffee, sugar, silk, arms, ammunition, etc.

The population is estimated at 1,500,000, and consists of several tribes of Arab origin, partly nomadic. The negro element is very numerous. At present Oman is practically under the protection of Great Britain. A British resident is stationed at Muscat, the capital.

HISTORY. Muscat was taken by the Portuguese in 1508 and remained in their hands until the middle of the seventeenth century, when the Arabs of the interior secured possession of it. The imams or sultans of Muscat afterwards made extensive conquests in Eastern Africa, including Zanzibar, Mombasa, and Quiloa. Oman was at the climax of its power and commercial prosperity in the first half of the nineteenth century, when the authority of the imams or sultans of Muscat extended over the Persian territories of Laristan and Mogistan, the islands of Kishm, Bahrein, and Ormuz, the important town of Bender Abbas, part of the coast of Baluchistan, and a long strip of African coastland, including Zanzibar, Mombasa, and Quiloa, together with the island of Socotra. The present ruling family originated in Yemen and was first established in the imamate in the person of Ahmed ibn Said in 1741. The rise of the Wahabi power in Nedjed (see Arabia) resulted in considerable loss of territory. In 1856, on the death of Sultan Said, his possessions were divided between his two sons, one receiving the African territories and the other Muscat with the Persian possessions. These last were lost in 1875. Sultan Thuwany, who succeeded in Muscat, was assassinated in 1866 by his son Selim, who reigned but a short time, and was driven out by his uncle, Seyyid Turki ibn Said. In 1888 the latter was succeeded by his son, Seyyid Feisal ibn Turki. The relations of Oman with Great Britain have been most friendly. The power of the Sultan is exercised very little beyond the capital, Muscat, the name of which is therefore probably better known in popular usage than that of the whole State. Consult Sahib-ibn-Razik, History of the *Imams and Seyids of Oman*, from the Arabic by Badger (London, 1781).

O′MAN, Charles William Chadwick (1860—). A British historian, born at Mozufferpore, India. He was educated at Winchester and at New College, Oxford, in 1883 became a fellow of All Souls' College, Oxford, and in 1900 deputy professor of modern history in the university. Among his published works are: *A History of Greece* (1888); *A Short History of the Byzantine Empire* (1892); *A History of Europe 476-918* (1893), in the "Periods of European History Series"; *A Short History of England* (1895); *A History of the Art of War in the Middle Ages* (1898); and *Seven Roman Statesmen* (1902).

O′MAR (Ar. *'Umar ibn al-Khaṭṭāb*). The second Mohammedan Caliph. He was born about 581. Before the year 617 he opposed the Prophet, but in that year he was won over to the new faith and became one of its ablest supporters. He was associated with Abu-bekr as one of his principal advisers, and on the death of Abu-bekr in 634 succeeded as Caliph, and pushed on the wars of conquest which had been undertaken by his advice, with increased vigor. The beginning of his reign was signalized by the victory of Cadesia (635) over the Persians. By 637 Omar had completed the conquest of Syria and Palestine. In 639 he sent Amru to invade Egypt. In 641 Alexandria fell, and the country passed from the Greeks to the Saracens. He was summoned to Jerusalem in 637 to receive the keys of that city. Barca and Tripoli were next subdued by Amru. Armenia was overrun in 641, and about the same time the victory of Nehavend brought Persia under the sway of the Arabs. In 644 Omar was assassinated in the mosque of Medina by a Persian slave from motives of revenge. He lingered five days after receiving the wound, but refused to appoint a successor, and named six commissioners who were to choose one from among themselves. He was buried in the mosque of Medina, near the Prophet and Abu-bekr, and his tomb is still visited by pilgrims. Omar may be called the organizer of the Mohammedan power, as from a mere sect he raised the followers of Islam to the rank of a conquering nation, and left to his successor an empire. He was the founder of many excellent institutions: he assigned a regular pay to his soldiers, and made some excellent regulations for the more lenient treatment of slaves. He originated the practice of dating from the era of the Hejira (q.v.). See references under Caliphs and Mohammedanism.

OMAR, Mosque of. A structure on the site of the ancient temple on Mount Moriah at Jerusalem (q.v. for illustration), said to have been built by the Caliph Omar. It is octagonal and constructed of colored marbles and tiles. It contains the 'Sacred Rock,' formerly looked upon by the Jews as the site of the intended sacrifice of Isaac and of the altar on which the sacrifices of the temple were offered. In Mohammedan belief, the rock was the scene of the Prophet's ascension to heaven and bears the imprint of his feet.

OMAR KHAYYAM, ō′mär kī-yäm′ (?-?1123). A Persian poet and astronomer. He was a native of the city of Nishapur in Khorasan. The date of his birth is not known, but it was probably before the middle of the eleventh century. His full name is given as Ghiyath ad-Din Abul-Fath Umar ibn Ibrahim-al-Khayyami. The name Khayyam, 'tent-maker,' seems to have been derived from his father's occupation.

There are a few general points known about his life. He had a good education for his time, and the excellence of his memory is proved by a report that he could recite by heart, without a mistake, a book when he had read it over seven times. His special training was acquired from an aged teacher of Nishapur, the Imam Muaffak. There is a persistent tradition that two of Omar Khayyam's fellow-students were Nizam ul-Mulk and Hassan ben Sabbah; the former of these was destined to become famous as the Grand Vizier of Alp Arslan, the latter infamous as the founder of the order of 'Assassins.' There are chronological difficulties in the way of making these three persons contemporaries in their youth, and this has led generally to a rejection of the story. The tale runs thus: The three collegians entered into a compact that whichever should first attain to fortune should aid the other two likewise to success. Nizam ul-Mulk's talents and skill elevated him to the position of Grand Vizier to Alp Arslan. Not forgetful of the pledge, he raised Hassan to a position at Court which the latter soon abused. On Omar Khayyam, apparently by Omar's own preference, Nizam ul-Mulk arranged to bestow an annual stipend of 1200 *mithkals*, or about $3000 a year, to enable him to follow his chosen pursuits. On the death of Alp Arslan and the accession of Jalal ad-Din Malik Shah, Omar Khayyam repaired from Nishapur to the new Sultan's capital, which was then at Merv, and received the appointment of Astronomer-Royal to the Court. He was engaged with seven other scientists to reform the calendar, which resulted in the adoption of a new era, the Jalalian, or in Persian *Tarikh-i-Jalāl*, or *Malik-Shāhī*. This mode of reckoning dated from March 15, 1079 (tenth Ramazan, A.H. 471). His work on this commission was doubtless in large part only through collaboration, but the results of it are embodied in a series of astronomical tables known as *Ziji-i Malik-Shāhī*. Besides this work three other mathematical contributions bear Omar Khayyam's name: an unedited monograph on extracting the square and cube roots, and another on 'Some Difficulties of Euclid's Definitions,' while his Algebra, translated by Wœpke in 1851, was important in the history of mathematics. It was as an algebraist that Omar made his most noteworthy contribution to science. In this respect, he stands out as the most notable mathematician of his time. He was the first to attempt a systematic classification of types of equations of the first three degrees, and to consider cubics from the standpoint of the general equation, rather than as means for solving specific geometric problems. While he could solve certain cubics, he was not able to find a general solution. Biquadratics he asserted to be insoluble by geometry, the method always thought necessary for the cubic until after his time. He also knew the rule for expanding a binomial for positive integral powers, a rule afterwards perfected by Newton as the binomial theorem (q.v.).

In still other scientific lines Omar Khayyam's intellectual activity found expression; he composed three different books on subjects of natural science, and three likewise on metaphysics. But it is on his verses as the author of the *Rubā'iyāt*, or quatrains, that his name will live.

The first Occidental mention of the *Rubā'iyāt*, or renowned collection of quatrains, is found in Hyde, *Historia Religionis Veterum Persarum*, pp. 498-500 (Oxford, 1700); but neither this allusion nor notices by Sir Gore Ouseley and others attracted any special attention. It remained for Edward FitzGerald (q.v.) to introduce Omar to the West through a version of a hundred of the quatrains. The version is indeed a paraphrase, yet often very close, and it has caught almost exactly the spirit of the original. FitzGerald boldly ventured to rearrange the hundred stanzas that he chose so as to give in a sort of sequence the development of the poet's changing moods. There is no standard manuscript to serve as a norm, and in the manuscript the quatrains are simply arranged in the alphabetic order of the final letter of the rhyme without reference to content. It is not even actually known how many of the quatrains are really Omar's. Over five hundred of these four-line stanzas are found, in different works and manuscripts, ascribed to him. Their tone is varied. In some the note is that of revolt against the Divine Master, whose power the slave must nevertheless acknowledge. A number of the quatrains revile the Sufis, yet after all Omar had been trained under Sufi influence, and so may not be wholly free from the mystic tinge. A strain of pantheism runs through many quatrains; while the song of the nightingale, its devotion to the pallid rose whose cheek the springtime causes to blush; the pleasures of love; and the joy of the fleeting hour darkened by the knowledge of inevitable death, give a tenderness to others that is truly poetic. The tone of much of Omar's verse was justly regarded as heretical by orthodox Mohammedan Persia; it is often debatable in the West whether the wine and the wine cup be symbolic or Anacreontic. Perhaps the latter is nearer the truth, although some allowance will be made by those who are acquainted with the mystic poetry of Hafiz, Jami, Nizami, or Jalal ad-Din Rumi.

The date of Omar Khayyam's death is not certain. The year is given as A.D. 1111 (A.H. 505) or as A.D. 1123 (A.H. 517); the latter, however, is much more probable. The story goes that he had prophesied that his grave would be at a place where a fruit tree should shower blossoms upon it; and this has been fulfilled, for his tomb at Nishapur is in the midst of a garden of roses, sheltered by fruit trees and bays.

BIBLIOGRAPHY. The Algebra of Omar Khayyam was edited and translated by Wœpke, *L'algèbre d'Omar Alkhayyâmî* (Paris, 1851). An almost complete bibliography of manuscripts, editions, translations, and imitations of the Quatrains is given by Dole, *Rubaiyat of Omar Khayyam* (Boston, 1896). FitzGerald's rendering into English verse has been constantly reproduced since the first edition at London in 1859. More important from a scholarly point of view are the edition of five hundred quatrains with a metrical text translation, by Whinfield (2d ed., London, 1893), and the elaborate translation, keeping the metrical tricks of the original, by Payne, *The Quatrains of Omar Khayyam, Now First Completely Done into English Verse from the Persian, with a Biographical and Critical Introduction* (ib., 1898); and Heron-Allen, *The Rubaiyat of Omar Khayyam: A Facsimile of the Manuscript in the Bodleian Library, Translated and Edited* (Boston, 1898). The convenient reissue of FitzGerald with a commentary by Batson, and a biographical introduction by Ross, *The Rubaiyat of Omar Khayyam* (New York, 1900), is also of considerable interest. The mysticism of Omar's poetry is ably treated by Bjerregaard, *Sufi Interpretations of the Quatrains of Omar Khayyam and FitzGerald* (ib., 1902).

OMAR PASHA, ō'mär pȧ-shä'. A Turkish general. See OMER PASHA.

OMBAY, ôm-bī'. One of the smaller of the Sunda Islands, situated near the eastern end of the group, 40 miles north of Timor and 260 miles southeast of Celebes (Map: Australasia, E 3). Area, 892 square miles. It is mountainous and volcanic, and inhabited almost exclusively by savage tribes of a mixed Malay and Papuan race. At Allor, on the northwest coast, is a Dutch settlement with some trade in wax, pepper, and edible birds' nests.

OM'BOS (Gk. *Ὄμβοι, Omboi*). An ancient Egyptian town on the eastern bank of the Nile in latitude 24° 28′ N., about ten miles south of the Jebel Silsilch. The site, which has long been uninhabited, bears the modern Arabic name of Kôm Ombô, 'the hill of Ombo.' The top of the hill forms a broad plateau upon which are the ruins of the town and of its fine temple buildings. In spite of its excellent strategic position upon an elevation commanding both the river and the route to Nubia, Ombos seems to have been a town of no special importance in the earlier period of Egyptian history. Under the Ptolemies, however, it advanced rapidly, was made the capital of the newly formed nome of Ombites, and continued to flourish down to a late period under the Roman Empire. The temple buildings, which date from the Ptolemaic period, formerly stood within an inclosure surrounded by a brick wall. Traces of this wall and a portion of the pylon forming the entrance to the inclosure yet remain. The court of the great temple, dedicated to the crocodile god Sobk and to Haroeris, was formerly colonnaded on three sides, and, at its upper end, several doors give entrance to a hypostyle hall opening by two doors into a smaller hall, from which three successive antechambers lead to the two sanctuaries. The latter are placed side by side, that of Sobk on the right and that of Haroeris on the left. Adjoining the antechambers and sanctuaries are a number of smaller chambers and corridors. A long corridor, starting from the upper end of the hypostyle hall, surrounds the inner portion of the temple, and outside of this a similar corridor runs parallel to it between the outer and the inner walls of the edifice. The reliefs adorning the walls and columns of the temple are inscribed with the names of Ptolemaic kings and Roman emperors. In front of the great temple stands the ruined birth-house built by Ptolemy Euergetes II.; to the right is a small temple dedicated to the goddess Hathor by the Emperor Domitian. Consult: *Description de l'Egypte* (Paris, 1820-30); Dümichen, *Geschichte des alten Aegyptens* (Berlin, 1878); Mariette, *Monuments of Upper Egypt* (London, 1877); De Morgan, *Kom Ombo* (Vienna, 1894).

OMDURMAN, ôm-dōōr′mȧn. The former capital of the successor of the Mahdi, situated on the left bank of the White Nile opposite Khartum (q.v.) (Map: Africa, H 3). It extends for a long distance along the river, and is believed to contain a population of 60,000. Omdurman is noted as the place where the Dervishes were overwhelmed by the Anglo-Egyptian troops under Lord Kitchener on September 2, 1898.

O'MEARA, ō-mā′rȧ, Barry Edward (1786-1836). An Irish surgeon, notable from his connection with Napoleon I., whom he accompanied to Saint Helena as household physician. At the age of eighteen he entered the British Army as assistant surgeon, afterwards transferring to the navy. He was serving with Captain Maitland in the *Bellerophon* when the Emperor Napoleon surrendered to that officer. He was introduced to Napoleon, on whom the impression he produced was favorable, leading to a proposal that he should accompany the Emperor into exile as private physician, an arrangement to which he acceded, stipulating that he should retain his rank in the navy, and be permitted to return to it at pleasure. Of his conversations with Napoleon, during a period of about three years, O'Meara took notes, which he afterwards published. Meantime he became involved, in the interest of Napoleon, in the series of squabbles which he waged with the Governor, Sir Hudson Lowe (q.v.). In 1818, after a violent altercation with Sir Hudson, O'Meara was committed to close arrest, and was authorized by the Emperor to resign his post. On his return to England he addressed a letter to the Admiralty, in which, among other things, he accused Sir Hudson Lowe of intentions against the life of his captive, and even of having, by hints, insinuated a desire for his services as secret assassin. For this he was instantly dismissed the service. After Napoleon's death O'Meara published *Napoleon in Exile* (1822) by which book alone he is now remembered.

OMENS (Lat. *omen*, OLat. *osmen*, prognostic, from *os*, mouth; connected with *auris*, Gk. *οὖς*, *ous*, Lith. *ausir*, OChurch Slav. *ucho*, Goth. *ausō*, Ger. *Ohr*, AS. *ēare*, Eng. *ear*). Events supposed to presage a future event. From prehistoric time it has been a universal belief that any important occurrence is preceded by omens, or, to use the traditional English word, by 'signs,' which will allow any observer to forecast what is to be. The notion may be regarded as an anticipation of modern science, but in the absence of adequate knowledge, attempts at prediction were of necessity fantastic, and any phenomenon was supposed to indicate good or evil, according to the effect which it produced on the imagination. Hence arose a mass of popular rules, handed down from generation to generation, and which exhibit all over the world great similarity. The signs noted in Anglo-American folk-lore are as old as any, and in part date back to a period antedating civilization. Among these omens a great number relate to the principal events of life, birth, marriage, and death. The last, especially, as the chief object of anxiety, has occupied a share of attention sufficiently proved by the bad sense attached to the terms fatal and ominous, while a multitude of occurrences, frequently of an insignificant character, are popularly held to betoken the speedy ending of life. Thus, it is said in popular lore that a death will occur if a batch of bread, in baking, cracks across the top, if the flame of a candle exhibits the excrescence called a 'winding-sheet,' if a person carries through the house a hoe or spade, or if a rose or other plant blossoms in the fall. Again, if during a funeral any one passes between the carriages, or if the procession returns by the same road as that which conducted it to the cemetery, another death will occur. In undertaking a journey, good or ill luck is conjectured from the animals encountered on the path. If a rabbit or (in other localities) a squirrel cross the track, the expedition will be fortunate if the creature pass from left to right, the reverse if from right to left; in the latter case, the misfortune can be averted by making a cross-mark with the feet. The passage of a cat, especially a black cat, is bad luck, unless the traveler immediately turns. So omens are taken from the flight of birds. If, as one leaves his house, a crow flies in front, it is said to be an evil portent, while the sight of a redbird is held to be a token of lovers' meeting. Hearing the cry of a whippoorwill when about to start on a journey indicates danger. Such beliefs are entirely in the spirit of ancient augury, according to which especial attention ought to be paid to the position and the notes of birds which may be met on the way. Other omens are taken from insects and plants. Thus, the color of the first butterfly seen in the spring is said to show the color of the first new dress, the chirping of a cricket to foretell sorrow, the advent of a bumblebee into the house to be a sign of news or company. Marks about the person of babes are supposed to be significant of character. Thus in English nursery lore, a straight line on the palm is regarded as a token of early death, while white and blue spots on the nails are taken to denote good or evil fortune. From such notions, originally of a simple nature, came to be developed an elaborate science of palmistry. When systems of rules had once been established, and connected with life, they continued with great obstinacy, so that the perception of failure in the validity of such expectations was met, not by discrediting the theory, but by increasing the complication of the maxims. A large mass of popular sayings relate to the determination of the weather, supposed to be predictable by means of signs often of a nature highly fantastic. The weather in each of the twelve days after Christmas is said to indicate that to be expected for every month in the year. Omens are derived from the actions of animals; if the winter is to be severe, they lay up additional supplies, or are more careful in constructing their habitations. The collection and classification of omens belonging to all countries has not yet proceeded far enough to determine how far they agree in different regions.

OMENTUM. See PERITONEUM.

OMER PASHA. ŏ'mẽr pȧ-shä' (1806-71). A celebrated Turkish general, born of Christian parents at Plasky, an Austrian village in the former Croatian Military Frontier. Michael Latas (this was his real name) was educated at a military school, and joined a frontier regiment, but fled in 1828 to Bosnia, turned Mohammedan, and became tutor in the household of Hussein Pasha, Governor of Widdin. In 1834 he was made writing master in a military school at Constantinople, and instructor to Abd-ul-Medjid, heir apparent to the throne. Omer was made Governor of Lebanon in 1842, and successively repressed insurrections in Albania, Kurdistan, and Bosnia. In 1853 he defeated the Russians at Oltenitza, and in 1854 at Silistria, gaining possession of Bucharest. Later he repulsed the Russians at Eupatoria, in the Crimea, and set out to relieve Kars, but failed. He became Governor of Bagdad in 1857, but was dismissed in 1859 on account of maladministration. In 1862 he repressed the insurrection in Montenegro and took Cetinje. In 1864 he was made field-marshal, and in 1867 was sent to put down the rebellion in Crete. From 1869 he was Minister of War. As a commander Omer was noted especially for his excellent strategy.

OM MANI PADME HUM, ōm mä'nê pȧd'-mê hōōm. A sacred formula in Buddhism, the so-called formula of six syllables, well known from the part which it plays in the Buddhist religion, and especially in that form of it called Lamaism. The reputed author of this formula is the Dhyana-Bodhisattva, or deified saint, Avalokiteśvara, or, as the Tibetans call him, Padmapani, the lotus-handed, or Amitabha. He is the Buddha of Eternal Light, the heavenly ruler of the Western paradise. Like Buddha, he is represented as sitting or standing within a lotus, and apparently there is an allusion to this in the sacred formula itself, *Om mani padme hum*, 'O, the Jewel in the Lotus, Amen!' The sacredness of this formula is sufficient when recited to secure exemption from the cycle of reincarnation, and final rebirth in the celestial paradise over which Amitabha rules. It would appear not to belong to the earliest stage of Buddhism, or to the oldest Buddhistic works of the north of India, or to those of Ceylon. Consult: Burnouf, *Introduction à l'histoire du Buddhisme indien* (Paris, 1844); Koeppen, *Die Religion des Buddha* (Berlin, 1857-59); Schlagintweit, *Buddhism in Thibet* (Leipzig, 1863); Waddell, *The Buddhism of Tibet, or Lamaism* (London, 1895).

OMMIADS, ŏm-mī'ădz, **OMAYYADS,** or **OMMEYADES.** A dynasty deriving its name from an ancestor, Omayya (Arabic *Umaiyah*), which succeeded to the Arabian caliphate on the death of Ali, the fourth Caliph (661), and possessed it till superseded by the Abbassides (q.v.) in 750. Moawiyah (q.v.), the founder of the dynasty, was the son of the Koreish leader Abu-Soflan, who defeated Mohammed at Bedr, and his mother was the notorious Hinda. After the death of Othman, the third Caliph (656), Moawiyah, who was his cousin, claimed the throne, and during the whole of Ali's reign ruled over the western provinces of Syria and Egypt; but it was not till the death of that Caliph, and the abdication of his son Hassan, that Moawiyah's authority as Caliph was recognized (661). He transferred the seat of the caliphate to Damascus, Kufa having been the residence of Ali, and Medina of the first three caliphs. The Arabs continued to extend their conquests during his reign; the Turks in Khorasan were subdued, Turkestan was invaded, and several important acquisitions were made in Asia Minor. The Caliph neglected no means of consolidating the Empire, and partly for this reason he made the succession hereditary, and caused his son YEZID (680-83) to be recognized as his heir. The reigns of Yezid and his successors, MOAWIYAH II. (683) and MERWAN I. (683-685), are devoid of importance, as their sway extended only over Syria and Palestine. ABD-EL MELEK (685-705), an able and warlike prince, succeeded in rendering himself undisputed ruler of the Mohammedan world (692), but the latter part of his reign was much disturbed by rebellions in the eastern provinces. He was the first Caliph who interested himself in the promotion of liberal knowledge, causing the most celebrated poetical and other works of the Persians to be translated into Arabic. Four of his sons, WALID I. (705-716), SULAIMAN (716-717), YEZID II. (720-724), and HISHAM (724-743), successively occupied the throne. Under Walid, the Ommiad caliphate reached the summit of its power and grandeur; Northern Africa (709), Spain (711-714), Turkestan (707), and Galatia (710) were conquered; while toward the close of his reign his empire was extended even to the Indus. OMAR II. (717-720), who, in the justice and mildness of his government, surpassed the whole of the race of Omayya, was appointed to succeed Sulaiman; but having excited discontent among his relatives by suppressing the formula of malediction against Ali and his descendants, which had hitherto been regularly pronounced at all public ceremonies, he was poisoned. The invasion of the country of the Franks and a siege of Constantinople in his reign marked the limits of the Ommiad power. Hisham, though, like his immediate predecessor, fond of pleasure, possessed all the qualities necessary for a sovereign. The Greeks, who still strove for the possession of Asia Minor, were repeatedly defeated; the Turks of Northern Persia and Turkestan were kept in stern subjection, and the civil affairs of the Empire carefully and strictly administered. Nevertheless the power of the dynasty now began to decline. The march of conquest in the West was arrested by Charles Martel (q.v.) at Poitiers (732), the discontented descendants of Ali raised the standard of revolt, and Ibrahim, the fourth in direct descent from Abbas, the uncle of Mohammed, invested Abu-Moslem with the arduous duty of enforcing his long-agitated claims to the throne. The reigns of WALID II. (742-743), YEZID III. (743-744), and IBRAHIM (744), though of ephemeral duration, were long enough to produce a complete disorganization of the Empire; and though Ibrahim's successor, MERWAN II. (744-750), was both an able and politic ruler, and a skillful warrior, the declining fortune of his family was beyond remedy.

Abu-Moslem, who had proclaimed the claims of the Abbassides amid the ruins of Merv in 747, took the field at the head of a small but zealous band, and carried the black flag of the Abbassides from victory to victory, till before the close of the following year the whole of Khorasan acknowledged his authority. Irak was subdued in 749; and though Ibrahim, the Abbasside claimant, was seized by Merwan, and executed in the same year, his brother, Abul-Abbas, succeeded to his claims, and the unfortunate Caliph, defeated in two engagements, fled to Egypt (750), whither he was pursued and slain. Abdallah, the uncle of the successful claimant, treacherously invited the remaining members of the House of Omayya to a conference, and ordered a general massacre of them. Two only escaped: the one to the southeast of Arabia, where he was recognized as Caliph, and where his descendants reigned till the sixteenth century; the other, Abderrahman, to Spain, where he founded the Emirate or Kingdom (afterwards Caliphate) of Cordova in 756.

OMMIADS OF SPAIN. ABDERRAHMAN I. (756-787) accepted the Spanish throne, which was offered him by the Arab chiefs of the West. In spite of numerous revolts, he strengthened and extended his power in Spain, till, with the exception of Asturias and the country north of the Ebro, his authority was everywhere acknowledged. He divided his kingdom into six provinces, whose rulers, with the *walis* of the twelve principal towns, formed a sort of national diet. His successors, HISHAM I. (787-796) and AL-HAKEM I. (796-821), were troubled with internal revolts, under cover of which the Christians established in the northwest what was known as the 'Spanish March.' ABDERRAHMAN II. (821-852) reëstablished internal quiet, and occupied his subjects with incessant wars against the Christians. These conflicts developed among the Arabs that chivalrous heroism which is found nowhere else in the Mohammedan world. Abderrahman II., himself a man of learning, greatly encouraged the arts and sciences, and diffused information among his people; he also attempted, by regulating the laws of succession to property, to constitute his kingdom on a basis similar to that of other European nations. During his reign Mohammedan Spain was the best governed country in Europe. His successors, MOHAMMED I. (852-880), MONAYYIR (880-882), and ABDALLAH (882-912), followed in his footsteps. ABDERRAHMAN III. (912-961), who assumed the title of Caliph, in opposition to the Abbasside caliphs of Bagdad, after suppressing some dangerous revolts which had gathered head during his minority, conquered the Kingdom of Fez from the Edrisites, and brought a long and exhausting war with the powers of Asturias and León to a victorious conclusion. This period is justly termed the golden age of the Arab domination in Spain, for at no period was their power so consolidated, and their prosperity so flourishing. (See CORDOVA.) Abderrahman III., like his predecessors, was a great patron of learning, and a poet of no mean ability. He founded schools which far surpassed those in other parts of Europe. His son, AL-HAKEM II. (961-976), was in every way worthy to be his successor. HISHAM II. (976-about 1009), a child of eight years, now occupied the throne; but fortunately his mother, Sobeiha, possessed the abilities necessary for such an emergency, and appointed as her son's vizier Mohammed ibn Abdallah, surnamed Al-Mansur, who had originally been a peasant. His administration was equally just and judicious, and his encouragement of literature, science, and art alike liberal and discriminating. But it is as a warrior that he is chiefly remembered. The lost provinces were recovered; Castile, Leon, and Barcelona were conquered; and Navarre was on the point of sharing the same fate, when a rebellion in Fez compelled him to detach a portion of his forces for service in Africa, and the combined armies of the four Christian monarchies, seizing this opportunity, inflicted upon the Arabs a sanguinary defeat in 1001. Mohammed's spirit was completely broken by this blow, and he died a few days afterwards. With him the star of the House of Omayya set forever. The rest of Hisham's reign was a scene of disorder and civil war. Pretenders to the caliphate arose, while the *walis* of the various provinces set up as independent rulers, and the invasions of the Christians added to the confusion. With the expiration of the brief reign of HISHAM III. (1027-31), the family of Omayya disappears from history. The three centuries of Ommiad rule in Spain is the period which gives lustre to the name. Consult Dozy, *Histoire des Musulmans d'Espagne* (Leyden, 1861); Viordot, *Histoire des Arabes et des Maures d'Espagne* (Paris, 1851). See references under MOORS.

OMNIBUS BILL. A term frequently applied to single legislative acts in which are incorporated a number of loosely related or wholly disconnected measures. The term probably first applied to a bill proposed in Congress in 1850 for the admission of California to the Union with a Constitution prohibiting slavery; for the organization of New Mexico and Utah without reference to slavery; for the abolition of the slave trade in the District of Columbia; for the payment of $10,000,000 to Texas for her claim to a part of New Mexico; and for the more efficient rendition of fugitive slaves. (See COMPROMISE MEASURES OF 1850.) As each of these matters was finally covered by a separate bill, it is incorrect to speak of the compromise measures of 1850 as the 'omnibus bill,' as is frequently done. A more recent instance of the kind was the Springer 'omnibus bill' of February, 1889, for the admission of Washington, Montana, and the Dakotas to the Union. Omnibus bills were formerly passed with some frequency by State Legislatures, but in recent years provisions have found their way into a number of Constitutions requiring that single statutes shall deal with but one main subject, which shall be clearly indicated in the title. This has proved fatal to the 'omnibus bill' in most cases.

O'MORE, ō-mōōr′, ROGER, or RORY (?-1652). An Irish patriot. He was the principal conspirator with Sir Phelim O'Neill in the attempted seizure of Dublin Castle in 1641, and as colonel of Ulster troops won a victory at Julianstown Meath. He fought under Owen Roe and with Antrim in 1644, but after the failure of the 1650 uprising, in which he was engaged, he disappeared and is supposed to have died miserably.

O'MORE, RORY, or RURY OGE (?-1578). An Irish patriot, second son and namesake of a captain of Leix. He entered young into the national conflict, and was pardoned in 1565-66. He was imprisoned for his share in the Kildare plots of 1574. He escaped, and was pardoned again in 1576, but the hope of help from Spain made him rebel once more. After several escapes he was caught and killed by the Fitzpatricks, and his head was set up on Dublin Castle.

OMPHALE, ŏm′fȧ-lē. The Lydian queen whom Hercules served. See HERCULES.

OM′PHALUS (Lat., from Gk. *ὀμφαλός*, *omphalos*, navel, the centre point). The name of a stone in the Temple of Apollo at Delphi, supposed to mark the centre of the earth. According to the legend Zeus loosed two eagles, one at the east and one at the west, and in their flight they met at this point. In works of art the stone is conical, and covered with a network of fillets or ribbons, while often on either side are perched the eagles. In the time of Pausanias the Omphalus stood outside the temple. The origin of the Omphalus is not clear. Conical stones were elsewhere worshiped, but there is much in the Delphic legend which suggests that the Omphalus marked a grave, and was connected with an early chthonic cult.

OMSK, ômsk. The capital of the Territory of Akmolinsk and of the Governor-Generalship of the Steppes, Russian Asia, situated at the confluence of the Om with the Irtysh, on a barren steppe, 1624 miles by rail east of Moscow (Map: Asia, G 3). Its average annual temperature is somewhat over 33°. It is poorly built. It has two gymnasia, a seminary for teachers, a technical school, and the West Siberian section of the Russian Geographical Society. Its industries are unimportant. Its commerce has somewhat developed since the construction of the Trans-Siberian Railway, Omsk having become a distributing station for Western Siberia. Population, in 1897, 37,470.

OMUL, ô-mṳl′. A small salmon (*Salmo migratorius*), which abounds in Lake Baikal and other waters of Eastern Siberia, whence great quantities are sent salted to all of the western parts of the country.

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